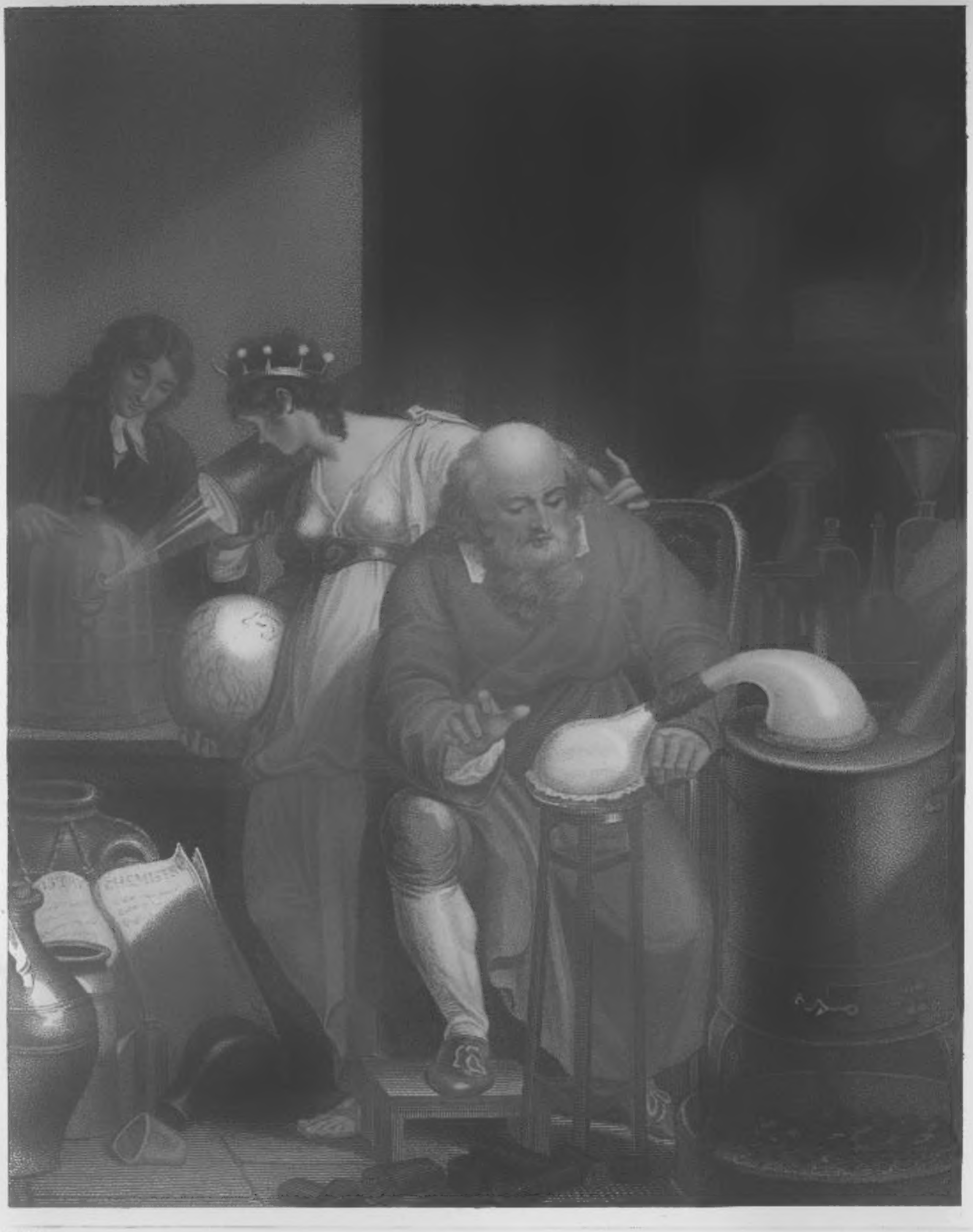

Chemistry.

ENCYCLOPÆDIA LONDINENSIS;

OR,

UNIVERSAL DICTIONARY

OF

ARTS, SCIENCES, AND LITERATURE.

COMPREHENDING,

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FORMING A COMPREHENSIVE VIEW OF THE RISE, PROGRESS, AND PRESENT STATE, OF HUMAN LEARNING IN EVERY PART OF THE WORLD.

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WITH PORTRAITS OF EMINENT AND LEARNED PERSONAGES, IN ALL AGES OF THE WORLD.

TOGETHER, WITH

A COMPREHENSIVE SYSTEM OF HERALDRY,

FINELY ILLUMINATED, AND ENRICHED WITH THE ARMORIAL BEARINGS OF THE ROYAL FAMILY; OF THE ENGLISH, SCOTCH, AND IRISH, NOBILITY; OF THE BARONETS OF THE UNITED KINGDOM; AND OF NUMEROUS DISTINGUISHED FAMILIES, PATRONS OF THIS WORK.

COMPILED, DIGESTED, AND ARRANGED,

BY JOHN WILKES, OF MILLAND HOUSE, IN THE COUNTY OF SUSSEX, ESQUIRE;

ASSISTED BY EMINENT SCHOLARS OF THE ENGLISH, SCOTCH, AND IRISH, UNIVERSITIES.

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1810.

Non audiendi sunt homines imperiti, qui humano ingenio majorem, vel inutilem, et rebus gerendis adversam πολυμαθειαν criminantur. Est scilicet quædam Scientiarum cognatio et conciliatio; unde et Εγκυκλοπαιδειαν vocant Græci; ut in una perfectus dici nequeat, qui cæteras non attigerit.—Morhofi Polyhistor, l. i. c. i. s. i.

Those inexperienced perſons, who make it a charge of accuſation againſt variety and extenſive learning, that it exceeds the compaſs of human ability, or is uſeleſs, or that it is an impediment to tranſacting buſineſs, deſerve no attention. For there is between the Sciences a degree of natural and cloſe connexion; from which the Greeks uſe the term "Encyclopædia;" so that no one can be perfect in any one Science, who has not attained to ſome knowledge of the reſt.

DESCRIPTION OF THE FRONTISPIECE ILLUSTRATING CHEMISTRY.

CHEMISTRY IS REPRESENTED BY A VENERABLE PHILOSOPHER SEATED NEAR A SAND-BATH FURNACE, IN THE ACT OF PERFORMING THE CHEMICAL ANALYSIS, SURROUNDED BY VARIOUS INSTRUMENTS. BEHIND HIM STANDS A FEMALE CLOTHED IN A SAF-FRON-COLOURED VEST, WITH A CORONET UPON HER HEAD, AND A GLOBE IN HER RIGHT HAND, ATTENTIVELY OBSERVING A YOUNG MAN WHO IS BUSILY EMPLOYED IN MELTING A DIAMOND BY THE FORCE OF A LENS ACTED UPON BY THE RAYS OF THE SUN.

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ARTS, SCIENCES, and LITERATURE.

CAU'SA MATRIMO'NII PRÆLO'CUTI, in law, a writ which lies where a woman gives land to a man in fee fimple, &c. to the intent he fhould marry her, and he refufeth to do it in any reafonable time, being thereunto required. *Reg. Orig.* 66. If a woman makes a feoffment to a ftranger, of land in fee, to the intent to infeoff her, and one who fhall be her hufband; if the marriage fhall not take effect, fhe fhall have the writ of *caufa matrimonii prælocuti* againft the ftranger, notwithftanding the deed of feoffment be abfolute. *New. Nat. Br.* 456. A woman infeoffed a man upon condition that he fhould take her to wife, and he had a wife at the time of the feoffment; and afterwards the woman, for not performing the condition, entered again into the land, and her entry was adjudged lawful, though upon a fecond feoffee. *Lib. Aff.* 40. *Ed.* III. The hufband and wife may fue the writ *caufa matrimonii prælocuti* againft another who ought to have married her: but if a man give lands to a woman to the intent to marry him, although the woman will not marry him, &c. he fhall not have his remedy by writ *caufa matrimonii prælocuti. New Nat. Br.* 455.

CAU'SABLE, *adj.* [from *caufo*, low Lat.] That which may be caufed, or effected by a caufe.—That may be miraculoufly effected in one, which is naturally *caufable* in another. *Brown.*

CAU'SAL, *adj.* [*caufalis*, low Lat.] Relating to caufes; implying or containing caufes.—*Caufal* propofitions are, where two propofitions are joined by *caufal* particles; as, houfes were not built, *that* they might be deftroyed; Rehoboam was unhappy, *becaufe* he followed evil counfel. *Watts.*

CAUSA'LITY, *adj.* [*caufalitas*, low Lat.] The agency of a caufe; the quality of caufing.—As God created all things, fo is he beyond and in them all, in his very effence, as being the foul of their *caufalities*, and the effential caufe of their exiftences. *Brown.*

CAU'SALLY, *adv.* According to the order or feries of caufes.—Thus may it be more *caufally* made out, what Hippocrates affirmeth. *Brown.*

CAU'SAM NO'BIS SIGNI'FICES, in law, a writ directed to a mayor of a town, &c. who was by the king's writ commanded to give feifin of lands to the king's grantee, on his delaying to do it, requiring him to *fhew caufe why* he fo delays the performance of his duty.

CAUSA'TION, *f.* [from *caufo*, low Lat.] The act or power of caufing.—Thus doth he fometimes delude us in the conceits of ftars and meteors, befides their allowable actions, afcribing effects thereunto of independent *caufation. Brown.*

CAU'SATIVE, *adj.* [a term in grammar.] That which expreffes a caufe or reafon.

CAU'SATOR, *f.* [from *caufo*, low Lat.] A caufer; an author of any effect.

CAUSE, *f.* [*caufa*, Lat.] That which produces or effects any thing; the efficient.—The wife and learned, amongft the very heathens themfelves, have all acknowledged fome firft *caufe*, whereupon originally the being of all things dependeth; neither have they otherwife fpoken of that *caufe*, than as an agent, which, knowing what and why it worketh, obferveth, in working, a moft exact order or law. *Hooker.*—*Caufe* is a fubftance exerting its power into act, to make one thing begin to be. *Locke.*—The reafon; motive to any thing:

> Thus, royal fir! to fee you landed here,
> Was *caufe* enough of triumph for a year. *Dryden.*

Reafon of debate; fubject of litigation.—Hear the *caufes* between your brethren, and judge righteoufly between every man and his brother, and the ftranger that is with him. *Deuteronomy.*—Side; party; ground or principle of action or oppofition:

> Ere to thy *caufe* and thee my heart inclin'd,
> Or love to party had feduc'd my mind. *Tickel.*

CAUSE, *f.* among civilians, the fame with, or rather the *caufe* of, action. See ACTION.

CAUSE, *f.* among phyficians, is applied to the caufe of a difeafe; which is defined by Galen to be, that during the prefence of which we are ill, and which being removed, the diforder immediately ceafes. The doctrine of the caufes of difeafes is called ETIOLOGY. It is often more difficult to difcover the caufes of diforders, than to prefcribe for their cure when the caufe is known; and it is by this fkill and fagacity in making fuch difcoveries, that a phyfician fhews how much he is above the ordinary practice of an apothecary. Great confufion is met with in moft writers on this fubject; and indeed it is hard to fay from whofe theory we fhall proceed to an ufeful practice. One fays that the caufes of difeafes are in the fluids; another fixes them in the folids; fome proceed from chemical, and others from mechanical, principles, &c. But when reafoning *a priori* is laid afide, when nature is ftudied, and theory is confirmed only by clinical obfervation, this fubject, fo perplexed, may gradually unfold, and a theory be formed, which, fo far as it extends, will happily convert this uncertain fcience into an art. It is fome fatisfaction to be able to account for morbid fymptoms, though the difeafes which give rife to them may be in their own nature

nature incurable; for, where we cannot relieve, we shall be at least prevented from doing harm, and also enabled to make judicious prognostics. Diseases should be distinguished by their causes, and not their effects; for this method, in many instances, Boerhaave and Van Swieten are truly admirable. It is owned that men of experience may be led from the effects of a disease to the knowledge of its cause in some cases; but then the curative indications can only be properly taken from the knowledge of the true cause.

Most diseases have four causes, viz. the *predisposing*, *primary*, *antecedent*, and *conjunct*. The three last are called *morbific causes*. The *predisposing cause*, also called *causa proegumina*, is that which renders the body more fit to receive a morbid impression, when a primary cause is applied; or disposes the body to suffer in one or other mode more readily than in any different ones. This kind of cause is a fault in the original constitution, or else it is induced in time by some accident. Of itself it neither constitutes nor produces a disorder; but, when certain morbid causes occur, it favours their effects; e. g. a long neck and flat breast dispose to a consumption; a short neck to an apoplexy; slenderness to a pain in the side; rigid fibres to inflammation and fever; lax fibres to a cachexy and dropsy, &c. Some diseases pave the way for others, as an asthma for a dropsy; colic for the palsy; small-pox and measles for an inflammation in the eyes and a consumption, &c. And a part once injured, is more subject to be affected in the same way again. The *primary cause*, called also the *active*, *efficient*, or *remote*, excites the predisposing cause to action, or these causes applied to the body that is predisposed thereto, excite diseases; and are generally an error in one or more of the non-naturals; as wounds, contusions, compressions, morbid effluvia, &c. The *antecedent cause*, called also the *mediate*, is usually in the excreta and retenta. In most complaints, the non-naturals first disorder some of the evacuations, this is the primary cause of the disease; then these evacuations affect the blood and juices, which is the second cause; the blood and juices thus affected, will not fail to disturb the action of the parts, which is the last and immediate cause of disease, and in which consists the nature of all diseases. The *immediate*, called also the *proximate*, *continent*, *hidden*, and *internal*, are those which, taken all together, immediately constitute and continue the present disease; the removal of which causes is the cure; as the air in an emphysema, and the blood in an aneurism.

A knowledge of the proximate cause enables us to judge of the nature of the complaint and its remedies, which may be learnt from, first, a fore-knowledge of the nature and powers of the remote causes; secondly, from collating the different symptoms of the disease together, and, by strict reasoning, to reduce them to one simple cause; thirdly, from the pernicious or salutary effects of the remedies applied during the disease; fourthly, by a careful inspection of dead bodies. In this last, likewise, much skill in the appearances met with in dead bodies is required, lest the effects of the causes should be mistaken for the causes themselves. The proximate cause is often difficult to be discovered, sometimes impossible; and general causes are very numerous, hence the difficulty to fix on the particular one. However, the immediate cause, wherever it can, ought to be discovered, because upon that depends the mode of cure which should be adopted, and from whence we have every right to expect success in all curable cases. Upon the whole, if we can find out the nature of the predisposing, the primary, and the proximate, cause, we shall be furnished with every material on which to found a rational practice, whether our endeavours are directed to prevent, palliate, or cure, disease. See MEDICINE.

CAUSES and EFFECTS, as appertaining to judicial proceedings, the law hath respect to the cause or beginning of a thing, as the principal part on which all other things are founded; and herein the next, and not the remote, cause, is mostly looked upon, except it be in covinous and criminal things; and therefore that which is not good at first will not be so afterwards; for such as is the cause, such is the effect. *Plowd.* 208. If an infant or femme-covert make a will, and publish it, and after die of full age, or sole, the will is of no force, by reason of the original cause of infancy and coverture. *Finch.* 12. Where the cause ceaseth, the effect or thing will cease. *Co. Lit.* 13.

To CAUSE, *v. a.* To effect as an agent; to produce.—Never was man whose apprehensions are sober, and by a pensive inspection advised, but hath found, by an irresistible necessity, one everlasting being, all for ever *causing*, and all for ever sustaining. *Raleigh.*

We derive our ideas of cause and effect from our observation of the vicissitudes of things, while we perceive some qualities or substances begin to exist, and that they receive their existence from the application and operation of other beings. That which produces, we call the cause; and that which is produced, the effect. Aristotle, and the schoolmen after him, distinguished four kinds of causes: the efficient, the material, the formal, and the final. This was only a distinction of the various meanings of an ambiguous word: for the efficient, the matter, the form, and the end, have nothing common in their nature by which they may be accounted species of the same genus; but the Greek word, which we translate *cause*, had these four different meanings in Aristotle's days; and we have since added other meanings.

With regard to the phenomena of nature, the important end of knowing their causes, besides gratifying our curiosity, is, that we may know when to expect them, or how to bring them about. This is often of real importance in life; and this purpose is served, by knowing what, in the course of nature, goes before them, and is connected with them: this, therefore, is called the *cause* of such a phenomenon. If a magnet be brought near to a mariner's compass, the needle, which was before at rest, immediately begins to move, and bends its course towards the magnet, or perhaps the contrary way. If an unlearned sailor is asked the cause of this motion of the needle, he is at no loss for an answer. He says it is the magnet; and the proof is clear; for, remove the magnet, and the effect ceases; bring it near, and the effect is again produced. It is, therefore, evident to sense, that the magnet is the cause of this effect. A Cartesian philosopher enters more deeply into the cause of this phenomenon. He observes, that the magnet does not touch the needle, and therefore can give it no impulse. He pities the ignorance of the sailor. The effect is produced, says he, by magnetic effluvia, or subtile matter, which passes from the magnet to the needle, and forces it from its place. He can even shew, by a figure, where these magnetic effluvia issue from the magnet, what round they take, and what way they return home again. Thus he thinks he comprehends perfectly how, and by what cause, the motion of the needle is produced. A Newtonian philosopher, however, inquires what proof can be offered of the existence of magnetic effluvia, and can find none. He therefore holds it as a fiction, an hypothesis; and he has learned that hypotheses ought to have no place in the philosophy of nature. He confesses his ignorance of the real cause of this motion, and thinks that his business as a philosopher is only to find from experiment the laws by which it is regulated in all cases. These three persons differ much in their sentiments with regard to the real cause of this phenomenon; and the man who knows most is he who is sensible that he knows least of the matter. Yet all the three speak the same language, and acknowledge that the cause of this motion is the attractive or repulsive power of the magnet.

The grandest discovery ever made in natural philosophy was that of the law of gravitation and deflection, which opens so rational a view of our planetary system; yet these discover no real cause, but only the law or rule according to which the unknown causes operate. Natural philosophers, therefore, who think accurately, have a precise meaning to the terms they use in the science; and, when they pretend to shew the cause of any phenomenon of nature,

nature, they mean by the cause a law of nature of which that phenomenon is a necessary consequence. The whole object of natural philosophy, as Newton expressly teaches, is reducible to these two heads: first, by just induction from experiment and observation, to discover the laws of nature; and then to apply those laws to the solution of the phenomena of nature. This was all that this great philosopher attempted, and all that he thought attainable. And this, indeed, he attained in a great measure, with regard to the motions of our planetary system, and with regard to the rays of light. But supposing that all the phenomena which fall within the reach of our senses were accounted for from general laws of nature justly deduced from experience; that is, supposing natural philosophy brought to its utmost perfection; yet it does not discover the immediate efficient cause of any one phenomenon in nature.

The laws of nature are the rules according to which the effects are produced; but there must be a cause which operates according to these rules. The rules of navigation never navigated a ship. The rules of architecture never built a house. Natural philosophers, by great attention to the course of nature, have discovered many of her laws, and have very happily applied them to account for many phenomena: but they have never discovered the efficient cause of any one phenomenon; nor do those who have distinct notions of the principles of the science make any such pretence. Upon the theatre of nature we see innumerable effects which require an agent endowed with active powers; but the agent is behind the scene. Whether it be the Supreme Cause alone, or a subordinate cause or causes; and, if subordinate causes be employed by the Almighty, what their nature, their number, and their different offices, may be, are things hid, for wise reasons without doubt, from the human eye.

Concerning this doctrine of *cause* and *effect*, many opinions have been hazarded by different writers, all of which tend finally to nearly the same results. That every event is, and must be, brought about by *some cause*, is held to be a self-evident truth which no man can deny who understands the terms in which it is expressed; but what or where the agency of the cause is, we can very seldom, if ever, know, except when we refer to our own voluntary actions. When a change is observed, we cannot doubt of its being produced by something: either the thing changed is animated, and has produced the change by its own agency, just as we move our heads or hands by an act of volition; or, if it be inanimated, or of itself incapable of agency, the change must be produced by some adequate operation, denominated a *cause*. See METAPHYSICS, NATURAL PHILOSOPHY, PHYSICS, &c.

CAU'SELESS, *adj.* Having no cause; wanting just ground or motive:

Alas! my fears are *causeless* and ungrounded,
Fantastic dreams, and melancholy fumes. *Denham.*

CAU'SELESSLY, *adv.* Without cause; without reason.—Human laws are not to be broken with scandal, nor at all without reason; for he that does it *causelessly* is a despiser of the law, and undervalues its authority. *Taylor.*

CAU'SER, *s.* He that causes; the agent by which an effect is produced.—Abstinence, the apostle determines, is of no other real value in religion, than as a ministerial *causer* of moral effects. *Rogers.*

CAU'SEY, or CAUSEWAY, *s.* [*chaussée*, Fr. This word, by a false notion of its etymology, has been lately written *causeway*. *Johnson.*] A way raised and paved; a way raised above the rest of the ground.—To Shuppim the lot came forth westward by the *causey*. *1 Chron.* xxvi.

Whose *causeway* parts the vale with shady rows;
Whose seats the weary traveller repose. *Pope.*

CAUSSA'DE, a town of France, in the department of the Lot, and chief place of a canton, in the district of Montauban: twelve miles north-east of Montauban.

CAUSSIN' (Nicholas), surnamed the Just, a French Jesuit, born at Troyes in Champagne, in 1580; and entered into the Jesuits' order when he was twenty-six years of age. He taught rhetoric in several of their colleges, and afterwards began to preach, by which he gained great reputation. He increased this reputation by publishing books, and in time was preferred to be confessor to the king. He died in the Jesuits' convent at Paris, in 1651. None of his works did him more honour than that entitled La Cour Sainte. It has been printed a great many times; and translated into Latin, Italian, Spanish, Portuguese, German, and English. He published several other books both in Latin and French.

CAU'STIC, or CAUSTICAL, *adj.* Epithets of medicaments which destroy the texture of the part to which they are applied, and eat it away, or burn it into an eschar, which they do by extreme minuteness, asperity, and quantity of motion, that, like those of fire itself, destroy the texture of the solids, and change what they are applied to into a substance like burnt flesh; which, in a little time, with a detergent dressing, falls quite off, and leaves a vacuity in the part. *Quincy.*—If extirpation be safe, the best way will be by *caustical* medicines, or escarotics. *Wiseman.*

CAU'STIC, *s.* [from καίω, Gr. to burn.] A burning application.—It was tenderness to mankind that introduced corrosives and *caustics*, which are indeed but artificial fires. *Temple.*—Caustics are denominated *common* or *lunar*. The common caustic is a fixed alkali, deprived of aerial acid, and most of its water. If the lixivium of the soap-boilers be evaporated to dryness in a silver or copper vessel, then fused in a crucible, poured out into a bason, and, when solid, cut into small pieces, it forms the common caustic. This must be kept in a closed bottle, to prevent its deliquescing. When a piece of this alkali is applied to the skin for the space of three quarters of an hour, it corrodes it by forming a saponaceous compound with its fat parts. It was first used in making issues before that practice was laid aside. The lunar caustic is called *lapis infernalis*, though improperly. It consists of the crystals of silver, obtained by solution in nitrous acid, and afterwards fused in a crucible. To make this preparation, very pure silver must be dissolved to saturation in nitrous acid, and the crystals separated by evaporation and cooling. These are to be fused in an earthen crucible, sufficiently large to admit of the frothing and swelling that happen at the commencement of the fusion. The heat must be gentle, because the crystals are very fusible, and the acid easily decomposed and driven off. It requires, however, to be somewhat raised after the ebullition has ceased. As soon as the matter is in quiet fusion, it is to be poured into a mould, consisting of five or six small cylindrical cavities, by which it acquires the form of small pencils, and may conveniently be held in a case, instead of touching it with the fingers. Lunar caustic is black, which seems to arise from part of the acid being driven off, and a portion of the silver revived. Its causticity, or action on animal substances, appears to depend on the strong disposition of the silver to recover its metallic state, and consequently is a true combustion.

CAUS'TIC CURVE, *s.* in the higher geometry, a curve formed by the concourse or coincidence of the rays of light reflected from some other curve.

CAUSTI'CITY, *s.* The quality of being caustic. All substances which have so strong a tendency to combine with the principles of organized substances as to destroy their texture, are said to be caustic. The chief of these are the concentrated acids, pure alkalis, and the metallic salts.

CAU'TEL, *s.* [*cautela*, Lat.] Caution; scruple: *a word now disused:*

Perhaps he loves you now;
And now no soil or *cautel* doth besmirch
The virtue of his will. *Shakespeare.*

CAU'TELOUS, *adj.* [*cauteleux*, Fr.] Cautious; wary; provident: *not in use.*—Palladio doth wish, like a *cautelous* artisan,

artifan, that the inward walls might bear fome good fhare in the burden. *Wotton.*—Wily; cunning; treacherous.—They are fo *cautelous* and wily, efpecially being men of fmall experience, that you would wonder whence they borrow fuch fubtilties and fly fhifts. *Spenfer.*

CAU'TELOUSLY, *adv.* Cunningly; flyly; treacherously; cautioufly; warily: *not in ufe.*—The Jews, not refolved of the fciatica fide of Jacob, do *cautelously*, in their diet, abftain from both. *Brown.*

CAUTERIZA'TION, *f.* The act of burning flefh with hot irons or cauftic medicaments. They require, after *cauterization*, no fuch bandage, as that thereby you need to fear interception of the fpirits. *Wifeman.*

To CAU'TERIZE, *v. a.* [*cauterifer*, Fr.] To burn with the cautery.—The defign of the cautery is to prevent the canal from clofing; but the operators confefs, that, in perfons *cauterized*, the tears trickle down ever after. *Sharp.*

CAU'TERY, *f.* [from καίω, *uro*, to burn.] A fubftance which has power to burn the flefh.—A *cautery* is either actual or potential; the firft is burning by a hot iron, and the latter with cauftic medicines. The actual *cautery* is generally ufed to ftop mortification, by burning the dead parts to the quick; or to ftop the effufion of blood by fearing up the veffels. *Quincy.*—In heat of fight it will be neceffary to have your actual *cautery* always ready; for that will fecure the bleeding arteries in a moment. *Wifeman.*

CAUTGUN'GE, a town of Hindooftan, in the country of Bahar, on the north fide of the Ganges, oppofite Bar.

CAU'TION, *f.* [*caution*, Fr. *cautio*, Lat.] Prudence, as it refpects danger; forefight; provident care; warinefs againft evil; fecurity for.—Such conditions, and *cautions* of the condition, as might affure with as much affurance as worldly matters bear. *Sidney.*—Provifion or fecurity againft.—In defpite of all the rules and *cautions* of government, the moft dangerous and mortal of vices will come off. *L'Eftrange.*—Provifionary precept.—Attention to the forementioned fymptoms affords the beft *cautions* and rules of diet, by way of prevention. *Arbuthnot.*—Warning.

To CAU'TION, *v. a.* To warn; to give notice of a danger:

How fhall our thought avoid the various fnare?
Or wifdom to our *caution'd* foul declare
The diff'rent fhapes thou pleafeft to employ,
When bent to hurt, and certain to deftroy? *Prior.*

CAU'TION-MONEY, *f.* in the univerfities, a fum paid to the tutor of the college, on the admiffion of a ftudent, as a kind of pledge or fecurity.

CAU'TIONARY, *adj.* Given as a pledge, or in fecurity. Thus, in 1585, Flufhing and the Brille, with the caftle of Rammekins, were configned by the United Provinces to Elizabeth as *cautionary* towns, for a fecurity that her expences in affifting them fhould be refunded at the conclufion of the war.

I am made the *cautionary* pledge,
The gage and hoftage of your keeping it. *Southern.*

CAU'TIOUS, *adj.* [from *cautus*, Lat.] Wary; watchful.—Be *cautious* of him; for he is fometimes an inconftant lover, becaufe he hath a great advantage. *Swift.*

CAU'TIOUSLY, *adv.* In an attentive wary manner; warily:

They know how fickle common lovers are:
Their oaths and vows are *cautioufly* believ'd;
For few there are but have been once deceiv'd. *Dryden.*

CAU'TIOUSNESS, *f.* Watchfulnefs; vigilance; circumfpection; provident care; prudence with refpect to danger.—I could not but approve their generous conftancy and *cautioufnefs*. *King Charles.*—We fhould always act with great *cautioufnefs* and circumfpection, in points where it is not impoffible that we may be deceived. *Addifon.*

CAU'TING-IRON, *f.* A farrier's iron to cauterize or fear the parts of a horfe which require burning.

CAU'TO, a town of the ifland of Cuba: twenty-five miles north-eaft of Bayamo.

CAU'TO, a river of the ifland of Cuba, which runs into the fea, twenty miles north-weft of Bayamo.

CAU'VERY, a principal river of Hindooftan, which rifes in the Bednore country, paffes by Seringapatam, Allumbaddy, Trichinopoly, &c. and empties itfelf by two branches into the Bay of Bengal, one near Devicotta, and the other near Negapatam.

CAUX, before the revolution, a country of France, in Normandy, about fifty leagues in circumference, lying between the ocean and the Seine, Vexin, Normandy, Picardy, and the country of Bray. The land is fertile in grain, hemp, fruits, &c. The coafts abound with fifh, and the forefts with game. Caudebec is the capital.

CA'VY, *f.* in zoology. See CAVIA.

To CAW, *v. n.* [taken from the found.] To cry as the rook, raven, or crow:

The rook, who high amid the boughs,
In early fpring, his airy city builds,
And ceafelefs *caws*. *Thomfon.*

CAWK, *f.* A term by which miners diftinguifh the opake fpecimens of vitriolated ponderous earth, or marmor metallicum.

CAWNPOUR', a town of Hindooftan, in the Subah of Oude: thirty-feven miles fouth-weft of Lucknow, and ninety-eight north-weft of Allahabad.

CA'WOOD, a fmall town in the weft riding of Yorkfhire, 190 miles from London, ten from York, and five from Selby; fituate upon the banks of the navigable river Oufe, over which there is a ferry from the town into the eaft riding. The town is in general well-built, and has a market on Wednefdays, and two annual fairs, viz. on old May-day, and the 23d of September. Here are the remains of a caftle of great antiquity, and which was the laft refidence of cardinal Wolfey, being the place he retired to when difgraced at court.

CAW'STON, a fmall town in the county of Norfolk, eleven miles from Norwich. It has a market on Wednefdays; fairs, Feb. 1, the laft Wednefday in April, and the laft Wednefday in Auguft, which is a large fair for fheep. Two miles from the town is Bickling, the fuperb feat of the earl of Buckinghamfhire.

CAX'A, *f.* A coin made of lead mixed with fcoria of copper, ftruck in China, but current chiefly at Bantam, in the ifland of Java, and fome of the neighbouring iflands.

CAX'A TAM'BO, a jurifdiction of South America, in the country of Peru, and archbifhopric of Lima.

CAXAMAR'QUA, a jurifdiction of Peru, in South America, under the bifhop of Truxillo, lying between the two Cordilleras of the Andes: it produces plenty of all kinds of grain, fruits, and vegetables; alfo cattle, efpecially hogs. They have here a confiderable trade with Chincay, Lima, Truxillo, &c. Here the Indians weave cotton for fhips' fails, bed-curtains, quilts, hammocks, &c. There are fome filver mines, but of little confequence. The town, which gives name to the diftrict, was at one time a royal city, where the emperor Atahualapa was put to death, after having been defeated and imprifoned by Pizarro: about feventy miles from the Pacific Ocean. Lat. 8. S. lon. 55. 20. W. Greenwich.

CAX'TON (William), a mercer of London, eminent by the works he publifhed, and for being reputed the firft who introduced and practifed the art of printing in England; for the particulars of which works, and alfo the origin of this invaluable art, fee the article PRINTING.

CAX'TON, a fmall town in Cambridgefhire, diftant fifty miles from London, on the old north road to York, and is one of the oldeft poft-towns in the kingdom. A Roman way paffes from Holm to Papworth through this town. Caxton, reputed the firft printer in England, was a native of this town; as was alfo Matthew Paris, the hiftorian. Here are two annual fairs, one on St. Thomas-a-Becket, the other three days after Michaelmas, for gloves,

hats, cloths, &c. The market was on Tuesdays, but is now discontinued. The prospects every way round Caxton consist of a rich and fertile corn-country, adorned with several seats of gentlemen; the chief of which is Wimple-hall, formerly built, at a vast expence, by one of the earls of Radnor. It was afterwards bought by his grace John Holles Cavendish, duke of Newcastle; in a partition of whose vast estate, it fell to Edward earl of Oxford and Mortimer, in right of his lady, the only daughter of the said duke; who brought the earl this estate, and many others sufficient to denominate her one of the richest heiresses in Great-Britain; but his lordship parted with it, a little before his death, to the right honourable the then lord chancellor Hardwicke, whose son, the present earl of Hardwicke, now possesses it.

CAY, a town of China, of the second rank, in the province of Pe-tche-li: 125 miles south-south-west of Peking. Lat. 38. 3. N. lon. 133. 6. E. Ferro.

CA'YA, a river of Spain, which runs into the Guadiana, near Badajoz.

CA'YA, a river of Spain in Catalonia, which runs into the Mediterranean, near Tamarit.

CAYAHO'GA, a town of North America, in the country west of Pennsylvania, on a river of the same name: thirty miles south of lake Erie. Lat. 41. 20. N. lon. 81. 20. W. Greenwich.

CAYAHO'GA, a river of North America, sometimes called the Great River, which runs in at the south bank of lake Erie, forty miles eastward of the mouth of Huron, having an Indian town of the same name on its banks. It is navigable for boats; and its mouth is wide, and deep enough to receive large sloops from the lake. Near this are the celebrated impending rocks, which bound the lake. They are several miles in length, and rise fifty feet perpendicular out of the water. Some parts of them consist of several strata, of different colours, lying in a horizontal direction, and so exactly parallel, that they resemble the work of art. The view from the land is grand, but the water presents the most magnificent prospect of this sublime work of nature: it is attended, however, with great danger; for, if the least storm arises, the force of the surf is such, that no vessel can escape being dashed to pieces against the rocks. The heathen Indians, when they pass this impending danger, offer a sacrifice of tobacco to the water. Part of the boundary line between the United States and the Indians, begins at the mouth of Cayahoga, and runs up the same to the portage between that and the Tuscawara branch of the Muskingum. The Cayahoga nation, consisting of 500 Indians, forty of whom reside in the United States, the rest in Canada, receive of the state of New-York an annuity of 2300 dollars, besides fifty dollars granted to one of their chiefs, as a consideration for lands sold by them to the state, and 500 dollars from the United States, agreeably to the treaty of 1794.

CAYAM'BA, a town of South America, in the country of Peru, and province of Quito: thirty miles north-east of Quito.

CAYAMBU'RO, a mountain of South America, in the country of Peru: thirty miles north-east of Quito.

CAYBO'BO, a town of the island of Ceram, in the eastern Indian Sea.

CAYEN'NE, a province in South America, belonging to the French, and the only part of the continent which they possess; bounded north and east by the Atlantic Ocean, south by Amazonia, and west by Guiana or Surinam. It extends 240 miles along the coast of Guiana, and nearly 300 miles within land; lying between the equator and the fifth degree of north latitude. The coast is low and marshy, and subject to inundations, from the multitude of rivers which rush down the mountains with great impetuosity. The soil is in many places fertile, producing sugar, tobacco, Indian corn, fruits, &c. The French have likewise possession of an island upon the coast called also Cayenne, which, as well as the whole country, takes its name from the river that is northward of it.

CAYEN'NE BAY, a bay on the south-west coast of the island of St. Vincent: two miles north-west of Kingston Bay.

CAYEN'NE RIVER, rises in the mountains near the lake of Parima, runs through the country of the Galibis, a nation of Charibbee Indians, and is 100 leagues long. The island which it environs is eighteen leagues in circuit, good and fertile, but unhealthy. In 1752, the exports of the colony were 260,541 lbs. of arnotto, 80,363 lbs. of sugar, 17,919 lbs. of cotton, 26,881 lbs. of coffee, 91,916 lbs. of cocoa, besides timber and planks. The French first settled here in 1625, and built the fort of Ceperou, but were often forced to quit it, yet returned thither again, as in 1640, 1652, and 1654, and were forced to leave it for want of reinforcements. The Dutch settled here in 1656, but were driven out by M. de la Barre. The English took it 1667, but afterwards restored it to the French. The Dutch had their revenge in 1676, and drove out the French; but were themselves beat out, the year after, by d'Estrées; since which time the French have had peaceable possession of it.

CAYES (Les), a town of the island of St. Domingo, on the south coast. Lat. 18. 13. N. lon. 73. 45. W. Gr.

CAYET' (Pierre de) author of the celebrated and very rare Memoirs relative to Henry IV. of France, was a protestant minister at the court of the king of Navarre, and was much pressed by the count of Soissons to marry him to one of the princesses of the house of Navarre. He refused, as not thinking it honourable to be concerned in giving the sanction of religion to a marriage which he knew to be disagreeable to the royal family of Navarre, and to which he was sure they would never give their consent. The count of Soissons still insisted; and Cayet refused with equal intrepidity. On the count's threatening to stab him if he persisted in his refusal, he very spiritedly replied, "Well, then, your highness may kill me, if you please; I prefer dying by the hand of a great prince to dying by that of the hangman."

CAYEU'X, a town of France, in the department of the Somme, and chief place of a canton, in the district of Abbeville: three leagues and a half north of Montdidier.

CAYHO'CA, or KEYOOCA, a town of Spanish America, in the province of Tabasco: thirty miles west of Tabasco.

CAYLAR' (Le), a town of France, in the department of Herault, and chief place of a canton, in the district of Lodeve: two leagues and a half north of Lodeve.

CAYLO'MA, a jurisdiction under the bishop of Arequipa, 32 leagues east of that city, in South America, in Peru, famous for the silver mines in the mountains of the same name, which are very rich, though they have been worked for a long time. The country round it is cold and barren. There is an office here for receiving the king's fifths, and vending quicksilver.

CAY'LUS, a town of France, in the department of the Lot, and chief place of a canton, in the district of Montauban: seven leagues north-east of Montauban.

CAY'LUS (Count de), Marquis de Sternay, and Baron de Bransac, born at Paris in 1692. He was the eldest of the two sons of John count de Caylus, lieutenant-general of the armies of France. The count and countess, his father and mother, were very careful of the education of their son. His mother was the author of that agreeable book entitled, the Recollections of Madame de Caylus, of which Voltaire published an elegant edition. The amiable qualities of the parents appeared in the son. In his natural temper he was gay and sprightly, had a taste for pleasure, a strong passion for independence, and an invincible aversion to the servitude of a court. He was only twelve years of age when his father died at Brussels in 1704. After finishing his academical exercises, he entered into the army; and in his first campaign, in 1709, he distinguished himself by his valour in such a manner, that Louis XIV. commended him before all the court. In 1711 he commanded a regiment of dragoons, which was called by his

 own

own name; and he signalized himself at the head of it in Catalonia. In 1713 he was at the siege of Fribourg, where he was exposed to imminent danger in the bloody attack of the covered way. The peace of Rastadt having left him in a state of inactivity ill suited to his natural temper, his vivacity soon carried him to travel into Italy; and his curiosity was greatly excited by the wonders of that country, where antiquity is still fruitful, and produces so many objects to improve taste and to excite admiration. After a year's absence, he returned to Paris with so strong a passion for travelling, and for antiquities, that he was induced to quit the army. He now set out for the Levant. When he arrived at Smyrna, he visited the ruins of Ephesus. From the Levant he was recalled in Feb. 1717, by the tenderness of his mother. From that time he left not France, but to make two excursions to London. The academy of painting and sculpture adopted him an honorary member in 1731; and the count spared neither his labour nor his fortune to instruct, assist, and animate, the artists. He wrote the lives of the most celebrated painters and engravers that have done honour to this illustrious academy; and, in order to extend the limits of the art, which seemed to him to move in too narrow a circle, he collected, in three different works, new subjects for the painter, which he had met with in the works of the ancients. A fortunate accident also furnished him with the means of shewing us the composition and the colouring of the pictures of ancient Rome. The coloured drawings which the famous Pietro Sante Bartoli had taken there from antique pictures, fell into his hands. He had them engraved, and, before he enriched the king of France's cabinet with them, he gave an edition of them at his own expence. It is, perhaps, the most extraordinary work of its kind that ever will appear. The whole is painted with a purity and precision that are inimitable: we see the liveliness and the freshness of the colouring that charmed the Cæsars. There were only thirty copies published, and there is no reason to expect that there will hereafter be any more.

In 1742, count Caylus was admitted honorary member of the academy of belles lettres; and then it was that he seemed to have found the place for which nature designed him. The study of literature now became his ruling passion; he consecrated to it his time and his fortune; he even renounced his pleasures to give himself wholly up to that of making useful improvements. But amidst the fruits of his research and invention, nothing seemed more flattering to him than his discovery of encaustic painting. A description of Pliny's, but too concise an one to give him a clear view of the matter, first suggested the idea. He availed himself of the friendship and skill of M. Magault, a physician in Paris, and an excellent chemist; and, by repeated experiments, found out the secret of incorporating wax with divers tints and colours, and of making it obedient to the pencil. Pliny has made mention of two kinds of encaustic painting, practised by the ancients; one of which was performed with wax, the other upon ivory, with hot punches of iron. It was the former that count Caylus had the merit of reviving; and M. Muntz afterwards made many experiments to carry it to perfection. Thus, in the hands of count Caylus, literature and the arts lent each other a mutual aid. He published above forty dissertations in the Memoirs of the Academy of Belles Lettres. The artists he was particularly attentive to; and to prevent their falling into mistakes from an ignorance of costume, which the ablest of them have sometimes done, he founded a prize of 500 livres, the object of which is to explain, by means of authors and monuments, the usages of ancient nations. In order that he might enjoy, with the whole world, the treasures he had collected, he caused them to be engraved, and gave a learned description of them in a work which he embellished with 800 copper-plates. The strength of his constitution seemed to give him hopes of a long life; but a humour settling in one of his legs, which entirely destroyed his health, he expired on the 5th of September, 1765, and by his death his family is extinct.

CAY'MANS, three small islands, 55 leagues north-north-west of the island of Jamaica and the West-Indies; the most southerly of which is called the Great Caymans, which is inhabited by a people who are the descendants of the old buccaniers. It has no harbour for ships of burden, only a tolerable anchoring place on the south-west. The climate and soil are singularly salubrious, and the people are vigorous, and commonly live to a great age. They raise all kinds of produce for their own use and to spare. Their chief employment is to pilot vessels to the adjacent islands, and to fish for turtle; with which they supply Port Royal and other places in great quantities. Great Caymans lies in lat. 19. 20. N. lon. 81. 40. W. Greenwich.

CAY'MITE GRANDE, an island on the north side of the south peninsula of the island of St. Domingo, two leagues long and one broad: thirty-six miles west of Cape Donna Maria.

CAYNE, a river of Wales, which runs into the Severn four miles west from Newtown, in Merionethshire.

CA'YO (El), a town of the island of Cuba: sixty miles east of Spirito Santo.

CAYON'NE, a river of the island of St. Christopher, in the West-Indies, which runs into the sea half a mile south-east of Madan's Point.

CAY'RES, a town of France, in the department of the Upper Loire, and chief place of a canton, in the district of Puy-en-Velay: eight miles south-south-west of Le Puy.

CAY'STER, a rapid river of Asia, rising in Lydia, and after a meandering course, falling into the Ægean Sea near Ephesus. According to the poets, the banks and neighbourhood of this river were generally frequented by swans.

CAZAL, a town of Arabia: eighty miles north-east of Medina.

CAZAL'LA. See CAÇALLA.

CAZAL'S, a town of France, in the department of the Lot, and chief place of a canton, in the district of Gourdon: three leagues south-west of Gourdon.

CAZAU'BON, a town of France, in the department of the Gers: six leagues west of Condom.

CAZENO'VIA, a new and thriving town of the American States, in Herkemer county, province of New-York: forty miles westward of Whitestown.

CAZE'RES, a town of France in the department of the Upper Garonne, and chief place of a canton, in the district of Rieux: two leagues south-west of Rieux.

CAZE'RES, a town of France, in the department of the Lower Pyrenées: four leagues west of Nogaro.

CA'ZES DE MONDENAR'D, a town of France, in the department of the Lot, and chief place of a canton, in the district of Lauzerte: three miles S. E. Lauzerte.

CAZI'QUE, *s.* A title given by the Spaniards to the petty kings and chiefs of the several countries of America, excepting those of Peru, which are called *curatas*. The French call them *casiques*, a denomination which they always give to the Tartarian hordes. Mexico comprehends a great number of provinces and islands, which were governed by lords called *caziques*, dependent on, and tributary to, the emperor. Thirty of these vassals are said to have been so powerful, that they were able, each of them, to bring an army of 100,000 men into the field.

CAZOU'LS, a town of France, in the department of the Herault, and chief place of a canton, in the district of Beziers: five miles north-west of Beziers.

CAZ'ZA, a small island in the Adriatic. Lat. 43. 6. N. lon. 34. 25. E. Ferro.

CAZZO'LA, a small island in the Adriatic, near the coast of Dalmatia. Lat. 43. 8. N. lon. 34. 30. E. Ferro.

CE'A, a town of Portugal, in the province of Beira: seven leagues south-south-east of Viseu.

CEANAMHAR'RA, a hill in the island of Tiree, near the west coast of Scotland, remarkable for a great number of caves, to which sea-fowl, eagles, and ravens, resort; some of these caves are upwards of fifty yards deep.

CEANO'THUS,

CEANOTHUS, *f.* [Κεανωθος of Theophrastus.] NEW JERSEY TEA; in botany; a genus of the class pentandria, order monogynia, natural order dumosæ. The generic characters are—Calyx: perianthum one-leafed, turbinate; border five-parted, acute, close-converging, permanent. Corolla: petals five, equal, roundish, of an arched saccular shape, compressed, very obtuse, spreading, smaller than the calyx, seated on claws the length of the petal, growing from the interstices of the calyx. Stamina: filaments five, subulate, erect, opposite to the petals, the length of the corolla; anthers roundish. Pistillum: germ superior, triangular; style cylindric, semitrifid, the length of the stamens; stigma obtuse. Perianthium: berry dry, three-grained, three-celled, obtuse, retuse, set with tubercles. Seeds: solitary, ovate.—*Essential Character*. Petals five, saccular, vaulted: berry dry, three-celled, three-seeded.

Species. 1. Ceanothus Americanus, or American ceanothus, or New Jersey tea: leaves three-nerved. In England this shrub seldom rises more than three or four feet high, sending out branches on every side from the ground upwards. The branches are very slender; and, as it is pretty late in the spring before they begin to shoot, they keep growing very late; therefore, unless the autumn proves dry and mild, the tender shoots are often killed down very low by the early frosts; but, in favourable seasons, the extreme parts of the shoots only are injured by the cold. These branches are garnished with oval pointed leaves, having three longitudinal veins running from the foot-stalk to the point, and diverging in the broad part of the leaves from each other: the leaves are placed opposite, are deciduous, and of a light green colour. At the extremity of each shoot the flowers are produced in close thick spikes, which are composed of five small petals, of a clear white. These appear in July, and make a pretty appearance during their continuance; for, as every shoot is terminated by one of these spikes, the whole shrub is covered over with flowers, the branches commonly growing very close to each other; and, when the autumn proves mild, these shrubs often flower again in October. The fruit, according to Gærtner, is a corticated, three or four-grained, capsule. The rind, before it is ripe, is soft and fleshy, but afterwards dries into a thin skin, forming spongy tubercles and very narrow crests on the head and back of the grains. These are cartilaginous, thin, extremely smooth within, opening elastically by the internal suture, and receding from each other spontaneously when ripe. The seeds are ovate rounded, convex on one side, very obscurely angular on the other, of a shining bay colour. Native of most parts of North America, as Canada, New England, Pennsylvania, Virginia, and Carolina: it is there known by the name of New Jersey Tea: the leaves being dried for the same purpose as tea. The Canadians use the root in venereal cases; and the cattle, browzing upon the shrub, keep it very low. It dies wool a fine strong Nankin cinnamon colour. This shrub was cultivated before 1713 by bishop Compton, in the episcopal garden at Fulham, and in Mr. Derby's garden at Hoxton. For several years after it was lost in England, but has since been recovered from America, so as to be now pretty common in most of our curious gardens and nurseries.

2. Ceanothus Asiaticus, or Asiatic ceanothus: leaves ovate, nerveless. Native of Ceylon and Japan. Introtroduced in 1781.

3. Ceanothus Africanus, or African evergreen Ceanothus: leaves lanceolate, nerveless; stipules roundish. The third sort grows naturally at the Cape of Good Hope, from whence it was originally brought to Holland, and has been many years preserved there; and since has been communicated to most of the curious gardens in Europe, where it has been long known by the title of alaternoides, &c. It rises to the height of ten or twelve feet, with a woody stem, covered with a rough dark-coloured bark, and sends out many weak branches, which hang downwards: these, while young, are green, but afterwards change to a purplish colour. They are garnished with oblong pointed leaves, of a lucid green, smooth, and slightly serrate on their edges. The flowers are small, of an herbaceous colour, coming out from the side of the branches: these sometimes appear in July, but are not succeeded by seeds in this country, nor do the plants often produce flowers; so that they are preserved only for the beauty of their shining evergreen leaves, which make a variety in the green-house during the winter season. It was cultivated here in 1712.

4. Ceanothus reclinatus: leaves ovate, entire, many-nerved; branches hanging down. Native of Jamaica.

5. Ceanothus circumscissus: leaves obcordate, opposite, in two rows; prickles solitary, recurved, opposite to the leaves. Native of the East-Indies, Ceylon, and Mauritius. This species is a connecting link between ceanothus and rhamnus; but, having a dry fruit, opening by pressure into three regular valves, it seems to approach nearer to the former, and therefore we have followed Gærtner in placing it here.

6. Ceanothus capsularis: leaves ovate-cordate, acuminate, serrate; capsules three-valved, gaping. Native of Otaheite.

Propagation and Culture. 1. This shrub is best propagated by seeds, which should be sown in autumn, in small pots, and plunged into an old hot-bed, where they may remain during the winter, exposing them in mild weather to the open air, but in frost they must be protected from cold. In March, the pots should be plunged into a moderate hot-bed to bring up the plants, which should be inured to bear the open air by degrees; and, as soon as they have obtained a little strength, they should be exposed in a sheltered situation till autumn, when they must be placed under a hot-bed frame, to screen them from severe frost in winter; in mild weather they should be fully exposed to the open air; but, while the plants are young, they will not endure the cold of the winter. In the following spring, before the plants begin to shoot, they should be transplanted; some of them may be put into separate pots, and the others into a nursery-bed, in a warm situation, where they may remain a year or two, to get strength; after which time they may be removed to the places where they are designed to remain: they should have a moderately dry soil and a sheltered situation, where they will thrive and flower extremely well; but in stiff, cold, land, they are always very late in the spring before they come out, so that their young shoots are full of sap in the autumn, and the first frost generally kills their tops, which frequently causes them to die great part of their length. It may also be propagated by laying down the young branches, which, in a light soil, will put out roots in a year's time; but these layers should not be much watered; for, as the shoots are tender, moisture will often occasion their rotting, when it is given in quantities, or too often repeated; therefore, the best method is to cover the surface of the ground in dry weather, all round the layers, either with mulch or rotten tan, which will preserve a sufficient moisture in the ground, provided the season is not extremely dry; in which case they should have a little water once in eight or ten days, which will be sufficient. The best time for laying down these branches is in autumn; and if, after this is performed, the surface of the ground is covered over with some old tan, taken from a decayed hot-bed, it will prevent the frost from penetrating the ground, which will secure them from injury; and the same covering will prevent the winds from drying the ground in the spring, and thereby promote their putting out roots. These layers, when rooted, may be taken up the following spring, and treated in the same manner as those raised from seeds.

The second may be increased by layers or cuttings, and must have the protection of the bark-stove.

The third may be propagated in the same ways, but that by cuttings, being most sure and expeditious, is generally preferred. They should be planted in spring in pots filled with good kitchen-garden earth, and plunged into a very moderate hot-bed, observing to shade them in the heat of the

the day, and now and then to refresh them with water. In two months, or less, they will have taken root, when they must be gradually inured to the open air, placing them in a sheltered situation till they have obtained strength, when they may be separated, and each planted in a small pot filled with light earth, placing them in the shade till they have taken fresh root; then they may be removed, and treated like other exotics. See SERRATULA.

CEAP'GILDE, *s.* [from *ceap*, *pecus*, Sax. cattle, and *gild*, i. e. *solutio*, Lat.] Hence it is *solutio pecudis*: from this Saxon word *gild*, it is very probable we have our English word *yield*; as yield, or pay. *Cowel.*

To CEASE, *v. n.* [*cesser*, Fr. *cesso*, Lat.] To leave off; to stop; to give over; to desist: with *from* before a noun:

The lives of all, who *cease from* combat, spare;
My brother's be your most peculiar care. *Dryden.*

To fail; to be extinct; to pass away.—The poor man shall never *cease* out of the land. *Deuteronomy.*—The soul being removed, the faculties and operations of life, sense, and intellection, *cease* from that *moles corporea*, and are no longer in it. *Hale.*—To be at an end; to rest.—The ministers of Christ have *ceased* from their labours. *Spratt.*

To CEASE, *v. a.* To put a stop to; to put an end to:

The discord is complete, nor can they *cease*
The dire debate, nor yet command the peace. *Dryden.*

CEASE, *s.* Extinction; failure: perhaps for *decease.*

The *cease* of majesty
Dies not alone, but like a gulph, withdraws
What's near it with it. *Shakespeare.*

CE'ASELESS, *adj.* Incessant; perpetual; continual; without pause; without stop; without end:

Like an oak
That stands secure, though all the winds employ
Their *ceaseless* roar; and only sheds its leaves,
Or mast, which the revolving spring restores. *Philips.*

CEAUX, a town of France, in the department of Vienne, and chief place of a canton, in the district of Loudun: two leagues east of Loudun.

CE'BA (Ansaldo), a politician, historian, orator, and poet, of Genoa, at the beginning of the seventeenth century, published several tracts in each of these departments. The Italians attach some value to his treatise on epic poetry: but he acquired reputation chiefly by his tragedies; the most esteemed of which are his Twins of Capua, and his Alcippus. The marquis Maffei has pronounced them deserving of being inserted in the collection of the best Italian tragedies, printed at Verona in 1723, 3 vols. 8vo. This poet died in 1623, at the age of fifty-eight.

CEBAS'SAT, a town of France, in the department of Puy-de-Dome, and chief place of a canton, in the district of Clermont Ferrand: three miles north of Clermont.

CE'BES, a Theban philosopher, one of the disciples of Socrates, B. C. 405. He attended his learned preceptor in his last moments, and distinguished himself by three dialogues that he wrote; but more particularly by his tables, which contain a beautiful and affecting picture of human life, delineated with accuracy of judgment, and great splendor of sentiment. The best editions of Cebes, are those of Gronovius, 8vo. 1689, and Glasgow, 12mo. 1747.

CE'CIL (William), lord Burleigh, treasurer of England in the reign of queen Elizabeth, was the son of Richard Cecil, master of the robes to Henry VIII. He was born in the house of his grandfather, at Bourn, in Lincolnshire, in 1520; and received the rudiments of his education in the grammar-school at Grantham. From thence he was removed to Stamford; and afterwards entered of St. John's college, Cambridge. Here he began his studies with a degree of enthusiastic application very uncommon in young gentlemen of family. In 1541 he became a member of the society of Gray's Inn, with an intention to study the law; but he had not been long in that situation, before an accident introduced him to king Henry, who commanded his father to find a place for him. He accordingly requested the reversion of the *custos brevium*, which Mr. Cecil afterwards possessed. About this time he married the sister of Sir John Cheke, by whom he was recommended to the earl of Hertford, afterwards duke of Somerset and protector. Soon after king Edward's accession, Mr. Cecil came into the possession of his office of *custos brevium*. His first lady dying in 1543, he married the daughter of Sir Anthony Cook, director of the king's studies. In 1547, he was appointed by the protector, master of requests; and soon after, attended his noble patron on his expedition against the Scots, and was present at the battle of Musselburgh. In this battle, which was fought on the 10th of September 1547, Mr. Cecil's life was miraculously preserved by a friend, who, in pushing him out of the level of a cannon, had his arm shattered to pieces. The sight and judgment of his friend must have been as extraordinary as his friendship, to perceive the precise direction of a cannon shot; unless we suppose, that the ball was almost spent; in which case the thing is not impossible. The story is told in his life by a domestic. In 1548, Mr. Cecil was made secretary of state; but, in the following year, the duke of Northumberland's faction prevailing, he suffered in the disgrace of the protector Somerset, and was sent prisoner to the Tower. After three months confinement he was released; in 1551 restored to his office; and soon after knighted, and sworn of the privy council.

On the death of Edward VI. Mr. Cecil refused to have any concern in Northumberland's attempt in favour of the unfortunate lady Jane Grey; and when queen Mary ascended the throne, he was graciously received at court; but, not choosing to change his religion, was dismissed from his employments. During this reign, he was twice elected knight of the shire for the county of Lincoln; and often spoke in the house of commons, with great freedom and firmness. Queen Elizabeth's accession in 1558, dispelled the cloud which had obscured his fortunes and ministerial capacity. On the day of her accession, he presented her with a paper containing twelve articles necessary for her immediate dispatch; and, in a few days after, was sworn of the privy-council, and made secretary of state. His first advice to the queen, was to call a parliament; and the first business he proposed after it was assembled, was the establishment of a national church. A plan of reformation was accordingly drawn up under his immediate inspection, and the legal establishment of the church of England was the consequence. Sir William Cecil's next important concern, was to restore the value of the coin, which had in the preceding reigns been considerably debased. In 1561, he was appointed master of the wards; and, in 1571, created baron of Burleigh, as a reward for his services. The following year he was honoured with the garter, and raised to the office of lord high treasurer of England. From this period we find him the *primum mobile* of every material transaction during the glorious reign of queen Elizabeth. Having filled the highest and most important offices of the state for forty years, and guided the helm of government during the most glorious period of English history, he departed this life on the 4th of August 1598, in the 78th year of his age. His body was removed to Stamford, and there deposited in the family-vault, where a magnificent tomb was erected to his memory. Notwithstanding his long enjoyment of such lucrative employments, he left only an estate of 4000l. per annum, 11,000l. in money, and effects worth about 14,000l. He lived, indeed, in a manner suitable to his high rank and importance. He had four places of residence, viz. his lodgings at court, his house in the Strand, his seat at Burleigh Park near Stamford, and his seat at Theobalds. The last of these was his favourite place of retirement, where he frequently entertained the queen at a vast expence. Lord Burleigh was doubtless a man of singular abilities and prudence; amiable in his private character, and one of the most able, upright, and indefatigable,

gable, ministers, ever recorded in the annals of this kingdom. As to his writings, he is reckoned by Hollingshed amongst the historians of the English nation. He wrote two poems in Latin, on the death of Margaret Nevil, lady of the bed-chamber to queen Catharine. They were printed among the Carmina Suffolc. fratrum, 1552, 4to. A Latin poem in memory of Thomas Chaloner, knight. A preface to queen Catharine's book, entitled, Lamentation of a Sinner, 1548, 12mo. Precepts or Directions for the Well-ordering and Carriage of a Man's Life, 1637. Harl. Cat. vol. ii. p. 755. Meditations on the Death of his Lady. A Meditation on the State of England during the Reign of Queen Elizabeth. He wrote answers to many libels against the queen and government, some of which are said to be extant in print, and more in manuscript. He drew up also a great number of pedigrees, some of which are preserved in the library at Lambeth, particularly the genealogies of the kings of England, from William the Conqueror to Edward IV. of queen Anne Boleyn, and of several princely houses in Germany. A collection of his state papers was published by Haynes, 1740; and a continuation of them by Murdin, 1760.

CE'CIL, a township in the American United States, in Washington county, Pennsylvania.

CECI'LIA (St.), the patroness of music, has been honoured as a martyr ever since the fifth century. Her story, as delivered by the notaries of the Roman church, and from them transcribed into the Golden Legend and other books of the like kind, says, that she was a Roman lady born of noble parents, about the year 225. That, notwithstanding she had been converted to Christianity, her parents married her to a young pagan nobleman named Valerianus, who, with his brother Tiburtius, she quickly found means to convert. Both the brothers were in consequence beheaded; and Cecilia was offered her life, upon condition that she would sacrifice to the deities of the Romans; but she refused: upon which she was thrown into a caldron of boiling water, and scalded to death. Others say, that she was stifled in a dry-bath, i. e. an inclosure, from whence the air was excluded, having a slow fire underneath it; which kind of death was sometimes inflicted by the Romans on women of quality who were criminals. Upon the spot where her house stood, a church is said to have been built by pope Urban I. who administered baptism to her husband and his brother: it is the church of St. Cecilia at Trastevere; within it is a curious painting of the saint, and a stately monument, with a statue of her with her face downwards. There is a tradition of St. Cecilia, that she excelled in music; and that an angel was enamoured of her, drawn from the celestial regions by the charms of her melody: this has been deemed authority sufficient for making her the patroness of music and musicians. The legend of St. Cecilia has given frequent occasion to painters and sculptors to exercise their genius in representations of her, playing on the organ, and sometimes on the harp. Raphael has painted her singing with a regal in her hands; and Domenichino and Mignard, singing and playing on the harp.

CECIN'NA (A.), a Roman knight in the interest of Pompey, who used to breed up young swallows, and send them to carry news to his friends as messengers. He was a particular friend of Cicero, with whom he corresponded. Some of his letters are still extant in Cicero.

CE'CITY, *s.* [*cæcitas*, Lat.] Blindness; privation of sight.—They are not blind, nor yet distinctly see; there is in them no *cecity*, yet more than a cecutiency; they have sight enough to discern the light, though not perhaps to distinguish objects or colours. *Brown.*

CECRO'PIA, the original name of Athens, in honour of Cecrops, its first founder. The ancients often use this word for Attica, and the Athenians are often called Cecropidæ.

CECRO'PIA, *s.* The TRUMPET-TREE; in botany, a genus of the class dioecia, order diandria, natural order scabridæ. The generic characters are—I. Male. Calyx: spathe ovate, bursting, caducous; aments very many, fasciculate, columnar, imbricate with scales; the scales (receptacles) copious, turbinate, compressed-quadrangular, obtuse, with a double perforation. Corolla: none, unless the scales be called nectaries. Stamina: filaments two, capillary, very short, from the perforations of the scales; antheræ oblong, quadrangular. II. Female. Calyx: spathe; aments four, columnar, imbricate with germs. Corolla: none. Pistillum: germs many, imbricate, compressed-quadrangular, obtuse; styles solitary, very short; stigmas somewhat headed, lacerated. Pericarpium: berry the form of the germ, one-celled, one-seeded. Seed oblong, compressed.—*Essential Character.* Male. Spathe caducous; ament imbricate with turbinate scales, compressed-quadrangular; corolla none. Female as in the male; germs imbricate; style one; stigma lacerated; berry one seeded.

There is only one species, called cecropia peltata, trumpet-tree, or snake-wood. It rises commonly to a considerable height, being seldom under thirty-five or forty feet in the most perfect state. The trunk and branches are hollow every where, and stopped from space to space with membranous septas, answering to so many light annular marks in the surface; leaves few, alternate, large, at the ends of the branches; they are peltate, divided into many lobes like those of *carica papaya*, downy-white underneath, petioled; lobes entire, sharp, rugged on the upper surface, the nerves obliquely transverse, and the veins very much so. There are stipules between the leaves, as in the fig, opening on the side opposite to the leaf, obvolute or imbricate on the edge, soon falling off. The fruits rise four, five, or more, from the very top of a common peduncle, and shoot into so many oblong cylindrical berries, composed of a row of little *acini*, something like our raspberry, which they resemble in flavour when ripe, and are agreeable to most European palates on that account. The wood of this tree, when dry, is very apt to take fire by attrition. The native Indians have taken the hint, and always kindle their fires in the woods by rubbing a piece of it against some harder wood. The bark is strong and fibrous, and is frequently used for all sorts of cordage. The trunk is very light, and for that reason much used for bark-logs and fishing-floats. The smaller branches, when cleared of the septums, serve for wind instruments. Both trunk and branches yield a great quantity of fixed salt, which is much used among the French, to despumate and granulate their sugars. The fruit is much fed upon by pigeons and other birds, and thus the tree is much spread and propagated. Native of South America, and the West-India islands. Miller received specimens of this tree from Dr. Houston, who found it growing naturally at Vera Cruz in New Spain; it does not appear however that he ever cultivated it. In the catalogue of the royal botanic garden at Kew, it is said to have been introduced in 1778, by Thomas Clark, M. D.

Propagation and Culture. It may be propagated by seeds, procured from the places of natural growth. They should be brought over in sand, for, if they are put up moist in papers, they will be apt to grow mouldy. They should be sown in small pots, filled with light earth, and plunged into a moderate hot-bed of tanner's-bark, observing to water the pots duly, and to admit fresh air whenever the weather is favourable. When the plants come up and are fit to transplant, they should be carefully taken up, and each planted in a separate small pot, filled with the like light earth, and plunged into the hot-bed again, being careful to water them to settle the earth to their roots, and also to screen them from the sun till they have taken new root: after which they should be constantly kept plunged into the bark-bed in the stove, and treated in the same manner as other plants from the same country.

CE'CROPS, a native of Sais, in Egypt, who led a colony to Attica about 1556 years before the Christian era, and reigned over part of the country which was called from him Cecropia. He softened and polished the rude and

and uncultivated manners of the inhabitants, and drew them from the country to inhabit twelve ſmall villages which he had founded. He gave them laws and regulations, and introduced among them the worſhip of thoſe deities which were held in adoration in Egypt. He married the daughter of Actæus, a Grecian prince, and was deemed the firſt founder of Athens. He taught his ſubjects to cultivate the olive, and inſtructed them to look upon Minerva as the watchful patroneſs of their city. It is ſaid that he was the firſt who raiſed an altar to Jupiter in Greece, and offered him ſacrifices. After a reign of fifty years, ſpent in regulating his newly-formed kingdom, and in poliſhing the minds of his ſubjects, Cecrops died, leaving three daughters, Aglauros, Herſe, and Pandroſos. He was ſucceeded by Cranaus, a native of the country. Some time after, Theſeus, one of his ſucceſſors, formed the twelve villages which he had eſtabliſhed, into one city, to which the name of Athens was given. See ATHENS. Some authors have deſcribed Cecrops as a monſter, half a man and half a ſerpent; and this fable is explained by the recollection that he was maſter of two languages, the Greek and Egyptian; or that he had the command over two countries, Egypt and Greece. Others explain it by an alluſion to the regulations which Cecrops made amongſt the inhabitants concerning marriage and the union of the two ſexes.

CECU'TIENCY, ſ. [*cæcutio*, Lat.] Tendency to blindneſs; cloudineſs of ſight.

CE'DAR, an iſland of United America, on the coaſt of Virginia. Lat. 37. 37. N. lon. 76. 40. W. Greenwich.

CE'DAR, a river of Canada, which runs into Lake Michigan. Lat. 47. 30. N. lon. 86. 50. W. Greenwich.

CE'DAR, a lake of North America. Lat. 53. 8. N. lon. 100. 5. W. Greenwich.

CE'DAR, BARBADOES, ſ. in botany; ſee CEDRELA. CEDAR, BERMUDAS and CAROLINA; ſee JUNIPERUS. CEDAR, JAMAICA; ſee THEOBROMA. CEDAR, LIBANUS or LEBANON; ſee PINUS CEDRUS. CEDAR, LYCIAN, PHENICIAN, and VIRGINIAN; ſee JUNIPERUS. CEDAR, VIRGINIAN and WHITE; ſee CUPRESSUS. No modern botaniſts find any of the cedar-trees that agree with the ſcripture account of their loftineſs; but rather with that account of them which the pſalmiſt gives, when he ſays, the flouriſhing ſtate of a people is, that they ſpread their branches like the cedar-tree. Maundrell, in his travels, ſays, he meaſured the trunks of ſome old cedar-trees, and found one to be twelve yards in circumference, and thirty-ſeven yards in the ſpread of its boughs; but the *altitude* he does not mention as remarkable, nor correſpondent either to the ſcripture account, or to that in the following paſſage:

I muſt yield my body to the earth:
Thus yields the *cedar* to the axe's edge,
Whoſe arms gave ſhelter to the princely eagle;
Under whoſe ſhade the ramping lion ſlept;
Whoſe top branch overpeer'd Jove's ſpreading tree,
And kept low ſhrubs from winter's pow'rful wind. *Shakſ.*

CE'DAR POINT, a port of entry in Charles county, Maryland, on the eaſt ſide of Patowmac river, about twelve miles below Port Tobacco, and ninety-ſix ſouth by weſt of Baltimore, in the American States. Its exports are chiefly tobacco and Indian corn, and in 1794, amounted in value to 18,593 dollars.

CEDEY'RA, a town of Spain, in the province of Galicia: five leagues north of Ferrol.

CED'MA, ſ. [from κεδάω, Gr. to diſperſe.] A defluxion, or rheumatic affection ſcattered over the parts about the hips.

CEDOG'NA, a town of Italy, in the kingdom of Naples, and province of Principato Ultra, the ſee of a biſhop, ſuffragan of Conza, at the foot of the Apennines; in a ſtate of decay: twelve miles north-weſt of Melfi.

CEDRE'LA, ſ. BARBADOES BASE CEDAR; in botany, a genus of the claſs pentandria, order monogynia, natural order miſcellaneæ. The generic characters are—Calyx: perianthium monophyllous, campanulate, very ſmall, five-toothed, withering. Corolla: funnel-form, pentapetalous, the tube bellied below; petals linear-oblong, obtuſe, erect, adjoined to the receptacle at one-third beneath. Stamina: filaments five, ſubulate, ſeated on the receptacle, ſhorter than the corolla; antheræ oblong, bent outwards at the tip. Piſtillum: receptacle proper five-cornered; germ globular; ſtyle cylindric, length of the corolla; ſtigma headed, depreſſed. Pericarpium: capſule ſuperior, woody, roundiſh, five-celled, five-valved; valves deciduous. Seeds numerous, fleſhy, imbricate downwards, terminated by a membranaceous wing. Receptacle woody, five-angled, free.—*Eſſential Character.* Calyx withering; corolla five-petalled, funnel-form, faſtened by the baſe to the receptacle to one-third of its length; capſule woody, five-celled, five-valved; ſeeds imbricate downwards, with a membranaceous wing.

Only one ſpecies, called cedrela odorata: flowers panicled. This tree riſes with a ſtraight ſtem to the height of ſeventy or eighty feet: while young the bark is ſmooth, and of an aſh-colour; but, as it advances, the bark becomes rough and of a darker colour. Towards the top it ſhoots out many ſide branches, garniſhed with winged leaves, compoſed of ſixteen or eighteen pair of leaflets, ſo that they are ſometimes near three feet long; the leaflets are broad at their baſe, and are near two inches long, blunt at their ends, and of a pale colour; theſe emit a very rank odour in the ſummer ſeaſon, ſo as to be very offenſive. The fruit is oval, about the ſize of a partridge's egg, ſmooth, of a very dark colour, and opens in five parts, having a five-cornered column ſtanding in the middle, between the angles of which the winged ſeeds are cloſely placed, lapping over each other like the ſcales of fiſh. The trunk is covered with a rough bark, marked with longitudinal fiſſures. This, as well as the berries and leaves, has a ſmell like aſſafœtida, when freſh. The timber however has a pleaſant ſmell. This is commonly known under the name of cedar in the Britiſh Weſt-India iſlands. The trunk is ſo large as to be hollowed out into canoes and periaguas, for which purpoſe it is extremely well adapted, the wood being ſoft, it may be cut out with great facility, and, being light, it will carry a great weight on the water. There are canoes in the Weſt-Indies, which have been formed out of theſe trunks, forty feet long and ſix broad; the wood is of a brown colour, and has a fragrant odour, whence the title of cedar has been given to it: it is frequently cut into ſhingles for covering houſes, and is found very durable; but, as the worms are apt to eat this wood, it is not proper for building ſhips, though it is often uſed for that purpoſe, as alſo for ſheathing of ſhips. It is often uſed for wainſcoting of rooms, and to make cheſts, becauſe vermin do not ſo frequently breed in it, as in many other ſorts of wood, this having a very bitter taſte, which is communicated to whatever is put into the cheſts, eſpecially when the wood is freſh; for which reaſon it is never made into caſks, becauſe ſpirituous liquors will diſſolve part of the reſin, and thereby acquire a bitter taſte. Dampier mentions ſome of theſe trees in the iſland of St. Andreas near the iſle of Providence, the bodies of which were forty or fifty, and many ſixty or ſeventy, feet long. Loureiro has another ſpecies, to which he has given the name of *cedrela roſmarinus*. It is a ſhrub, about four feet high, with linear leaves, and axillary one-flowered peduncles; the ſeeds are not winged. It grows wild in Cochinchina and about Macao in China. It yields a fine eſſential oil, and a ſpirit not inferior to that which is drawn from roſemary.

Propagation and Culture. It is propagated by ſeeds, which may be eaſily procured from the Weſt-Indies. They muſt be ſown upon a hot-bed in the ſpring, and the plants treated in the ſame manner as the mahogany. See SWIETENIA. They are of much quicker growth, for in four years the plants will be upwards of ten feet high.

CEDRE'NUS (George), a Grecian monk, who lived in

in the 11th age, and wrote Annals, or an Abridged History, from the Beginning of the World to the Reign of Isaac Comnenus emperor of Constantinople, who succeeded Michael IV. in 1057. This work is no more than an extract from several historians. There is an edition of it, printed at Paris in 1647, with the Latin version of Xylander, and the notes of father Goar, a Dominican.

CE'DRINE, *adj.* [*cedrinus*, Lat.] Of, or belonging to, the cedar-tree.

CE'DRO, *s.* in botany. See CEDRELA.

CEDRONEL'LA, *s.* in botany. See DRACOCEPHALUM.

CEDRO'TA, *s.* in botany, a genus of the class octandria, order monogynia. The generic characters are—Calyx: perianthium one-leaved, six-parted; parts ovate, obtuse, concave. Corolla: none. Stamina: filaments eight, short; antheræ roundish. Pistillum: germ superior, roundish, surrounded by a gland; style short; stigma obtuse.—*Essential Character.* Calyx six-parted; corolla none; germ superior, surrounded by a gland; style short.

There is but one species, called cedrota guianensis. It is a tree forty feet in height, and two feet in diameter, with a thick, unequal, wrinkled, bark, full of clefts, and a yellow, heavy, aromatic, wood, which however becomes light when dry. It has a great number of large branches at top, some straight, others inclined, and spreading every way. These are loaded with twigs, having leaves either opposite, or in whorls of three or five together: they are smooth, thin, entire, oblong, oval, acuminate, on a short petiole channelled above. Flowers very small, loosely racemed, on a long, weak, axillary, peduncle. It grows in the great forests of Guiana, flowering in May. The inhabitants call it *bois de cedre*, and use it for making their *pirogues*; they say that it is also fit for masts.

CE'DRUS, *s.* in botany. See CEDRELA, CLIFFORTIA, JUNIPERUS, PINUS, and SWIETENIA.

CEES'TER, a town of Germany, in the duchy of Holstein: eleven miles west of Pinnenberg.

CEES'TER MU'HE, a town of Germany, in the duchy of Holstein: thirteen miles west of Pinnenberg.

CEFALU', a sea-port of Sicily, in the valley of Demona, on the north coast of the island, the see of a bishop, suffragan of Messina. The harbour will not contain above thirty or forty vessels. The number of inhabitants is about 5000: fourteen miles east of Termini. Lat. 38. 5. N. lon. 31. 51. E. Ferro.

CEGI'NUS, the name of a fixed star of the third magnitude, in the left shoulder of Bootes; marked γ by Bayer.

CE'GLIA, a town of Italy, in the kingdom of Naples, and province of Bari: five miles south-south-east of Bari.

CEI'BA, *s.* in botany. See BOMBAX.

To CEIL, *v. a.* [*cælo*, Lat.] To overlay, or cover, the inner roof of a building.—And the greater house he *ceiled* with fir-tree, which he overlaid with fine gold. *2 Chron.*

CEIL'ING, *s.* The inner roof of a building:

And now the thicken'd sky
Like a dark *ceiling* stood; down rush'd the rain
Impetuous. *Milton.*

For the construction of ceilings, see ARCHITECTURE, vol. ii. p. 108 and the article PLASTERING.

CEIME'LIA, *s.* [from κειμαι, Gr. to be laid up.] Choice or precious furniture or ornaments, reserved for extraordinary uses; in which sense, sacred garments, vessels, &c. are the ceimelia of a church. Medals, antiques, manuscripts, records, &c. are the ceimelia of men of letters.

CEIMELIAR'CHUM, *s.* The repository or place where ceimelia are preserved.

CEIMELIO'PHYLAX, [from κειμηλιον, and φυλαττω, Gr. to keep.] The keeper or curator of a collection of ceimelia; sometimes denominated *ceimeliarcha*. The ceimeliarcha, or ceimeliophylax, was an officer in the ancient churches or monasteries, answering to what was otherwise denominated *chartophylax*, and *custos archivorum*.

CEI'RA, a town of Portugal, in the province of Beira: one league south-east of Coimbra.

CEI'RA, a river of Portugal, which runs into the Mondego, about a league south-east of Coimbra.

CELÆ'NÆ, in the ancient geography, a city of Phrygia, of which it was once the capital. Cyrus the younger had a palace there, with a park filled with wild beasts, where he exercised himself in hunting. The Mæander arose in this park. Xerxes built a famous citadel there after his defeat in Greece. The inhabitants of Celænæ were carried by Antiochus Soter to people Apamea when newly founded. *Strabo.*

CE'LANDINE, *s.* in botany. See CHELODINUM.

CELA'NO, a town of Italy, in the kingdom of Naples, and province of Abruzzo Ultra, near a lake of the same name: sixteen miles west of Solmona.

CELA'NO, a river of Italy, which runs into the Gulf of Tarento, three miles from Rossano.

CE'LARENT, *s.* among logicians, a mode of syllogism wherein the major and conclusion are universal negative propositions, and the minor an universal affirmative; *e. g.*

cE None whose understanding is limited can be omniscient.
lA Every man's understanding is limited.
rEnt Therefore no man is omniscient.

CELAS'TRUS, *s.* [from κηλα, a dart or pole, which it represents. Blanchard derives it from κηλας, a week, because it is slow in bringing its fruit to maturity.] The STAFF-TREE; in botany, a genus of the class pentandria, order monogynia, natural order dumosæ. The generic characters are—Calyx: perianthium one-leaved, half five-cleft, flat, small; divisions obtuse, unequal. Corolla: petals five, ovate, spreading, sessile, equal, reflected at the borders. Stamina: filaments five, subulate, length of the corolla; anthers very small. Pistillum: germ very small, immersed in a large flat receptacle, which is marked with ten streaks; style subulate, shorter than the stamens; stigma obtuse, trifid. Perianthium: capsule coloured, ovate, obtusely triangular, gibbous, trilocular, trivalvular. Seeds: few, ovate, coloured, smooth, half involved in an unequal coloured aurillus, with a four-cleft mouth.—*Essential Character.* Corolla five-petalled, spreading; capsule triangular, trilocular; seeds calyptrated.

Species. 1. Celastrus bullatus: unarmed; leaves ovate, quite entire. It rises to the height of eight or ten feet; but in England there are few of these shrubs much more than half that height. It generally puts out two or three stems from the root, which divide upwards into several branches, covered with a brown bark, garnished with leaves near three inches long, and two broad, placed alternately on the branches; the flowers come out in loose spikes at the ends of the branches, and are white; the capsule is of a scarlet colour, set full of small protuberances; it opens into three cells, each containing a hard oval seed, covered with a thin red pulp. This shrub flowers in July, but rarely produces good seeds in England. Grows naturally in many parts of North America.

2. Celastrus scandens, or climbing staff-tree: unarmed; stem twining. This sort sends out several woody stalks, which are flexible, and twist themselves round trees and shrubs, or round each other, to the height of twelve or fourteen feet, or more, girding trees so closely as in a few years to destroy them. The leaves are about three inches long, and nearly two broad, serrate, alternate, of a lively green above, but paler on the under side, having several transverse nerves. The flowers are produced in small bunches towards the ends of the branches; they are of an herbaceous colour, and are succeeded by roundish three-cornered capsules, which are red when ripe, and spread open their three cells, disclosing their seeds in the same manner as our common spindle-tree. It flowers in the beginning of June, and the seeds ripen in autumn. Native of North America and Japan.

3. Celastrus myrtifolius, or myrtle-leaved staff-tree: unarmed; leaves ovate, finely serrate; flowers racemed; stem erect. Native of North America.

4. Celastrus procumbens, or procumbent staff-tree: unarmed, procumbent; leaves ovate, serrate; flowers axillary, subsolitary. 5. Celastrus filiformis, or filiform-branched staff-tree: unarmed; leaves lanceolate, entire; branches filiform; peduncles axillary, one-flowered. 6. Celastrus acuminatus, or acuminate-leaved staff-tree: unarmed; leaves ovate, acuminate, serrate; peduncles axillary, one-flowered; stem erect, lax. 7. Celastrus microphyllus: unarmed; leaves ovate, obtuse, entire; cymes terminal, dichotomous. All found at the Cape of Good Hope by Thunberg.

8. Celastrus articulatus: unarmed; leaves rounded, acuminate, serrate; peduncles axillary, subtrifid. 9. Celastrus dilatatus: leaves obovate, cusped, serrate at the tip, and smooth; stem unarmed. 10. Celastrus striatus: unarmed; branchlets erect, striated; leaves ovate, acuminate, serrate; peduncles scattered, one-flowered. 11. Celastrus alatus, or wing-branched staff-tree: unarmed; branches winged. This and the three foregoing species were first observed by Thunberg in Japan. The last is a handsome shrub, singular for its winged branches. It is frequently cultivated by the Japanese in their gardens: and the young men hang bunches of the flowers before the doors of a house, to signify their desire to pay addresses to a young woman within.

12. Celastrus buxifolius, or box-leaved staff-tree: spines leafy; branches angular; leaves obtuse. This rises with a slender woody stalk to the height of ten or twelve feet, covered with a light ash-coloured bark, and full of joints, armed with long spines, upon which grow many small leaves; the branches are slender, armed also with spines at every joint; but the whole plant is so weak as to require some support. The leaves come out in clusters, without any order, are shaped somewhat like those of the narrow-leaved box-tree, but longer and of a loose texture. They are obovate and acutely serrate. Both branches and branchlets are angular. The flowers are on peduncled cymes from the axils. The fruit is globular; in the next species it is triquetrous. Native of the Cape of Good Hope, and flowers in May and June.

13. Celastrus pyracanthus, or pyracantha-leaved staff-tree: spines naked; branches round; leaves acute. This rises with an irregular stalk, three or four feet high, sending out several side branches, covered with brown bark. Leaves about two inches long, and more than half an inch broad, some pointed and others obtuse; they are stiff, of a lucid green, come out irregularly from the branches, and continue green through the year. The flowers are produced from the sides of the branches in loose tufts, many from one point, on long peduncles, and of an herbaceous white colour. The fruit is of a fine red colour, and opens into three cells, containing one oblong hard seed; two of the cells being generally empty. It is a native of the Cape of Good Hope, whence the seeds were first brought to the gardens in Holland, and thence communicated to most of the curious gardens in Europe. Flowers most part of the summer.

14. Celastrus lucidus, or shining staff-tree, or small Hottentot cherry: leaves oval, shining, quite entire, margined. An upright shrub, with brown hard branches. Native of the Cape of Good Hope; flowers from April to September.

15. Celastrus linearis, or linear-leaved staff-tree: spines leafy; leaves linear, entire. 16. Celastrus integrifolius, or entire-leaved staff-tree: spines leafy; leaves ovate, obtuse, quite entire; cymes lateral. Found at the Cape of Good Hope by Thunberg.

17. Celastrus crenatus, or notch-leaved staff-tree: unarmed; leaves ovate, crenulate; cymes axillary. Native of the Marquesas islands in the South Seas.

18. Celastrus corniculatus: leaves oval, quite entire, perennial; capsule three-horned. It has the appearance of euclea, and is a native of the Cape of Good Hope.

19. Celastrus cassinoides, or crenated staff-tree: unarmed; leaves ovate, acute both ways, loosely toothed, perennial; flowers axillary. Native of the Canary Islands; flowers in August and September.

20. Celastrus phyllacanthus: thorns leafy; leaves lanceolate, serrate, perennial; flowers lateral. Found in Senegal by Adanson. It flowered in the Paris garden, but has not borne fruit.

21. Celastrus octogonus, or angular-leaved staff-tree: unarmed; leaves elliptic, angular, almost nerveless, perennial; capsules bivalve, one-seeded. Found in Peru by Dombey. There are other species from Peru and Chili, which have a bivalve capsule. It flowers in October.

22. Celastrus undulatus, or wave-leaved staff-tree: unarmed; leaves nearly opposite, lanceolate, waved; capsules bivalve, many seeded. Commerson found it in the isle of Bourbon, where they call it *bois de joli cœur*, and use it as an antisiphylitic.

Propagation and Culture. The first species is propagated here by layers, which will take root in one year; the young branches only are proper for this purpose, so that, where there are not any of these near the ground, the main stalks should be drawn down, and fastened with pegs to prevent their rising, and the young shoots from them should be laid. The best time for doing this is in autumn, when they begin to cast their leaves, and by that time twelvemonths they will be sufficiently rooted, when they should be cut off from the old plant, and planted in a nursery for two or three years, to get strength; after which they must be removed to the places where they are to remain. This shrub grows naturally in moist places, and will not thrive well in a dry soil. It is very hardy, and bears the cold of our winters very well. It is also propagated by seeds, which are frequently brought from America; but, as these rarely arrive here time enough to sow before the spring, the plants never come up the first year; therefore the seeds may be sown either in pots, or in a bed of loamy earth, keeping them clean from weeds during the summer; and those in the pots should be placed in the shade till the autumn, when the pots should be either plunged into the ground in a warm situation, or placed under a common frame, to prevent the frost from penetrating through the sides of the pots; and, if the surface of those which are plunged into the ground, and also the bed where the seeds are sown, are lightly covered with some old tan from a decayed hot-bed, it will secure the seeds from being hurt by severe frosts. In the spring, when the plants come up, they must be kept clear from weeds; and, if the season prove dry, they should have water now and then, which will greatly forward their growth. If the plants make good progress the first summer, they may be transplanted into a nursery in autumn; otherwise they should remain in the seed-bed till the second year, when they may be treated in the same manner as the layers.

The seeds of the second sort generally ripen well in England, and this may be propagated from these or by layers, as the former. It delights in a strong loamy soil, rather moist than dry, and will grow in woods, among other trees and shrubs; where, when the fruit is ripe, it makes a pretty appearance. It is extremely hardy.

The Cape sorts may be propagated by cuttings, which is more expeditious than raising them from seeds, because these rarely come up the same year. The cuttings may be planted any part of the summer; but those which are planted early will have more time to get strength before winter. Put them in small pots filled with good kitchen-garden earth, four together: plunge them into a moderate hot-bed, shade them from the sun, and gently refresh them with water now and then. When they have taken root, expose them gradually to the open air, and then place them in a sheltered situation till they have obtained strength. Plant each in a small pot filled with the same earth; place them in the shade till they have taken fresh root; set them with other exotic plants in a sheltered situation till autumn; then house them with other hardy green-house plants. See Cassine, Ceanothus, and Euonymus.

CE'LATURE, *f.* [*cælatura*, Lat.] The art of engraving, or cutting in figures.

CE'LEBES, an island in the Eastern Indian Ocean, about 500 miles long, and 200 broad. It is situated under the equator, between the island of Bormeo and the Spice Islands. The heat, which would otherwise be excessive, is moderated by the abundant rains which fall, as they say, regularly some days before and after the full moon. The vapours which rise from the mines of gold and copper, and those which are caused by the alternate rain and heat, would render the air very unwholesome if the north winds did not frequently purify it: these winds produce terrible tempests and thunder. In the centre of the island are mountains, almost inaccessible, in which are found quarries of excellent stone and marble, mines of gold, copper, and tin. Some of the provinces are covered with trees, ebony, sandal, and other woods, used for dying; carpenters' wood is very common, and bamboos of a size fit for boats. The trees are always green, fruits and flowers in all seasons, jasmines, roses, carnations, and other beautiful flowers, grow without culture; orange-trees and citrons shade the plains, with mangoes, bananas, and other fruits; cotton-trees cover the extensive plains. It produces no spice except pepper; the inhabitants raise a great number of cattle; the oxen are larger than those of Europe. In the forests are large herds of deer, wild hogs, and a great variety of monkies, large and ferocious; some with tails and some without; some walking upon their four legs, others upon two; the largest and most dangerous are the white, especially to women, whom they seize and carry away. The chief enemies of the monkies are serpents, which are continually in pursuit of them, the larger swallowing them whole; the smaller employ art and cunning to ensnare them: perched upon a tree, they make a hissing noise, which draws the curious apes to find the cause, when the serpent suddenly seizes on his prey, and drinks his blood. Anciently, the inhabitants considered the sun and the moon as their gods; at present, they pretend to be Mahometans. No place is furnished with a greater variety of poisons; and the natives, it is said, study which will have the most speedy operation. Their darts, which are dipped in poison, give instant death. Travellers say, that, even if a limb be cut off immediately after the wound is received, it will not save the patient's life. The Dutch first settled and fortified this island, as a barrier against all nations. The principal articles which the Dutch obtain from this colony are rice, gold, ivory, deals, and sandal wood; cotton, camphor, ginger, long pepper, and pearls. They carry thither scarlet cloth, gold and silver stuffs, linens of Cambray, tin, copper, iron, soap, and assafoetida. This island is also called Macassar, from a town of that name in the southern part of the island. Lat. 1. 20. N. to 5. 40. S. lon. 118. 40. to 124. 15. E. Greenwich.

To CE'LEBRATE, *v. a.* [*celebro*, Lat.] To praise: to commend; to give praise to; to make famous.—The songs of Sion were psalms and pieces of poetry that adored or *celebrated* the Supreme Being. *Addison.* To distinguish by solemn rites; to perform solemnly.—He slew all them that were gone to *celebrate* the sabbath. 2 *Maccabees.* To mention in a set or solemn manner, whether of joy or sorrow:

This pause of pow'r 'tis Ireland's hour to mourn,
While England *celebrates* your safe return. *Dryden.*

CELEBRA'TION, *f.* Solemn performance; solemn remembrance.—He laboured to drive sorrow from her, and to hasten the *celebration* of their marriage. *Sidney.*—Praise; renown, memorial. No more shall be added in this place, his memory deserving a particular *celebration*, than that his learning, piety, and virtue, have been attained by few. *Clarendon.*

CELE'BRIOUS, *adj.* [*celeber*, Lat.] Famous; noted; renowned.—The Jews, Jerusalem, and the temple, having been always so *celebrious*; yet when, after their captivities, they were despoiled of their glory, even then the Assyrians, Greeks, and Romans, honoured with sacrifices the Most High God, whom that nation worshipped. *Grew.*

CELE'BRIOUSLY, *adv.* In a famous manner.

CELE'BRIOUSNESS, *f.* Renown; fame.

CELE'BRITY, *f.* [*celebritas*, Lat.] Public and splendid transaction.—The manner of her receiving, and the *celebrity* of the marriage, were performed with great magnificence. *Bacon.*

CELEN'ZA, a town of Italy, in the kingdom of Naples, and province of Abruzzo Citra: twelve miles east of Civita Borello.

CE'LERES, in Roman antiquity, the body-guard belonging to the Roman kings, established by Romulus, and composed of 300 young men, chosen out of the most illustrious Roman families. They always attended near the king's person, to be ready to carry his orders, and to execute them. In war they made the van-guard in the engagement, which they always began first; in retreats they made the rear-guard. Though they were a body of horse, yet they usually dismounted, and fought on foot; their commander was called tribune, or prefect of the Celeres. They were divided into three troops of 100 each, commanded by a captain called centurio. Their tribune was the second person in the kingdom.

CE'LERI, or CELERY, *f.* in botany. See APIUM.

CELE'RITY, *f.* [*celeritas*, Lat.] Swiftness; speed; velocity.—Whatever increaseth the density of the blood, even without increasing its *celerity*, heats, because a denser body is hotter than a rarer. *Arbuthnot.*—In mechanics, it denotes that affection of motion by which any moveable body runs through a given space in a given time.

CELES'TIAL, *adj.* [*celestis*, Lat.] Heavenly; relating to the superior regions:

There stay, until the twelve *celestial* signs
Have brought about their annual reckoning. *Shakesp.*

Heavenly; relating to the blessed state:

Play that sad note
I nam'd my knell, whilst I sit meditating
On that *celestial* harmony I go to. *Shakespeare.*

Heavenly, with respect to excellence:

Telemachus, his blooming face,
Glowing *celestial* sweet, with godlike grace. *Pope.*

CELES'TIAL, *f.* An inhabitant of heaven:

Thus affable and mild the prince precedes,
And to the dome th' unknown *celestial* leads. *Pope.*

CELES'TIALLY, *adv.* In a heavenly manner.

To CELES'TIFY, *v. a.* [from *celestis*, Lat.] To give something of heavenly nature to any thing. *Not used.*—We should affirm, that all things were in all things, that heaven were but earth terrestrified, and earth but heaven *celestified*, or that each part above had influence upon its affinity below. *Brown.*

CELES'TINS, a religious order, so called from their founder, Peter de Meuron, afterwards raised to the pontificate under the name of Celestin V. Meuron, who was born at Isernia, in the kingdom of Naples, in 1215, retired, while very young, to a solitary mountain, in order to dedicate himself wholly to prayer and mortification. The fame of his piety brought several to see him; some of whom, charmed with his virtues, renounced the world to accompany him in solitude. With these he formed a kind of community, which was approved by Pope Urban IV. in 1264, and erected into a distinct order, called the hermits of St. Damien. Peter de Meuron governed this order till 1286, when his love of solitude and retirement induced him to quit the charge. In July, 1294, the great reputation of his sanctity raised him to the pontificate. He then took the name of Celestin V. and his order that of Celestins. By his bull he approved their constitutions, and confirmed all their monasteries. After his death, which happened in 1296, his order made great progress, and established convents all over Europe.

CELET'TE, a town of France, in the department of the Loire and Cher, and chief place of a canton, in the district of Blois: four miles south of Blois.

CELEU'MA, *s.* in antiquity, the shout or cry of the seamen, whereby they animated each other in their work of rowing. The word is formed from κελευειν, to call, to give the signal. Celeuma was also a kind of song or formula, rehearsed or played by the master or others, to direct the strokes and movements of the mariners, as well as to encourage them to labour.

CE'LEUS, a king of Eleusis, father to Triptolemus by Metanira. He gave a kind reception to Ceres, who taught his son the cultivation of the earth. His rustic dress became proverbial. *Virgil.*

CELEUS'TES, *s.* in ancient navigation, the boatswain or officer appointed to give the rowers the signal when they were to pull, and when to stop. He was also denominated *epopeus*, and by the Romans *portisculus*; sometimes simply *hortator*.

CE'LIAC, *adj.* [from κοιλια, Gr. the belly.] Relating to the lower belly.—The blood moving slowly through the celiac and mesenteric arteries, produces complaints. *Arbuthnot.*

CE'LIBACY, *s.* [from *cœlebs*, Lat.] Single life; unmarried state.—I can attribute their numbers to nothing but their frequent marriages, for they look on *celibacy* as an accursed state, and generally are married before twenty. *Spectator.*—The ancient Romans used all means imaginable to discourage celibacy. Nothing was more usual than for the censors to impose a fine on bachelors. Dionysius Halicarnassensis mentions an ancient constitution, whereby all persons of full age were obliged to marry. But the first law of that kind, of which we have any certainty, is that under Augustus, called *lex Julia de maritandis ordinibus*. It was afterwards denominated *Papia Poppæa*, and more usually *Julia Papia*, in regard of some new sanction and amendments made to it under the consuls Papius and Popæus. By this law, divers prerogatives were given to persons who had many children; penalties imposed on those who lived a single life, as that they should be incapable of receiving legacies, and not exceeding a certain proportion.

CE'LIBATE, *s.* [*cœlibatus*, Lat.] Single life.—The males oblige themselves to *celibate*, and then multiplication is hindered. *Graunt.*—This word is chiefly used in speaking of the single life of the Romish clergy, or the obligation they are under to abstain from marriage. The church of Rome imposes an universal celibacy on all its clergy, from the pope to the lowest deacon and subdeacon. The advocates for this usage pretend, that a vow of perpetual celibacy was required in the ancient church as a condition of ordination, even from the earliest apostolic ages. But the contrary is evident, from numerous examples of bishops and archbishops who lived in a state of matrimony, without any prejudice to their ordination or their function. It is generally agreed, that most of the apostles were married. Some say all of them, except St. Paul and St. John. Others say St. Paul himself was married, because he writes to his *yoke-fellow*, whom some interpret *his wife*. In the next ages after the apostles, we have accounts of divers married bishops, presbyters, and deacons, without any reproof or mark of dishonour set upon them. The reply which the Romanists give to this is, that all married persons, when they came to be ordained, promised to live separate from their wives by consent, which answered the vow of celibacy in other persons. There seems, indeed, to have been, in some cases, a tendency towards the introduction of such a law; for Eusebius observes, that Pinytus, bishop of Gnossus in Crete, was for laying the law of celibacy upon his brethren; but Dionysius, bishop of Corinth, wrote to him that he should consider the weakness of men, and not impose that heavy burden on them. In the council of Nice, anno 325, the motion was renewed for a law to oblige the clergy to abstain from all conjugal society with their wives, whom they had married before their ordination: but Paphnutius, a famous Egyptian bishop, and one who himself never was married, vigorously declaimed against it, upon which it was unanimously rejected. So Socrates and Sozomen tell the story; to which all that Valesius, after Bellarmin, has to say, is, that he suspects the truth of it. The council in Trullo, held in 692, made a difference in this respect between bishops and presbyters, allowing presbyters, deacons, and all the inferior orders, to cohabit with their wives after ordination; and giving the Roman church a rebuke for the contrary prohibition; but at the same time laying an injunction upon bishops to live separate from their wives, and appointing the wives to betake themselves to a monastic life, or become deaconesses in the church. And thus was a total celibate established in the Greek church as to bishops, but not any others. In the Latin church the like establishment was also made, but by slow steps, in many places. For in Africa even bishops themselves cohabited with their wives, at the time of the council of Trullo. The celibacy of the clergy, however, appears of an ancient standing, if not of command and necessity, yet as of counsel and choice. But, as it is clearly neither of divine nor apostolical institution, it is hard to conceive from what motive the court of Rome persisted so very obstinately to impose this institution on the clergy. But we are to observe, that this was a leading step to the execution of the project formed of making the clergy independent of princes, and rendering them a separate body to be governed by their own laws. In effect, while priests had children, it was very difficult to prevent their dependence on princes, whose favours have such an influence on private men; but, having no family, they were more at liberty to adhere to the pope.

After all, it seems an institution highly repugnant to reason, and to the design of Providence. For the prevalence of a notion so pernicious, and literally destructive to the human species, during a period of gross ignorance, we may easily account; but, when the world began to be enlightened by the revival of learning and philosophy, it might have been expected, that an opinion so palpably contradictory to the first law of nature, with every absurd practice to which it had given birth, would instantly disappear. To the no small discredit, however, of the reformers of the world, the same opinion, even through ages of increasing knowledge, has still remained; or, perhaps, it might more justly be said, that the practice arising from it has existed long after the parent notion has in reality been dead. Not only have the whole body of the Romish priesthood been kept in the unnatural state of celibacy, but a considerable body of the protestant clergy, in conformity to the ancient Romish institutions, have been obliged, in order to possess certain academical honours and emoluments in our universities, to deny themselves the enjoyment of domestic comforts. It is impossible that a restriction of so serious a nature should not long have been lamented as a grievous burden; yet so difficult is it to alter ancient establishments, that this grievance remains even up to the close of the eighteenth century!

CELIDOGRA'PHIA, *s.* The description of the spots which appear on the surfaces of the sun and planets.

CE'LIS, *s.* [κηλις, from καιω, to burn.] A spot or blemish upon the skin, particularly that which is occasioned by a burn.

CELL, *s.* [*cella*, Lat.] A small cavity or hollow place:

The brain contains ten thousand *cells*;
In each some active fancy dwells. *Prior.*

The cave or little habitation of a religious person:

Then did religion in a lazy *cell*,
In empty, airy, contemplations dwell. *Denham.*

A small and close apartment in a prison; any small place of residence; a cottage:

In cottages and lowly *cells*
True piety neglected dwells;
Till call'd to heav'n, its native seat,
Where the good man alone is great. *Somerville.*

Little

Little bags or bladders, where fluids, or matter of different sorts, are lodged; common in the structure both of animals and plants. *Quincy.*

CEL'LAR, *s.* [*cella*, Lat.] A place under ground, where stores and liquors are reposited.—If this fellow had lived in the time of Cato, he would, for his punishment, have been confined to the bottom of a *cellar* during his life. *Peacham.*

CEL'LARAGE, *s.* The part of the building which makes the cellars.—A good ascent makes a house wholesome, and gives opportunity for *cellarage. Mortimer.*

CEL'LARER, *s.* [from *cellerarius*, Lat.] An officer in monasteries, to whom belonged the care and procurement of provisions for the convent. The denomination is said to be borrowed from the Roman law, where *cellarius* denotes an examiner of accounts and expences. The *cellarius* was one of the four great officers of monasteries: under his ordering was the *pristinum*, or bakehouse, and the *bracinum*, or brewhouse. In the richer houses there were particular lands set apart for the maintenance of his office, called, in ancient writings, *ad cibum monachorum*. The *cellerarius* was a great man in the convent. His whole office, in ancient times, had a respect to that origin; he was to see his lord's corn got in, and laid up in granaries; and his appointment consisted in a certain proportion thereof, usually a thirteenth part of the whole, together with a furred gown. The office of cellarer then only differed in name from those of bailiff and minstrel; excepting that the cellarer had the receipt of his lord's rents through the whole extent of his jurisdiction. Cellarer was also an officer in chapters, to whom belonged the care of the temporals, and particularly the distributing of bread, wine, and money, to canons, on account of their attendance in the choir. In some places he was called *cellarer*, in others *bursér*, and in others *currier*.

CELLA'RIUS (Christopher), a learned voluminous writer, born in 1638, at Smalcalde, in Franconia. His father was minister of the town, and his mother was daughter of the famous divine Joachim Zehners. He began his studies in the college of Smalcalde, and at eighteen was removed to Jena, to finish his education in that university. He staid three years in this place, where he applied to classical learning under Bosius, to philosophy under Bechman, to the oriental languages under Frischmuth, and to mathematics under Weigelius. He took his doctor's degree in 1666. The year following he was made professor of Hebrew and moral philosophy at Weissenfels, and he filled this charge for seven years. In 1673 he was called to Weymar, to be rector of the college there. He kept this employment three years, and quitted it for another of the same kind at Zeits. After two years, the college of Mersbourg was offered to him, which he accepted. His learning, his abilities, and his diligence, soon rendered this college famous, and drew a great number of students; and the place was so agreeable to him, that he determined to end his days there. But Providence disposed of him otherwise; for, the king of Prussia having founded an university at Halle in 1693, he prevailed upon him to be professor of eloquence and history in it. Here he composed a great part of his works. His great application shortened his days, and hastened on the infirmities of old age. He was a long time afflicted, but could never be persuaded to seek assistance from medicine. He died in 1707, in his sixty-ninth year. He published good editions of above twenty Latin and Greek authors; and, although he was a very voluminous writer, yet he published nothing in haste; nothing but what was quite correct and finished, and what was likewise of great utility. His works relate chiefly to grammar, geography, history, and the oriental languages. His works in geography are well known, as excellent helps to the understanding of ancient authors.

CEL'LE, or MARIEN CELLE, a town of Germany, in the duchy of Lower Stiria, on the confines of Austria, with a celebrated abbey, to which the empress Maria Theresa presented a silver image of the Virgin, after the birth of the emperor Joseph II. twelve miles north of Pruck.

CEL'LE, a town of France, in the department of the Two Sevres, and chief place of a canton, in the district of Melle: ten miles south-east of Niort.

CEL'LE SUR THIERS, a town of France, in the department of the Puy-de-Dome: two leagues E. Thiers.

CELLEFROU'IN, a town of France, in the department of the Charente, and chief place of a canton, in the district of La Rochefoucauld: nine miles north of La Rochefoucauld.

CELLI'NI (Benvenuto), a celebrated sculptor and engraver of Florence, born in 1500, and intended to be trained to the profession of music; but, at fifteen years of age, he bound himself, contrary to his father's inclinations, to a jeweller and goldsmith, under whom he made such a progress, as presently to rival the most skilful in the profession. He also discovered an early taste for drawing and designing, which he afterwards cultivated. Nor did he neglect music; for, assisting at a concert before Clement VII. that pope took him into his service, in the double capacity of goldsmith and musician. He applied himself also to seal-engraving, learned to make curious damaskeenings of steel and silver on Turkish daggers, &c. and was very ingenious in medals and rings. But Cellini excelled in arms, as well as in arts; and Clement VII. valued him as much for his bravery, as for his skill in his profession. When the duke of Bourbon laid siege to Rome, and the city was taken and plundered, the pope committed the castle of St. Angelo to Cellini, who defended it like a man bred to arms, and did not suffer it to surrender but by capitulation. Cellini, however, was one of those great wits who may truly be said to have bordered upon madness; he was of a desultory, capricious, unequal, humour; and this involved him perpetually in adventures, which were often near being fatal to his interests. He travelled among the cities of Italy, but chiefly resided at Rome, where he was sometimes in favour with the great, and sometimes not. He consorted with all the first artists in their several ways, with Michael Angelo, Julio Romano, &c. Finding himself at length upon ill terms in Italy, he formed a resolution of going to France; and, passing from Rome through Florence, Bologna, and Venice, he arrived at Padua, where he was kindly received by the famous Pietro Bembo. From Padua he travelled through Swisserland, visited Geneva in his way to Lyons, and, after resting a few days in this last city, he arrived at Paris. He met with a gracious reception from Francis I. who would have taken him into his service; but, conceiving a dislike to France, from a sudden illness he fell into there, he returned to Italy. He was scarcely arrived, when, being accused of having robbed the castle of St. Angelo of a great treasure at the time that Rome was sacked by the Spaniards, he was arrested and sent to prison. Being set at liberty, after many hardships and difficulties, he was sent for by the French king, and he set out with the cardinal Ferrara for Paris; where, when they arrived, being disgusted at the cardinal's proposing what he thought an inconsiderable salary, he set off abruptly upon a pilgrimage to Jerusalem. He was, however, pursued, and brought back to the king, who settled a handsome salary upon him, assigned him a house to live in at Paris, and granted him naturalization. But here, getting into scrapes and quarrels, and particularly having offended Madame d'Estampes, the king's mistress, he was exposed to endless troubles and persecutions; with which at length being wearied out, he obtained the king's permission to return to Italy, and went to Florence, where he was kindly received by Cosmo de Medici, the grand duke, and he engaged himself in his service. Here again disgusted with some of the duke's servants, he went to Venice, where he was caressed by Titian, Sansovino, and other ingenious artists; but, after a short stay, he returned to Florence, and resumed his business. He died in 1570. His life, written in the Tuscan language, was not published till 1730, in one volume 4to. as abounding, we presume, with personal anecdotes and strictures, which would not suffer its appearance sooner: and it was translated into English,

English, in 1771, by Dr. Nugent, and published in two vols. 8vo.

CELLI'NO, a town of Italy, in the kingdom of Naples, and province of Abruzzo Ultra: seven miles E. Teramo.

CEL'LULAR, *adj.* [*cellula*, Lat.] Consisting of little cells or cavities.—The urine, insinuating itself amongst the neighbouring muscles, and *cellular* membranes, destroyed four. *Sharp.*

CEL'ME, a town of Spain, in the province of Gallicia, on the river Lima: six leagues south of Montefura.

CELON'ZA, a town of Italy, in the kingdom of Naples, and province of Capitanata: five miles north-west of Volturara.

CELORI'CO, a town of Portugal, in the province of Beira, which contains three churches, and about 1100 inhabitants: three leagues north-west of Guarda.

CELO'SIA, *f.* The COCK'S-COMB; in botany, a genus of the class pentandria, order monogynia, natural order miscellaneæ. The generic characters are—Calyx: perianthium three-leaved; leaflets lanceolate, dry, acute, permanent, similar to the corolla. Corolla: petals five, lanceolate, acuminate, erect, permanent, stiffish, calyciform; nectary a margin surrounding the germ, very small, five-cleft. Stamina: filaments five, subulate, conjoined at the base to the plaited nectary, length of the corolla; antheræ versatile. Pistillum: germ globular; style subulate, straight, length of the stamens; stigma simple. Pericarpium; capsule globular, surrounded by the corolla, one-celled, circumcised. Seeds: few, roundish, emarginate.—*Essential Character.* Calyx three-leaved, leaflets similar to those of the five-petalled corolla; stamina conjoined at the base to the plaited nectary; capsule gaping horizontally.

Species. 1. Celosia argentea, or silvery-spiked celosia: leaves lanceolate; stipules subfalcated; peduncles angular; spikes scariose. Native of the East-Indies, China, Cochinchina, and Japan. Introduced in 1714, by the duchess of Beaufort. It flowers from June to September.

2. Celosia margaritacea: leaves ovate; stipules falcated; peduncles angular; spikes scariose. This, says Linnæus, bears so much similitude to the foregoing sort, as to be almost a variety; there can, indeed, be little doubt of its being quite so. The leaves are rather ovate, and the stamina purple. Miller describes his margaritacea as rising with an upright stalk about two feet high, garnished with oval leaves ending in points, of a pale colour; those on the lower part being four or five inches long, and one and a half broad in the middle, but they diminish gradually in their size upwards. Towards the upper part of the stalk, there are a few side branches sent out, which stand erect, each terminated by a slender spike of flowers, and the principal stalk is terminated by one which is much larger; this is two or three inches long, and about as thick as a man's middle finger, the whole spike being of a silvery colour. But there is a variety of this with slender pyramidal spikes, intermixed with red towards the top. It is different from that which was figured by Martyn in his Decades of rare Plants. The spike of this is much thicker than that of Linnæus's, and of equal size the whole length; whereas his diminishes almost to a point at the top, and the colours of both are very different. He says that it grows naturally in America; and that he has frequently received the seeds from thence.

3. Celosia cristata, or crested amaranth, or cock's-comb: leaves oblong-ovate; peduncles round, substriated; spikes oblong. This is well known by the common appellation of cock's-comb, which was given it from the form of its crested head of flowers, resembling the comb of a cock. There are many varieties, differing in form, magnitude, and colour, from the same seed. The principal colours of their heads are red, purple, yellow, and white; but some are variegated with two or three colours. Linnæus remarks, that it varies with narrow and broad leaves. It is a native of Asia. Thunberg informs us, that the crests or heads of the flowers are frequently a foot in length and breadth in Japan, and extremely beautiful, but that they degenerate in other countries. It was cultivated here in 1570.

4. Celosia paniculata, or panicled celosia: leaves ovate-oblong; stem rising, panicled; spikes alternate, terminal, remote. Miller says, that the stems are near four feet in length; and that the slender spikes are of a pale yellow, shining with a gloss like silk; that it grows naturally in most of the sugar islands; and that the seeds were sent him from Jamaica by Dr. Houstoun.

5. Celosia coccinea, or scarlet celosia, or Chinese cock's-comb: leaves ovate, stiff, earless: stem grooved; spikes manifold, crested. This has a furrowed stalk, rising three or four feet high, and terminated by several spikes of flowers variously formed, some being crested, others plumed like feathers, of a bright scarlet colour, and making a good appearance. The seeds, even when carefully saved, are apt to degenerate. According to Linnæus, it differs from the third sort, in having leaves three times as thick, and brittle; the flowers wholly purple, not red, with a purple keel; and the stamina shorter instead of longer than the corolla. It is a native of China, whence Mr. Miller received the seeds; but it was cultivated long before by Gerarde, in 1597.

6. Celosia castrensis, or branched celosia, or cock's-comb: leaves lanceolate-ovate, marked with lines, very much acuminated; stipules falcated: spikes crested. This is of humbler growth. The branches proceed from the axils of the leaves almost the length of the stalk, and are terminated by slender spikes of flowers of no great beauty. The plant, therefore, is only preserved in botanic gardens. The stem, according to Loureiro, is a foot and a half in height, red, striated, and thick, with simple rising branches. Leaves quite entire, smooth, scattered, marked underneath with red lines running obliquely, on short petioles. Linnæus adds, that they often grow by threes. Flowers blood-red, in terminating spikes, which are crested and large, and in axillary ones, which are oblong and small. The capsules have many flatted, black, shining, seeds. Native of the East-Indies. Cultivated generally in China and Cochinchina; here by Miller in 1739.

7. Celosia trigyna, or oval-leaved celosia: leaves ovate-oblong; raceme lax; pistil trifid. Native of Senegal. Introduced in 1777, by Monf. Thouin.

8. Celosia lanata, or woolly celosia: leaves lanceolate, tomentose, obtuse; spikes crowded; stamina woolly. This rises with a white woolly stalk, from two to three feet high. From the upper part come out two or three slender side-branches, which, as also the principal stalk, are terminated by woolly spikes of flowers; the corollas are so closely wrapt up in their woolly calyxes as to be scarcely visible to the naked eye; so that they make no great appearance: the extreme whiteness, however, of the stalk, leaves, and spikes, makes a pretty variety. It is a native of the island of Ceylon.

9. Celosia guaphaloides: shrubby, woolly; leaves opposite, ovate, white beneath; head globular, peduncled. Was found in Brasil, on monte Video, by Thouin.

10. Celosia nodiflora, or knotted celosia: leaves wedge-form, somewhat acute; spikes globular, lateral. Stems angular, grooved, even; leaves like those of purslane, obovate, obtuse with a point, quite entire, smooth, subpetioled. It varies, 1. with oblong leaves and peduncled heads; 2. with short roundish leaves, ending in a point, and sessile heads: the first from Sumatra, and the second from Malabar. It was introduced here in 1780; and flowers in July and August.

11. Celosia procumbens, or procumbent celosia: stems decumbent; peduncles very long, leafless; spikes ovate, approximating; capsules compressed, crested-winged. Stems two feet high, prostrate, round, little branched. Native of St. Domingo; introduced in 1784, by Monf. Thouin.

12. Celosia monsoniæ, or downy celosia: spikes compact, cylindric; branches brachiate; leaves subulate. Stems prostrate,

proftrate, branching, ending in more elongated branches, a fpan long, and hoary. Native of the Eaft-Indies.

13. Celofia polygonoides: leaves cordate; ftem hifpid; raceme fpiked, loofe; flowers three-flyled. 14. Celofia baccata: flowers three-ftyled; fruits berried. Found in the Eaft-Indies by Kœnig.

Propagation and Culture. In order to have large fine amaranths, great care fhould be taken in the choice of the feeds; for, if they are not carefully collected, the whole expence and trouble of raifing them will be loft. The feeds muft be fown on a hot-bed, which fhould have been prepared a few days before, that the violent heat may be abated, about the beginning of March; and in about a fortnight's time, if the bed is in good temper, the plants will rife; but, as they are tender when they firft appear, they require great care for a few days till they get ftrength; firft, in giving them a due proportion of air, to prevent their drawing up weak; and next, to keep them from too great a moifture, for a fmall fhare of moifture will caufe their tender ftems to rot: in fowing the feeds, there fhould be care taken not to put them too clofe; for, when the plants come up in clufters, they frequently fpoil each other for want of room to grow: in a fortnight or three weeks time the plants will be fit to remove, when you muft prepare another hot-bed, covered with a good, rich, light, earth, about four inches thick, which fhould be made a few days, that it may have a proper temperature of heat: then raife up the young plants with your finger, fo as not to break off the tender roots, and prick them into the new hot-bed, about four inches diftance every way, giving them a gentle watering to fettle the earth to their roots; but in doing this, be very cautious not to bear the young plants down to the ground by hafty watering. After the plants are thus planted, they muft be fcreened from the fun till they have taken frefh root; but, as there is generally a great fteam rifing from the fermentation of the dung, which condenfes againft the glaffes, and, dropping upon the plants, very frequently deftroys them; the glaffes fhould, therefore, be frequently turned in the day-time, whenever the weather will permit; but, if the weather happen to prove bad, it will be of great fervice to your plants to wipe off all the moifture two or three times a day with a woollen cloth, to prevent its dropping upon the plants. When your plants are firmly rooted, and begin to grow, you muft obferve to give them air every day, (more or lefs as the weather is cold or hot,) to prevent their drawing up too faft, which greatly weakens their ftems. In about a month or five weeks, thefe plants will have grown fo as to meet; therefore another hot-bed fhould be prepared of a moderate temper, and covered with the fame rich earth about fix inches thick, in which they fhould be planted (obferving to take them up with as much earth about their roots as poffible) at feven or eight inches diftance every way, giving them fome water to fettle the earth about their roots; but be very careful not to water them heavily, fo as to bear down the plants; and keep them fhaded in the heat of the day, until they have taken frefh root; and be fure to refrefh them often, but gently, with water, and give them air in proportion to the heat of the weather, covering the glaffes with mats every night, left the cold chill your beds, and ftop the growth of the plants. In the middle of May you muft provide another hot-bed, which fhould be covered with a deep frame, that your plants may have room to grow: upon this hot-bed you muft fet as many three-penny pots as can ftand within the compafs of the frame; thefe pots muft be filled with good rich earth, and the cavities between each pot filled up with any common earth, to prevent the heat of the bed from evaporating, and filling the frame with noxious fteams; then with a trowel take up your plants with as much earth as poffible to the roots, and place each fingle plant in the middle of one of the pots, filling the pot up with the earth before defcribed, and fettle it clofe to the root of the plant with your hands; water them gently, as before, and fhade them, in the heat of the day, from the violence of the fun, by covering the glaffes with mats; refrefh them often with water, and give them a good quantity of air in the day-time. In about three weeks more, thefe plants will have grown to a confiderable fize and ftrength, fo that you muft now raife the glaffes very much in the day time; and, when the air is foft, and the fun is clouded, draw off the glaffes, and expofe them to the open air, and repeat this as often as the weather will permit, which will harden them by degrees to be removed abroad into the places where they are to remain the whole feafon; but it is not adviseable to fet thefe plants out until a week in July, obferving to do it when the air is perfectly foft, and, if poffible, in a gentle fhower of rain. Let them at firft be fet near the fhelter of a hedge for two or three days, where they may be fcreened from the violence of the fun and ftrong winds, to which they muft be inured by degrees: thefe plants, when grown to a good ftature, perfpire very freely, and muft be every day refrefhed with water, if the weather be hot and dry; otherwife they will ftunt, and never produce their plumes fo fine as they would do if taken care of. This is the proper management in order to have fine amaranths; which, if rightly followed, and the kinds are good, in a favourable feafon will produce wonderful large fine heads, and are the greateft ornament to a good garden for upwards of two months: by this method, plants will grow to five or fix feet high, with crefts nearly a foot in breadth; and, perhaps, much larger, if the kind be good, and there be no want of dung or conveniencies. By the middle or latter end of September, the amaranths will have perfected their feeds, fo that you muft make choice of the largeft, moft beautiful, and leaft branching, plants, of each kind, for feed, which you fhould remove under fhelter, efpecially if the weather prove wet, or the nights frofty, that the feeds may be perfectly ripened; be fure never to take any feeds from fide-branches, nor from the neck of the plume, but only fuch as are produced in the middle thereof, which, in many plants, perhaps, may be but a fmall quantity; but thefe only can be depended on to produce good kinds the fucceeding year. See IRESINE.

CELO'TOMY, *f.* [*celotomia*, Lat. from κηλη, a tumor or hernia, and τεμνω, to cut.] The operation of cutting a hernia, or of caftration.

CEL'SA, a town of Italy, in the kingdom of Naples, and province of Principato Citra: twenty-five mile fouthweft of Cangiano.

CEL'SIA, *f.* [the name was given to this plant by Linnæus, in honour of *Olaus Celfus*, D.D. profeffor of the Greek language, and afterwards of theology, in the univerfity of Upfal.] In botany, a genus of the clafs didynamia, order angiofperma, natural order luridæ. The generic characters are—Calyx: perianthium five-parted; divifions lanceolate, obtufe, length of the corolla, permanent. Corolla: monopetalous, rotated; tube extremely fhort; border flat, half-five-cleft, unequal; divifions roundifh, of which the two fuperior ones are fmaller, the inferior one larger. Stamina: filaments four, capillary, inclined towards the fmalleft divifions of the corolla; of which the two longer ones are fhorter than the corolla, and are outwardly woolly; antheræ roundifh, fmall. Piftillum: germ roundifh; ftyle filiform, length of the ftamens; ftigma obtufe. Pericarpium: capfule roundifh, compreffed at the tip, acuminate, fitting on the calyx, bilocular. Seeds: very many, fmall, angular. Receptacles folitary, hemifpherical.—*Effential Character.* Calyx five-parted; corolla rotated; filaments bearded; capfule two-celled.

Species. 1. Celfia Orientalis, or Oriental celfia: leaves bipinnate. Leaves oblong, finely divided almoft to the midrib on both fides, lying flat on the ground: from the centre of thefe a round herbaceous ftalk rifes near two feet high, with leaves of the fame fhape the whole length, but gradually diminifhing in fize to the top; they are placed

placed alternately, and at the foot-stalk of each come out the flowers, more than half the length of the stalk; they are of an iron colour on the outside, but pale yellow within, spreading open like those of common mullein, but not so regular. It flowers in June, and the seeds ripen in September. Native of the Levant. Tournefort sent the seeds from Armenia to the royal garden at Paris, whence this plant has been communicated to most parts of Europe. It is annual; but in England it will rarely ripen its seeds, unless the plants come up in the autumn, and live through the winter. It was cultivated in 1739, in Chelsea garden.

2. Celsia arcturus, or scollop-leaved celsia: radical leaves lyrate-pinnate; peduncles longer than the flower. Native of Crete; biennial; cultivated about 1780.

3. Celsia cretica, or great-flowered celsia: radical leaves lyrate; stem leaves subcordate, embracing; flowers subsessile. Native of the East-Indies; introduced in 1776, by M. Thouin; it flowers in July; biennial.

4. Celsia linearis: leaves tern, linear, toothletted. This is an elegant, evergreen, smooth, shrub. The trunk is woody, but weak, the thickness of a quill, striated, pale brown, three feet high, putting out numerous spreading branches its whole length; the younger ones green, grooved, and very leafy. Leaves growing three together, spreading much, the largest two inches long. Professor Jacquin received it from Ortega of Madrid. It was found in Peru by Dombey; and was introduced here from France by Mr. Williams.

Propagation and Culture. If the seeds are sown on a warm dry border as soon as they are ripe, the plants will often come up and live through the winter, if the soil be poor: in rich ground they are apt to grow rank, and then they are generally destroyed by the early frosts, or will rot with much wet; but, if the plants should not rise the same autumn, there will be little hazard of their growing the following spring. They require no other care but to keep them clean from weeds, and thin them if they are too close; for they do not bear removing well, and should therefore be sown where they are intended to remain. Sometimes, when the season proves warm, the plants sown in the spring produce ripe seeds, but these cannot be depended on. The second and third species require the protection of the green-house. The fourth may be propagated both by seeds and cuttings. It succeeds best in a moderate stove, but will bear to be treated as a tender green-house plant.

CEL'SITUDE, *s.* [*celsitudo*, Lat.] Height.

CEL'SUS, a celebrated philosopher of the Epicurean sect, flourished in the second century under Adrian and Antoninus Pius, and is the same with him to whom Lucian has dedicated his Pseudamantis. He wrote a famous work against the Christian religion, under the title of "A True Discourse," which was answered by Origen in as famous a work, consisting of eight books. His "True Discourse" is lost; but his objections against Christianity may be known from the extracts which are preserved of it in Origen's answer. It is agreed on all hands, that he was a most subtle adversary, perfectly versed in all the arts of controversy, and as learned as he was ingenious: so that it is no wonder if the primitive Christians thought nothing less than such a champion as Origen a match for him.

CEL'SUS (Aurelius Cornelius), a philosopher and physician, who flourished under the reign of Augustus and Tiberius. We know but little of him; that he lived at Rome, and spent the greatest part of his days there, we have some reason to think; but whether he was born in that city, or ever made free of it, must remain for ever uncertain. He wrote upon several subjects, as we learn from Quintilian: upon rhetoric, for which he is often quoted and commended by this great master; upon the art military; upon agriculture; and we have still extant of his, eight books de Medicina, which are written in very pure Latin. There is a passage in one of these books, which deserves to be quoted, because it shews a generous and enlarged mind; because, too, it is applicable to more professions than one, and may help to cure that obstinacy and bigotry which are so natural to the pride of the human heart. Hippocrates, knowing and skilful as he was, once mistook a fracture of the skull for the natural suture, and was afterwards so ingenuous as to confess his mistake, and even to leave it upon record. "This," says Celsus, "was acting like a truly great man. Little geniuses, conscious to themselves that they have nothing to spare, cannot bear the least diminution of their prerogative, nor suffer themselves to depart from any opinion which they have once embraced, how false and pernicious soever that opinion may be; while the man of real ability is always ready to make a frank acknowledgement of his errors, and especially in a profession where it is of importance to posterity to record the truth." Boerhaave tells us, that Celsus is one of the best authors of antiquity, for letting us into the true meaning of Hippocrates; and, that without him, the writings of this father in physic would be often unintelligible, often misunderstood by us. Dr. Mead also speaks of him in the highest terms; says, that he endeavours to imitate not only his sense, but, as often as he can, his language too; and wishes that he could have done it oftener. The books de Medicina have been often printed: the best edition is supposed to be that of Leyden, 1730, in two vols. 8vo.

CEL'TÆ, or CELTES, an ancient nation, by which most of the countries of Europe are thought to have been peopled. The compilers of the Universal History are of opinion that they are descended from Gomer the eldest son of Japhet, the son of Noah. They think that Gomer settled in the province of Phrygia in Asia: Ashkenaz his eldest son, or Togarmah his youngest, or both, in Armenia; and Riphath the second son in Cappadocia. When they spread themselves wider, they seemed to have moved regularly in columns without interfering with, or disturbing, their neighbours. The descendants of Gomer, or the Celtæ, took the left hand, insensibly spreading themselves westward, towards Poland, Hungary, Germany, France, and Spain; while the descendants of Magog, Gomer's brother, moving eastward, peopled Tartary. In this large European tract, the Celtes began to appear a powerful nation under a regular monarchy, or rather under several considerable kingdoms. Mention is made of them indeed in so many parts of Europe, by ancient geographers and historians, that Ortelius took *Celtica* to be a general name for the continent of Europe, and made a map of it bearing this title. In those parts of Asia which they possessed, as well as in the different parts of Europe, the Celtes went by various names. In Lesser Asia they were known by the names of *Titans* and *Sachs*; in the northern parts of Europe, by those of *Cymmerians*, *Cymbrians*, &c. and in the southern parts they were called *Celtes*, *Gauls*, or *Galatians*. In after-times the name *Celtæ* came to be more particularly applied to that part of the Gauls, whose country, called *Gallia Celtica*, was situate between the rivers Sequana and Garumna, modernly called the Seine and the Garonne. Mr. Bryant seems to shew, that the Celtæ sprung from Celtus, the son of Polyphemus; and hence that they were of Cyclopian original, and of the Anakim race. The promontory which bore the name of *Celticum*, is now called *Cape Finisterre*.

With respect to the government of the Celtes, we are entirely in the dark. All we know is, that the curates, and afterwards druids and bards, were the interpreters of their laws; judged all causes, whether criminal or civil; and their sentence was reckoned so sacred, that whoever refused to abide by it, was by them excluded from assisting at their sacred rites; after which no man dared converse with him; so that this punishment was reckoned severer than death itself. They neither reared temples nor statues to the Deity, but destroyed them wherever they could find them, planting in their stead large spacious groves, which, being open on the top and sides, were, in their opinion, more acceptable to the Divine Being, who is absolutely unconfined. In this their religion seems

seems to have resembled that of the Persees and disciples of Zoroaster. The Celtes only differed from them in making the oak instead of the fir the emblem of the Deity; in choosing this tree above all others to plant their groves with, and attributing several supernatural virtues both to its wood, leaves, fruit, and misfletoe; all which were made use of in their sacrifices and other parts of their worship. But after they had adopted the idolatrous superstition of the Romans and other nations, and the apotheosis of their heroes and princes, they came to worship them much in the same manner; as Jupiter under the name of Taran, which in the Celtic signifies thunder; Mercury, whom some authors call *Heus* or *Hesus*, probably from the Celtic *huadh*, which signifies a dog, and might be the *Anubis latrans* of the Egyptians. But Mars was held in the greatest veneration by the warlike, and Mercury by the trading part of the nation. The care of religion was immediately under their *curates*, since known by the name of druids and bards. These were, as Cæsar tells us, the performers of sacrifices and all religious rites, and expounders of religion to the people; for an account of whom see DRUID; and for the history of the different Celtic nations, see the article GAUL, &c.

CEL'TES, *s.* Ancient instruments of a wedge-like form, which have been dug up in different parts of Great-Britain. Antiquarians have generally attributed them to the Celtæ; but, not agreeing as to their use, they distinguished them by the above appellation. Mr. Whitaker makes it probable that they were British battle-axes.

CEL'TES (Conrad), a Latin poet, of Sweinfurt near Wertzburg, born in 1549, died at Vienna in 1508, at the age of forty-seven, after having gained the poetic laurel. He has left, 1. Odes, Strasburg, 1513, 8vo. 2. Epigrams, and a Poem on the Manners of the Germans, 1610, 8vo. 3. An historical Account of the City of Nuremburg, Strasbourg, 1513, 4to. He was not deficient in the fallies of imagination, though not exempt from the defects of the age in which he wrote. He is censurable for negligencies in point of style, and with choosing his sentiments more for their brilliancy than their solidity. He wrote also four books in elegiac verse, on the same number of mistresses he boasts to have had. They appeared at Nuremberg in 1502, 4to. This volume is scarce. The emperor Maximilian made him his librarian, and granted him the privilege of conferring the poetic crown on whomsoever he judged worthy of it.

CELTIBE'RIA, in the ancient geography, a country of the Hither Spain, along the right or south-west side of the river Iberus; though sometimes the greatest part of Spain was called by the name of Celtiberia. The people were denominated *Celtiberi*, or the Celtæ seated on the Iberus. They were very brave and warlike, and made strong head against the Romans and Carthaginians when they invaded their country.

CEL'TIS, *s.* [*à celsitate*, Lat. from its height.] The LOTE or NETTLE-TREE; in botany, a genus of the class polygamia, order monoecia, natural order of scabridæ. The generic characters are—I. Hermaphrodite flowers solitary, superior. Calyx: perianthium one-leafed, five-parted; divisions ovate, patulous, withering. Corolla: none. Stamina: filaments five, very short, concealed at first by the antheræ, but, after the shedding of the pollen, growing longer; antheræ oblong, thickish, quadrangular, four-furrowed. Pistillum: germ ovate, acuminate, length of the calyx; styles two, spreading, variously inflected, subulate, pubescent on every side, very long; stigmas simple. Pericarpium: drupe globular, one-celled. Seed: nut roundish. II. Male flowers on the same plant, inferior. Calyx: perianthium six-parted; the rest as in the hermaphrodites. Corolla: none. Stamina: six; the rest as in the hermaphrodites.—*Essential Character*. Hermaphrodite. Calyx five-parted; corolla none; stamina five; styles two; drupe one-seeded. Male. Calyx six-parted; corolla none; stamina six.

Species. 1. Celtis australis, or European nettle-tree: leaves ovate-lanceolate. The European nettle-tree, or lote-tree with a black fruit, rises with an upright stem to the height of forty or fifty feet, with many slender branches which have a smooth dark-coloured bark, with some grey spots. Leaves alternate, near four inches long and about two broad in the middle. Flowers axillary all along the branches; being composed of a green calyx without any corolla, they make no appearance; they come out in the spring, at the same time with the leaves, and generally decay before these are arrived at half their size. The fruit is the size of a pea, and black. According to Pallas, it is the size of a small cherry, first yellow, then livid, on a long peduncle. It grows naturally in the south of Europe, where it is one of the largest trees. D'Asso mentions some of a prodigious height and girth in Spain; and Pallas says, that they attain the size of the elm in the Chersonesus Taurica. It is not so common in England as the second. The wood of this tree is one of the hardest we are acquainted with. Evelyn says that it was anciently used for flutes and other musical instruments, and that hafts for knives and tools were made of the root. When it arrives at any size, its hardness, toughness, and flexibility, must entitle it to more important services. Its fine regular spreading head, of a cheerful green colour, renders this tree extremely proper for clumps in parks, groves, single trees, or avenues. Of the branches are made hoops for casks, and fishing-rods. The berries are eaten by birds, and also by the children in the south of Europe.

2. Celtis occidentalis, or American nettle-tree: leaves obliquely-ovate, serrate, acuminate. The American nettle-tree rises with a straight stem, which, in young trees, is smooth and of a dark colour; but, as they advance, it becomes rougher and of a lighter green. The branches spread very much; the leaves are alternate, and on pretty long foot-stalks; the flowers come out opposite to the leaves upon long peduncles. The fruit is smaller than that of the first sort, and, when ripe, of a dark purple colour. It is very nearly related to the foregoing species; but the leaves are much broader and shorter. It grows naturally in North America, and in a moist rich soil becomes a very large tree. Evelyn says, that John Tradescant, jun. first brought it from Virginia. It flowers in May, and the seeds ripen in October. There are many large trees of this sort in the English gardens, some of which produce great quantities of fruit annually, which, in favourable seasons, come to maturity; and there are few years in which the fruit is not sent from America. This tree comes out late in the spring, but it is the latest in fading of any deciduous tree; nor do the leaves alter their colour long before they fall, but continue in full verdure till within a few days of their dropping off; so that the litter occasioned by the falling leaves may be soon cleared away. There is little beauty in the flower or fruit; but the branches being well clothed with leaves of a fine green colour, the trees, when mixed with others in plantations, make a pleasing variety during the summer season. The wood of this tree, being tough and pliable, is esteemed by coachmakers for the frames of their carriages.

3. Celtis orientalis, or oriental nettle-tree: leaves obliquely cordate, serrate, villose underneath. This tree rises with a stem about ten or twelve feet high, dividing into many branches, which spread horizontally on every side, and have a smooth greenish bark. The leaves are about an inch and a half long, and near an inch broad, inclining to a heart shape, but oblique, one side of the base being smaller and lower than the other; they are of a thicker texture than those of the common sorts, and of a paler green, alternate as they are, and on short foot-stalks. Linnæus adds, that they are very finely serrate, and the nerves underneath smooth; the peduncles are axillary, very short, and branching. The fruit is oval and yellow; when fully ripe, it turns to a darker colour. The wood of this tree is very white. It is a native of the Levant, and was discovered by Tournefort in Armenia, whence he

fent the fruit to the royal garden at Paris. The trees there raised produced fruit, and from them the other gardens in Europe have been furnished. Mr. Miller cultivated it in 1748. It yields gum like the cherry-tree; and has been found to be a native of the East-Indies, Japan, and the Society Isles.

4. Celtis Americana: leaves oblong-ovate, nerved, obtuse, smooth above, golden beneath. This rises with a straight trunk near twenty feet high, covered with a grey bark, and dividing at top into many branches. Leaves near four inches long, and two and a half broad, rounded at their extremity, of a thick texture, very smooth on their upper surface, and on their under of a lucid gold colour. The fruit is round and red. It was first discovered by father Plumier in the French West-India islands; and it was found in Jamaica by Dr. Houstoun, who sent the seeds to England.

5. Celtis micrantha, or Jamaica nettle-tree: leaves obliquely cordate, ovate-lanceolate, serrulate, somewhat rugged on the upper surface. This shrubby tree seldom rises above ten or twelve feet, and throws out a great number of loose branches. It is a native of Jamaica. Introduced in 1788, by Mr. Gilbert Alexander. It flowers in August and September.

6. Celtis aculeata: leaves cordate-ovate, blunt at the tip, almost entire, very smooth; branches prickly. This is an inelegant little tree; the branches are pliant, very long, scarcely divided, reclining, and have frequently alternate distich branchlets their whole length, the upper ones gradually shorter. Native of the Caribbee islands, and the neighbouring continent.

7. Celtis lima: leaves ovate-lanceolate, acuminate, obliquely cordate, serrate, very rugged above. Height fifteen feet; trunk straight, with a smooth reddish or light brown bark, and several branches spreading towards the top. Leaves alternate, half an inch distant from each other, two inches long, and half as broad near the base, dark green, petioled; flowers axillary, small, greenish; Fruit orange-coloured, no bigger than a pin's head, oval, insipid, having an orange-coloured pulp, and one small black round stone or seed within. Native of the West-Indies.

Propagation and Culture. These trees are all propagated by seeds, which should be sown soon after they are ripe, when they can be procured at that season, for these frequently come up the following spring: whereas those which are sown in the spring will not come up till a twelvemonth after; therefore it is the best way to sow them in pots or tubs, that they may be easily removed, for those which are sown in the spring should be placed in a shady situation in summer, and constantly kept clean from weeds; but in autumn they should be placed in a warm situation, plunging the pots into the ground; and, if they are covered over with a little tan from a decayed hot-bed, it will prevent the frost from penetrating the earth to injure the seeds; and, if these pots are placed on a gentle hot-bed in the spring, it will greatly forward the vegetation of the seeds, whereby the plants will have more time to get strength before the winter; but, when the plants appear above ground, they must have a large share of air admitted to them, otherwise they will draw up weak; and, as soon as the weather is warm, they must be exposed to the open air, and in summer they must be constantly kept clean from weeds; if the season proves dry, they will require water two or three times a week. In autumn it will be proper to remove the pots, and place them under a hot-bed frame, to shelter them in winter from severe frost; or, where there is not that conveniency, the pots should be plunged into the ground near a wall or hedge; and, as the plants, when young, are full of sap, and tender, the early frosts in autumn frequently kill the upper part of the shoots; therefore the plants should be either covered with mats, or a little straw or pease-haulm laid over them to protect them. In the following spring the plants should be taken out of the seed-pots, and planted in the full ground: this should be done about the middle or latter end of March, when the danger of the frost is over: therefore a bed or two should be prepared, according to the number of plants raised, in a sheltered situation, and, if possible, in a gentle loamy soil. The ground must be well trenched, and cleared from the roots of bad weeds, and, when levelled, should be marked out in lines at one foot distance; then the plants should be carefully turned out of the pots, and separated, so as not to tear their roots, and planted in the lines at six inches asunder, pressing the earth down close to the roots. If the ground is very dry when they are planted, and there is no appearance of rain soon, it will be proper to water the beds, to settle the ground to the roots of the plants; and after this, if the surface of the ground is covered with some old tan or rotten dung, it will keep it moist, and prevent the drying winds from penetrating to the roots of the plants. The following summer the necessary care must be, to keep them constantly clean from weeds; but, after the plants are pretty well established in the ground, they will not require any water, especially towards the latter end of the summer, for that will occasion their late growth, whereby they will be in great danger of suffering by the autumn frosts; for the more any of these young trees are stopped in their growth by drought towards autumn, the firmer will be their texture, so better able to bear the cold. The plants may remain in these nursery-beds two years, by which time they will have obtained sufficient strength to be transplanted where they are designed to remain for good, because these plants extend their roots wide every way; so that, if they stand long in the nursery, their roots will be cut in removing, which will be a great prejudice to their future growth. These sorts are hardy enough to thrive in the open air in England, after they are become strong; but, for the two first winters after they come up from seeds, they require a little protection, especially the third sort, which is tenderer than either of the former. The young plants of this sort frequently have variegated leaves, but those are more impatient of cold than the plain leaved.

Mr. Boutcher recommends to sow the seeds of the common nettle-tree in spring, soon after they are ripe, which is in January, in pots or boxes, a foot deep, with holes in the bottom, covered with oyster-shells, or tile-shreds, and three or four inches thick of rough gravel over them, to drain the moisture; then to fill them within an inch of the top with rich loose compost mould; sow the seeds, and sift over them half an inch more of the same earth. These pots or boxes ought not to be sunk into the earth, but to be raised six or eight inches by stones or logs of wood, and placed where they may receive the morning sun only, till autumn, when they should be removed under a south wall, and in severe weather be put under a covered frame, the covering being taken off in mild weather. About the beginning of April remove them to their first situation, loosen the earth gently, and sift on a little fresh mould. The end of April most of the plants will appear, when they must be frequently but moderately watered, kept clean in summer, and protected, as before, in severe weather. If you would propagate them by layers, let them be layed as soon as the leaves begin to tarnish at the end of September, or beginning of October. The wood being extremely hard, they will not root sufficiently till the second year, unless the season is wet, or you assist them with plentiful waterings. Take them up the end of March, or beginning of April, and plant them in rows at two feet and a half distance, and a foot asunder, giving them frequent waterings; keep the ground clean, and let them remain here two years. They may then be planted out for good, or removed again to greater distances, to stand three years more. This tree will do in any ordinary land, but succeeds best in a deep moist soil, where it will soon become a stately tree.

CEM'BRA, *s.* in botany. See PINUS.

CEMENT', *s.* [*cæmentum*, Latin.] The matter with which two bodies are made to cohere, as mortar or glue.—You may see divers pebbles, and a crust of *cement* between them,

them, as hard as the pebbles themselves. *Bacon.*—Bond of union in friendship.—Look over the whole creation, and you shall see, that the band or *cement* that holds together all the parts of this glorious fabric, is gratitude. *South.*

The cements used for holding together broken glasses, china, and earthen ware, are of many kinds. For this purpose the juice of garlic is recommended as exceedingly proper, being very strong, and, if the operation is performed with care, it leaves little or no mark. Quicklime and the white of an egg, mixed together, and expeditiously used, answer well for this purpose. Dr. Lewis recommends a mixture of quicklime and cheese in the following manner: sweet cheese, shaved thin and stirred in boiling water, changes into a tenacious slime which does not mingle with the water. Worked with fresh parcels of hot water, and then mixed upon a hot stone with a proper quantity of unslaked lime, into the consistence of a paste, it proves a strong and durable cement for wood, stone, earthen-ware, and glass. When thoroughly dry, which will be in two or three days, it is not in the least acted upon by water or damps. A composition of the drying oil of linseed and white-lead is also used for the same purposes, but is inferior. For the preparation of cements used in building, see MORTAR.

A cheap and valuable cement has lately been invented by the ingenious French chemist M. Chaptal, which he used as a substitute for sheet-lead, in lining rooms for his alum works, and which he found to answer his purpose in all respects equal to that metal; not being acted upon by the strong vapour of acids; neither by water or damps; nor by any degree of heat under 144 of Fahrenheit. This cement is composed of equal parts of rosin, turpentine, and wax. These three substances are melted together in a pot; and, when all the volatile oil which causes the mixture to rise is dissipated, it is to be applied, boiling hot, with a brush. The number of valuable uses to which this cement may be applied is very great: it may be employed to line the casks used on-board ships; the water or victuals kept in them would not be so subject to become putrid; even the ships themselves might be coated with it. This cement is found preferable to tar in many respects; it is not so subject to crack, it is less sticky, is more simple, and leaves a smoother surface. A board six feet long, and eighteen inches wide, covered with this cement, was kept in water for nineteen months; in all which time it had neither imbibed any water, nor was the coating at all cracked or damaged. If, in any case, it be necessary to render this cement more consistent, it may be done by the addition of powdered bricks.

The cement prepared by Mr. John Worth, of Diss, in Norfolk, and vended under the sanction of letters patent, for preserving ships and vessels from worms, and for coating over out-buildings, &c. is obviously derived from the same source. His composition is as follows: Take of rosin fourteen pounds; sand, sifted and clean washed, twenty-eight pounds; red lead three pounds and a half; oil one pound and three quarters. Melt the rosin over a gentle fire; put the sand and lead in by degrees, and lastly the oil; stirring them constantly till cold, to reduce the mass to an uniform consistence. Whenever this cement is used it must be made hot, with the addition of half a pound of what the painters call fat oil, which must be well stirred in; then it may be applied with a brush, in the same manner as common paint. This cement is of a red colour; but, if it be wanted white or green, then, instead of the red lead, use the same quantity of ceruse, or verdegris.

The following cement will be found extremely valuable for filling up cracks and fissures in iron vessels, which by this means become as sound and as useful as ever: Take six parts of yellow potters' clay, one part of the filings of iron, and as much linseed oil as will be necessary to mould it up into a stiff mixture, of nearly the same consistence as putty. In this state of it, fill up the holes or cracks as close and hard as possible, rubbing the outer and inner surfaces smooth and even; and in a few days the cement will adhere so completely to the broken sides of the iron, as to stop the leak, and obliterate the blemish.

A cement which quickly hardens in water.—This is described in the posthumous works of Mr. Hooke, and is recommended for gilding live cray-fish, carps, &c. without injuring the fish. The cement for this purpose is prepared by putting some Burgundy pitch into a new earthen pot, and warming the vessel till it receives so much of the pitch as will stick round it; then strewing some finely-powdered amber over the pitch when growing cold, adding a mixture of three pounds of linseed oil, and one of oil of turpentine, covering the vessel, and boiling them for an hour over a gentle fire, and grinding the mixture as it is wanted, with as much pumice-stone in fine powder as will reduce it to the consistence of paint. The fish being wiped dry, the mixture is spread upon it; and the gold leaf being then laid on, the fish may be immediately put into water again, without any danger of the gold coming off, for the matter quickly grows hard in the water.

To CEMEN'T, *v. a.* To unite, by means of something interposed:

Love with white lead *cements* his wings;
White lead was sent us to repair
Two brightest, brittlest, earthly things,
A lady's face, and china ware. *Swift.*

To CEMENT', *v. n.* To come into conjunction; to cohere.—When a wound is recent, and the parts of it are divided by a sharp instrument, they will, if held in close contact for some time, reunite by inosculation, and *cement* like one branch of a tree ingrafted on another. *Sharp.*

CE'MENT COP'PER, *s.* Copper precipitated from vitriolic waters by iron. The name is said to be derived from a vitriolic water in Hungary, called *Zement.*

CEMENTA'TION, *s.* The act of cementing, or uniting with cement. In chemistry, it is a process which consists in surrounding a body in the solid state with the powder of some other bodies, and exposing the whole, for a time, in a closed vessel, to a degree of heat not sufficient to fuse the contents. Thus iron is converted into steel by cementation with charcoal; green bottle glass is converted into porcelain by cementation with sand, &c. The effects of cementation appear to be chiefly produced by one or more of the bodies being converted into vapour, and acting upon the others. The change in the solid is chiefly attended to. The powder is called by the name of a *cement.*

CEMEN'TER, *s.* A person or thing that unites in society.—God, having designed man for a sociable creature, furnished him with language, which was to be the great instrument and *cementer* of society. *Locke.*

CE'METERY, *s.* [κοιμητηριον, from κοιμαω, to sleep.] A place set apart or consecrated for the burial of the dead. Among the primitive Christians, cemeteries were held in great veneration. It even appears from Eusebius and Tertullian, that, in the early ages they assembled for divine worship in them. Valerian seems to have confiscated cemeteries, with the other places of divine worship, but they were restored again by Gallienus. As the martyrs were buried in these places, the Christians chose them for building churches on, when Constantine established their religion; and hence some derive the rule, which still obtains in the church of Rome, never to consecrate an altar without putting under it the relics of some saint.

CEN, and CIN, denote *kinsfolk*: so *Cianulph* is a help to his kindred; *Cinehelm*, a protector of his kinsfolk; *Cinburg*, the defence of his kindred; *Cenric*, powerful in kindred. *Gibson.*

CENAPATAM', a town of Hindoostan, in the Mysore country: thirty-four miles north-east of Seringapatam, and twenty-eight south-west of Bangalore.

CE'NATORY, *adj.* [from *ceno*, Lat. to sup.] Relating to supper.—The Romans washed, were anointed, and wore a *cenatory* or supper garment. *Brown.*

CENCHRAMI'DIA, *s.* in botany. See CLUSIA and THEOBROMA.

CEN'CHRUS, *s.* [κεγχρος, Gr.] In botany, HEDGEHOG GRASS; a genus of the class polygamia, order monoecia, natural order of grasses. The generic characters are—Calyx: involucres many, laciniate, echinate, gathered into a head, each sessile, including three calyxes, biflorous; perianthium a bivalve glume, lanceolate, concave, acuminate, biflorous, shorter than the corolla. Corolla: one male, the other hermaphrodite; proper, each bivalve; valves lanceolate, acuminate, concave, awnless; the interior one smaller. Stamina: to each three filaments, capillary, length of the corolla; antheræ sagittate. Pistillum: germ of the hermaphrodite roundish; style filiform, length of the stamens; stigmas two, oblong, hairy, spreading. Pericarpium: none. Seed: roundish.—*Essential Character.* Involucre, laciniate, echinate, two-flowered; calyx, glume two-flowered, one male, the other hermaphrodite. Hermaphrodite: corolla, glume awnless; stamina three; seed one. Male: corolla, glume awnless; stamina three.

Species. 1. Cenchrus racemosus, or branching cenchrus: panicle spiked; glumes muricated with ciliary bristles. Native of the southern parts of Europe, on the coast of Egypt, and the East Indies; flowering in July and August.

2. Cenchrus lappaceus, or bur cenchrus: branches of the panicle very simple, corollas hispid, backward; calyxes three-valved, two-flowered. 3. Cenchrus muricatus: spike muricated, scales various, mucronated. Natives of the East Indies.

4. Cenchrus capitatus, or oval-spiked cenchrus: spike ovate, simple. Culm three or four inches high, with only one joint. Native of the South of France and Italy.

5. Cenchrus echinatus, or rough-spiked cenchrus: spike oblong, conglomerate. This is one of the most common sorts of grass in the open pastures of Jamaica, and is looked upon both as a wholesome and pleasant food for all sorts of cattle. Native of the West Indies and Society Isles; cultivated in 1691 by Mr. Doody.

6. Cenchrus tribuloides: spike glomerate, female glumes globular, muricate, spiny, hirsute. Culms many, trailing, round, yellowish, crooked, a foot and half long, the joints an inch and half distant; leaves two or three inches long. Native of Virginia and Jamaica.

7. Cenchrus ciliaris, or ciliated cenchrus: spike with setaceous, ciliated, four-flowered, involucels. Culm ascending, glossy, the thickness of a thread, a short span in length, with inflected joints. Found at the Cape by Koenig.

8. Cenchrus granularis: racemes double, fruits globular, wrinkle-netted. Native of the East Indies. Retzius says, that he has it both from Sumatra and Malabar; both have the leaves and sheaths clothed with longish white hairs.

9. Cenchrus frutescens: heads lateral, sessile; leaves mucronated, stem shrubby. Found by Tournefort in Armenia.

10. Cenchrus setosus: spike linear, oblong; involucres bristly; bristles unarmed, the interior ones villose at the base, hairs ciliate, glumes even. Native of the West Indies.

11. Cenchrus purpurascens: raceme spiked, simple; florets surrounded with very long awns, culms erect, two feet high; leaves longer than the culm; raceme loose, a span long, with peduncles the length of the florets, spreading in a double row; awns purple, six times the length of the florets. Native of Japan.

CENEAN'GIA, *s.* [from κενοω, to empty, and αγγος, a vessel.] An emptiness of the vessels, particularly those of the body, on account of abstinence, or refraining from food. By some it is thought to mean primarily, a spontaneous evacuation of blood from the vessels; and consequently that which is artificial may be meant in some authors by this term.

CENE'DA, a town of Italy, in the Trevisano, belonging to the state of Venice, the see of a bishop, suffragan of Udina; this town was destroyed by the Huns and the Goths: twenty miles north of Trevigno.

CE'NEGILD, *s.* [from *cinne*, Sax. i. e. *cognatio*, relation, and *gild*, *solutio*, payment.] In the Saxon law, an expiatory mulct, paid by one who had killed a man, to the kindred of the deceased.

CENGOT'TO, a small island in the Mediterranean, twenty-four miles north-north-west of Candia. Lat. 36. 5. N. lon. 41. 0. E. Greenwich.

CE'NIA, a river of Spain, which runs into the Mediterranean, eight miles north-east of Pegniscola. It separates the provinces of Catalonia and Valencia in its course.

CE'NIS (Mount), a part of the Alps, which separates the marquisate of Susa from Morienne.

CE'NO, or ZENO, a river of Italy, which runs into the Taro, eight miles south-south-west of Parma.

CE'NOBITE, *s.* [from κοινος, *communis*; and βιος, *vita*, life.] A religious person who lives in a convent, or in community, under a certain rule; in opposition to anchorite, or hermit, who lives in solitude. Cassian makes this difference between a *convent* and a *monastery*, that the latter may be applied to the residence of a single religious person; whereas the *convent* implies *cenobites*, or numbers of religious persons living in common. Fleury speaks of three kinds of monks in Egypt; *anchorites*, who live in solitude; *cenobites*, who live in community; and *sarabaites*, who are a kind of monks-errant, that stroll from place to place. He refers the institution of cenobites to the times of the apostles, and makes it a kind of imitation of the ordinary lives of the faithful at Jerusalem. St. Pachomius is ordinarily owned the institutor of the cenobite life; as being the first who gave a rule to any community.

CENOBI'TICAL, *adj.* [κοινος and βιος, Gr.] Living in community.—They have multitudes of religious orders, black and grey, eremitical and *cenobitical*, and nuns. *Stillingfleet.*

CE'NOTAPH, *s.* [κενος and ταφος, Gr.] A monument raised to the memory of one buried elsewhere.—The Athenians, when they lost any men at sea, raised a *cenotaph*, or empty monument:

Priam, to whom the story was unknown,
As dead deplor'd his metamorphos'd son;
A *cenotaph* his name and title kept,
And Hector round the tomb with all his brothers wept.
Dryden.

CENSE, *s.* [*census*, Lat.] Public rate.—We see what floods of treasure have flowed into Europe by that action; so that the *cense*, or rates of Christendom, are raised since ten times, yea twenty times told. *Bacon.*

To CENSE, *v. a.* [*encenser*, Fr.] To perfume with odours; contracted from *incense*:

The Salii sing, and *cense* his altars round
With Saban smoke, their heads with poplar bound. *Dryd.*

CEN'SER, *s.* [*encensoir*, Fr.] The pan or vessel in which incense is burned:

Of incense clouds,
Fuming from golden *censers*, hid the mount. *Milton.*

A pan in which any thing is burned; a fire-pan:

Here's snip, and nip, and cut, and slish, and slash,
Like to a *censer* in a barber's shop. *Shakespeare.*

The term *censer* is chiefly used in speaking of the Jewish worship. Among the Greeks and Romans it is more frequently called *thuribulum*, λιβανωτις, and *accera*. The Jewish censer was a small sort of chaffing-dish, with a dome cover suspended by a chain; and the Roman catholics still use them for their incense in particular masses. Josephus tells us, that Solomon made twenty thousand golden censers for the temple of Jerusalem, to offer perfumes in, and fifty thousand others, in which to carry fire.

CEN'SION, *s.* [*censio*, Lat.] A rate, an assessment.

CEN'SOR, *s.* [from *censere*, Lat. to see or perceive.] An officer of Rome, who had the power of correcting manners. One who is given to censure and exprobation:

Ill-natur'd *censors* of the present age,
And fond of all the follies of the past. *Roscommon.*

The business of the Roman censors was to number the people, estimate the possessions of every citizen, reform and

and watch over the manners of the people, and regulate the taxes. Their power was also extended over private families; they punished irregularity, and inspected the management and education of the Roman youth. They could inquire into the expences of every citizen, and even degrade a senator from all his privileges and honours, if guilty of any extravagance. This punishment was generally executed in passing over the offender's name in calling the list of the senators. The office of public censor was originally exercised by the kings. Servius Tullius, the sixth king of Rome, first established a *census*, by which every man was obliged to come to be registered, and give in writing the place of his residence, his name, his quality, the number of his children, of his tenants, estates, and domestics, &c. The ends of the census were very salutary to the Roman republic. They knew their own strength, their ability to support a war, or to make a levy of troops, or raise a tribute. It was required that every knight should be possessed of 400,000 sesterces, to enjoy the rights and privileges of his order; and a senator was entitled to sit in the senate, if he was really worth 800,000 sesterces. This laborious task of numbering and reviewing the people, was, after the expulsion of the Tarquins, one of the duties and privileges of the consuls. But when the republic was become more powerful, and when the number of its citizens was increased, the consuls were found unable to make the census, on account of the multiplicity of business. After it had been neglected for sixteen years, two new magistrates called censors, were elected. They remained in office for five years, and every fifth year they made a census of all the citizens, in the campus martius, and offered a solemn sacrifice, and made a lustration in the name of all the Roman people. This space of time was called a *lustrum*, and ten or twenty years were commonly expressed by two or four lustra. After the office of the censors had remained for some time unaltered, the Romans, jealous of their power, abridged the time of their existence, and a law was made, A. U. C. 420, by Mamercus Æmilius, to limit the time of the censorship to eighteen months. After the second Punic war, they were always chosen from such persons as had been consuls; their office was more honourable, though less powerful, than that of the consuls; the badges of their office were the same, but the censors were not allowed to have lictors to walk before them as the consuls. When one of the censors died, no one was elected in his room till the five years were expired, and his colleague immediately resigned. This circumstance originated from the death of a censor before the sacking of Rome by Brennus, and was ever after deemed an unfortunate event to the republic. The emperors abolished the censors, and took upon themselves to execute their office. The republic of Venice have always had a censor of the manners of their people, whose office has constantly been restrained to only six months.

CEN'SORS of BOOKS, were a society of learned persons, established in divers countries, to examine all books before they were sent to the press, to see that they contained nothing contrary to faith and good manners. The faculty of theology claimed this privilege in Paris; and in England we had formerly an officer of this kind, under the title of licenser of the press: but, since the revolution, our press has been laid under no such restraint; which constitutes what is termed *the liberty of the press*.

CENSO'RIAN, *adj.* Relating to the censor.—As the chancery had the pretorian power for equity, so the starchamber had the *censorian* power for offences under the degree of capital. *Bacon.*

CENSORI'NUS, a celebrated critic, chronologist, antiquarian, and grammarian, for such Priscian calls him in his book upon grammar, flourished at Rome in the time of Alexander Severus. This part of his character must, however, arise from his book Concerning Accents, frequently cited by Sidonius Apollinaris, and other things, which are lost; and not from his De Die Natali, which is the only piece remaining of him. This treatise was written about the year 238, and dedicated to Quintus Cerellius, a man of the equestrian order, of whom he speaks very highly in his 15th chapter. Vossius calls this "a little book of gold;" and declares it to be "a most learned work, and of the highest use and importance to chronologers, since it connects and determines with great exactness some principal æras in history." It is, however, a work of a miscellaneous nature, and treats of antiquities as well as chronology. It was printed with the notes of Lindenbrokius at Cambridge, in 1695. The best edition now extant is by Haverkamp, Lug. Bat. 1767.

CENSO'RIOUS, *adj.* Addicted to censure; severe; full of invectives.—Do not too many believe no religion to be pure, but what is intemperately rigid? no zeal to be spiritual, but what is *censorious*? *Spratt.* Sometimes it has *of* before the object of reproach.—A dogmatical spirit inclines a man to be *censorious of* his neighbours. *Watts.* Sometimes *on*.—He treated all his inferiors of the clergy with a most sanctified pride; was rigorously and universally *censorious upon* all his brethren of the gown. *Swift.*

CENSO'RIOUSLY, *adv.* In a severe and reflecting manner.

CENSO'RIOUSNESS, *s.* Disposition to reproach; habit of reproaching.—Sourness of disposition, and rudeness of behaviour, *censoriousness* and sinister interpretation of things, all cross and distasteful humours, render the conversation of men grievous and uneasy to one another. *Tillotson.*

CEN'SORSHIP, *s.* The office of a censor; the time in which the office of censor is borne.—It was brought to Rome in the *censorship* of Claudius. *Brown.*

CENSUA'LES, a species or class of the *oblati*, or voluntary slaves of churches or monasteries, i. e. those who, to procure the protection of the church, formerly bound themselves to pay an annual tax or quit-rent out of their estates to a church or monastery. Besides this, they sometimes engaged to perform certain services.

CENSU'RABLE, *adj.* Worthy of censure; blameable; culpable.—A small mistake may leave upon the mind the lasting memory of having been taunted for something *censurable*. *Locke.*

CEN'SURABLENESS, *s.* Blameableness; fitness to be censured.

CEN'SURE, *s.* [*censura*, Lat.] Blame; reprimand; reproach:

Enough for half the greatest of these days,
To 'scape my *censure*, not expect my praise. *Pope.*

Judgment; opinion:

Madam, and you, my sister, will you go
To give your *censures* in this weighty business? *Shakesp.*

Judicial sentence. A spiritual punishment inflicted by some ecclesiastical judge.—Upon the unsuccessfulness of milder medicaments, use that stronger physic the *censures* of the church. *Hammond.*

To CEN'SURE, *v. a.* [from *censurer*, Fr.] To blame; to brand publicly. The like *censurings* and despisings have embittered the spirits, and whetted both the tongues and pens of learned men one against another. *Sanderson.*—To condemn by a judicial sentence.

CEN'SURER, *s.* He that blames; he that reproaches. —A statesman, who is possest of real merit, should look upon his political *censurers* with the same neglect that a good writer regards his critics.

CEN'SUS, *s.* [from *censeo*, Lat. to value.] The numbering of the people at Rome, performed by the censors. A census, similar to that of the Romans, was taken by order of congress, in the United States of America, in 1790, when it was found that their population amounted to near four millions of people, and enabled them to regulate their government upon a firm basis.

CENT, *s.* [*centum*, Lat.] A hundred; as, five *per cent*, that is, five in the hundred.

CENTAL'LO, a town of Italy, in the principality of Piedmont: four miles north of Coni.

CEN'TAUR, *s.* [*centaurus*, Lat.] A poetical being, supposed to be compounded of a man and a horse.—Down from

from the waiſt they are *centaurs*, though women all above. *Shakeſpeare.*—The idea of a *centaur* has no more falſehood in it than the name *centaur*. *Locke.*—See CENTAURI, p. 28. The archer in the zodiac:

> The chearleſs empire of the ſky
> To Capricorn the *centaur* archer yields. *Thomſon.*

CENTAURE'A, *ſ.* [from Κενταυρος, a Centaur; ſuppoſed to be ſo named from Chiron, who cured Hercules's foot with it, which had been wounded by a poiſoned arrow.] In botany, CENTAURY, BLUE-BOTTLE, KNAPWEED, &c. a genus of the claſs ſyngeneſia, order polygamia fruſtranea, natural order of compound flowers. The generic characters are—Calyx: common imbricate, roundiſh; ſcales often variouſly terminated. Corolla: compound floſculous, difform; corollules hermaphrodite, very many in the diſk; females fewer, larger, lax, in the ray. Proper of the hermaphrodite monopetalous; tube filiform; border ventricoſe, oblong, erect, terminated by five diviſions which are linear, erect. Of the females monopetalous, funnel-form; tube ſlender, gradually enlarged, recurved; border oblong, oblique, unequally divided. Stamina: in the hermaphrodites, filaments five, capillary, very ſhort; antheræ cylindric, tubular, length of the corollule. Piſtillum: in the hermaphrodites, germ ſmall; ſtyle filiform, length of the ſtamens; ſtigma very obtuſe, projecting in a point which in many is bifid: in the females, germ very ſmall; ſtyle ſcarce any; ſtigma none. Pericarpium: none; calyx unchanged, converging. Seeds: in the hermaphrodites ſolitary; down or egret in moſt plumoſe or piloſe; in the females none. Receptaculum: briſtly.—*Eſſential Character.* Receptaculum briſtly; down ſimple; corolla of the ray funnel-form, longer, irregular.

Species. I. Jaceas: calyxes even, unarmed. 1. Centaurea crupina, black-ſeeded centaury, or bearded creeper: ſcales lanceolate; leaves pinnate, ſerrate, ſubciliate. Stem ſtriated, three feet high, almoſt quite ſimple. Native of the South of France, Piedmont, Tuſcany, and the Levant; annual; cultivated in 1640.

2. Centaurea moſchata, or purple ſweet centaury, or ſweet ſultan: calyxes roundiſh, ſmooth; ſcales ovate; leaves lyrate-toothed. This ſort is annual, and has been many years propagated in the Engliſh gardens, under the title of ſultan flower, or ſweet ſultan. It was brought from the Levant, where it grows naturally in arable land among the corn. This ſends up a round channelled ſtalk near three feet high, which divides into many branches, with jagged leaves, of a pale green, ſmooth, and cloſe to the branches. From the ſide of the branches come out long naked peduncles, each ſuſtaining a ſingle head of flowers, which have a very ſtrong odour, ſo as to be offenſive to many people, but to others very grateful; they are purple, white, or fleſh, colour. There is alſo a variety with fiſtular flowers, and another with fringed flowers; but theſe degenerate in a few years, however carefully the ſeeds may be ſaved. Native of Perſia, and cultivated in 1629. It came to us firſt from Conſtantinople.

3. Centaurea cruciſolia: ſcales lanceolate; leaves lanceolate, ſomewhat toothed. Root annual; ſtem a foot high, furrowed, rough with hairs; branches erect, many, from top to bottom.

4. Centaurea Lippii, or Egyptian centaury: ſcales mucronate; leaves ſubdecurrent, lyrate-toothed. This, according to Linnæus, bears ſome reſemblance to the blue-bottle, No. 15. Native of Egypt, between Alexandria and Roſetta. Cultivated in 1759 by Mr. Miller, who received the ſeeds from Juſſieu, and he had them from Dr. Lippi at Grand Cairo.

5. Centaurea Alpina, or Alpine centaury: ſcales ovate-obtuſe; leaves pinnated, ſmooth, quite entire, the odd leaflet ſerrated. Root perennial, ſtriking deep into the ground, and ſending out a great number of long, ſmooth, pinnate leaves, of a glaucous hue; ſtems near four feet high, dividing at top into many branches, having ſmall leaves on them of the ſame form with the lower; each ſtem is terminated by a ſingle head of yellow flowers, which come out in June and July, and in dry ſeaſons perfect their ſeeds in autumn. It grows naturally upon the Alps in Italy; and was cultivated in 1640.

6. Centaurea centaurium, or great centaury: ſcales ovate; leaves pinnated; leaflets ſerrated, decurrent. This has a ſtrong perennial root like the foregoing ſort; and a great number of long pinnate leaves, of a lucid green, ſpreading wide on every ſide, proceed from it. The peduncles are ſlender, but very ſtiff, and divide at top into many ſmaller peduncles; theſe, together with the ſtalks, riſe five or ſix feet high, having at each joint one ſmall pinnate leaf of the ſame form with the others; each of the peduncles is terminated by a ſingle head of purple flowers, conſiderably longer than the calyx. They come out in July, and in very warm ſeaſons produce ripe ſeeds in England. It grows naturally on the mountains of Italy, Spain, and Tartary; and was cultivated in 1596 by Gerarde. This is ſuppoſed to be the triſtia centaurea of Lucretius, and the graveolentia centaurea of Virgil, recommended by the latter in diſorders of the bees.

II. Cyani: with the ſcales of the calyx ſerrate-ciliated. 7. Centaurea Phrygia, or Auſtrian centaury: calyxes recurve-plumoſe; leaves undivided, oblong, ſcabrous. Stem ſomewhat ſhrubby, upright, from eight or ten inches to a cubit in height; at the end of the ſtem and each branch a ſingle large flower, with a ſmall leaf or two at the baſe. Native of Germany, Auſtria, and Swiſſerland. Haller has two varieties, one loftier in Germany, and the other about eighteen inches high, in the Swiſs alps; cultivated in 1727 by Mr. Miller.

8. Centaurea capillata, or feathered centaury: calyxes recurve-plumoſe; bottom leaves pinnated, toothed, upper lanceolate. Stem four or five feet high, angular, hard, branching; root-leaves with four or five pairs of pinnas; ſtem-leaves ſimply pinnate; uppermoſt tongue-ſhaped, ſimple. Native of Spain and Siberia.

9. Centaurea uniflora, or one-flowered centaury: calyxes recurve-plumoſe; leaves lanceolate, ſomewhat toothed, tomentoſe; a palm or foot in height. Native of the South of Europe.

10. Centaurea linifolia, or flax-leaved centaury: calyxes recurve-plumoſe; leaves linear, ſcattered. Stem a palm in height, often decumbent, branching from the bottom, furrowed angular, rough with ſtiff hairs; leaves entire, rugged, much crowded, near two inches in length, a line or a line and half in breadth, ending in a very ſharp point; thoſe next the root dilated at the baſe, and half ſtem-claſping; flower protected with from three to ſix leaves, twice its length. It varies with ſhorter thickiſh leaves, ſcarcely ciliate, and an almoſt ſimple erectiſh ſtem. Native of Spain and Italy; perennial.

11. Centaurea pectinata: calyxes recurve-plumoſe; leaves lyrate, toothletted; branch-leaves lanceolate, quite entire. Native of Spain, South of France, and Sileſia.

12. Centaurea nigra, or black centaury, or knapweed: calyxes ciliate, with the little ſcale ovate; cilias capillary, erect; leaves lyrate, angular; flowers floſcular. Stem from two to three feet in height, angular, ſcored, ſlightly downy, often tinged with purple. Dillenius obſerves, that Parkinſon's figure only agrees with our Engliſh plant. It has many provincial names, as knap-weed, knop-weed, knob-weed, horſe-knops, all from *knob* or *nob*, a head; alſo hard-heads, hard-irons, and matfellon; in Scotland, *horſe-knot*. It is found in Germany, Auſtria, France, &c. With us in England it is a bad weed in meadows and paſtures; being a harſh ſtubborn plant, ſeldom touched by cattle either green or in hay, and being with difficulty extirpated. Linnæus marks it as biennial, but our plant is perennial, and increaſes much by the root.

13. Centaurea pullata: calyxes ciliate, vertical, leafy; leaves lyrate, toothed, obtuſe. It is a low plant; native of the South of France, Spain, and the Levant. Miller ſays the ſeeds were ſent him from Portugal by Robert Moore, Eſq. and that it is biennial; flowers in June and July, and the ſeeds ripen in the autumn.

14. Centaurea

14. Centaurea montana, mountain centaury, or perennial blue-bottle: calyxes ferrate, leaves lanceolate, decurrent; ftem quite fimple. Scopoli, who mentions feveral varieties, defcribes the common fort as being a foot and half in height; leaves on the ftem as far as fixteen, with one flower at the end; it is alfo found with two flowers on a ftem, and as far as nineteen florets in the ray. Native of the South of Europe. Ray obferved it about Spa, and on mount Jura, not far from Geneva; but it is common on many parts of the continent. It was cultivated in 1596 by Gerarde, and flowers in May and June; it is commonly called perennial blue-bottle, and by fome batchelor's buttons.

15. Centaurea cyanus, or corn centaury, annual blue-bottle: calyxes ferrate; leaves linear, quite entire, the loweft toothed. Stem one to two feet high, angular, flightly tomentofe, branched at top. It is a common weed among corn, flowering from June to Auguft; the wild flower is ufually blue, but fometimes white or purple. Our old Englifh writers, befides *blue-bottle*, which has commonly obtained, have the names of *blue-ball*, *blue-blow*, *corn-flower*, and *hart-fickle*. In the Booke of Hufbandrye afcribed to Fitzherbert, it feems to be called *hadods* or *haudod*. Some modern agriculturifts fpeak of it under the name of *buddle*, which is evidently nothing more than a corruption of bottle. Dr. Stokes informs us, that it is called *batchelor's buttons* in Yorkfhire and Derbyfhire; but this is a name given to many other flowers. In Scotland it is called *blue bonnets*; in German, Dutch, Swedifh, and Danifh, *korn-blume*; in French, *bluet*; in Italian and Portuguefe, *ciano*; in Spanifh, *aciano*, *azuleio*. The expreffed juice of the neutral florets makes a good ink; it alfo ftains linen of a beautiful blue, but the colour is not permanent in any mode hitherto ufed. Mr. Boyle fays, that the juice of the central florets, with the addition of a very fmall quantity of alum, makes a lafting tranfparent blue, not inferior to ultramarine.

16. Centaurea paniculata, or panicled centaury: calyxes ciliate, fcales flat; leaves bipinnate, branch-leaves pinnatifid, linear; ftem panicled, almoft woody, ftiff, ftriated, or angular, whitifh, branched, from a foot to eighteen inches and two feet in height. Native of the South of France, Swifferland, Germany, Auftria, Carniola, Italy, and Spain. Annual; cultivated in 1640. There is a variety with larger flowers; leaves hoary, and differing fomewhat in appearance.

17. Centaurea fpinofa, or prickly-branched centaury: calyxes fubciliate, branches fpinous. The whole plant is tomentofe; the fmall branches terminate in ftiff thorns, and the calyx is very flightly ciliate. Native of the ifland of Candia.

18. Centaurea Ragufina, or Cretan centaury: calyxes ciliate; leaves tomentofe, pinnatifid; leaflets obtufe, ovate, quite entire, the outer ones larger. Leaves white, as it were pappous, pinnated with rounded lobes; flower folitary, peduncled. It feldom rifes more than three feet high in this country, with a perennial ftalk dividing into many branches. The flowers, which are produced from thefe, on fhort peduncles, are of a bright yellow. They appear in June and July, but the feeds feldom ripen in England. As this plant retains its leaves, which are extremely white, all the year, it makes a pretty variety in a garden. Native of the ifland of Candia, and of feveral places on the coafts of the Mediterranean, both in Europe and Africa; cultivated in 1714 by the duchefs of Beaufort.

19. Centaurea cineraria, or white-leaved mountain centaury: calyxes ciliate, terminal, feffile; leaves tomentofe, bipinnatifid; lobes acute. Stems near three feet high, branching, from a perennial root; leaves white, as it were pappous; flower purple, with white ftyles. Thefe come out in June, and in favourable feafons the feeds are perfected in autumn; it retains its leaves all the year. It grows naturally in Italy, on the borders of the fields.

20. Centaurea argentea, or filvery centaury: calyxes ferrate; leaves tomentofe, root-leaves pinnatifid, leaflets earlefs. Flowers yellow; leaves white, as in the laft fpecies. Native of Candia or Crete; perennial, flowering in July.

21. Centaurea Sibirica, or Siberian centaury: calyxes ciliate; leaves tomentofe, undivided and pinnatifid, quite entire; ftem declined. Found in Siberia by Gmelin; introduced in 1782 by Mr. John Bufh.

22. Centaurea fempervirens, or evergreen centaury: calyxes ciliate; leaves lanceolate, ferrate, fubftipuled at the loweft tooth; lower leaves haftate. It is a perennial plant, and the leaves continue in verdure through the year, for which it is chiefly valued, for the flower has little more beauty than the common knap-weed; flowers in June and July, and in warm feafons the feeds ripen in September. It grows naturally in Spain and Portugal; and was cultivated in 1683 by Mr. James Sutherland.

23. Centaurea fcabiofa, or fcabious centaury, or great knap-weed: calyxes ciliate; leaves pinnatifid; pinnas lanceolate. It varies frequently with white flowers. Haller mentions feveral other variations in the colour, as flefh-coloured variegated with that and white, pale yellow, and full yellow. Native of moft countries of Europe, except the very fouthern parts, in meadows, on the borders of corn-fields, among corn, and by road fides; perennial, flowering in July and Auguft; called, in Yorkfhire, *great horfe-knobs*.

24. Centaurea Tatarica, or Tartarian centaury: calyxes ciliate; leaves pinnate; pinnas lanceolate, undivided. Native of Siberia; perennial.

25. Centaurea Stoebe: calyxes ciliate, oblong; leaves pinnatifid, linear, quite entire. Stems near three feet high, branched, with a fingle leaf at each joint. Flowers appear in June; feeds ripen in Auguft.

26. Centaurea acaulis, or ftemlefs centaury: calyxes ciliate; leaves lyrate; ftem fcarcely any. The flower is yellow; cilias of the fcales white; root fweet and efculent.

III. Rhapontica: with the fcales of the calyx dry and fcariofe. 27. Centaurea orientalis, or oriental centaury: calyxes fcariofe-ciliate; leaves pinnatifid; pinnas lanceolate. The ftems rife near five feet high, dividing at top into many fmaller branches. Flowers yellow; they come out from June to Auguft, and the feeds ripen in autumn. Native of Siberia; cultivated in 1759 by Mr. Miller, to whom the feeds were fent from Peterfburgh.

28. Centaurea Behen: calyxes fcariofe; radical leaves lyrate; lobes oppofite; ftem-leaves embracing. Leaves large, like thofe of docks, fharp, and ftiff, like pear-leaves, with two pair of fmaller ones at the bafe, which make them lyrate. Stems eighteen inches high; flowers oblong, yellow. Grows at the foot of Mount Libanus, in fhady watery places.

29. Centaurea repens, or creeping centaury: calyxes fcariofe; leaves lanceolate, fubpetioled, toothed; peduncles filiform, leaflefs. Native of the Levant; perennial.

30. Centaurea jacea, or common centaury, or knap-weed; calyxes fcariofe, lacerate; leaves lanceolate, radical leaves finuate-toothed; branches angular. Stem from two to eighteen inches in height, (fometimes, according to others, attaining the human ftature,) little branched, with a large flower terminating each branch. It often varies, like many other of the fpecies, with a white flower. Native of the North of Europe, and of the South of France, &c. Perennial.

31. Centaurea amara, or bitter centaury: calyxes fcariofe; leaves lanceolate, quite entire; ftems decumbent. 32. Centaurea alba, or white-flowered centaury: calyxes fcariofe, entire, mucronated; leaves pinnate, toothed; ftem-leaves linear, toothed at the bafe. Natives of Spain and Swifferland.

33. Centaurea fplendens, or fhining centaury: calyxes fcariofe, obtufe; radical leaves bipinnatifid; ftem-leaves pinnated, teeth lanceolate. Stems three feet high, angular, hard, fmooth, branched, many-flowered; flowers purple, with a beautiful filvery calyx. Biennial, flowering in July; the feeds ripen in September. Found in tranfalpine

alpine Swisserland, Spain, and Siberia. Cultivated in 1597, by Gerarde.

34. Centaurea Rhapontica, or Swiss centaury: calyxes scariose; leaves ovate-oblong, toothletted, entire, petioled, tomentose beneath. This is a handsome plant; the root is thick, round, black, wrinkled, and irregular, strikes deep in the ground, and when dry is aromatic; stem eighteen inches high. Found in Swisserland and about Verona, whence Miller received the seeds. Cultivated in 1656, by Mr. John Tradescant, jun. It flowers in July. The roots of this, and several of the species allied to it, are bitter and astringent, and formerly were much given in cases wherein we now give Jesuits' bark. The plants also will dye yellow.

35. Centaurea Babylonica, or Babylonian centaury: calyxes scariose; leaves subtomentose, decurrent, undivided; radical leaves lyrate. Native of the Levant; perennial.

36. Centaurea glastifolia, or woad-leaved centaury; calyxes scariose; leaves undivided, quite entire, decurrent. Root perennial, striking deep into the ground; from this springs a great tuft of long entire leaves, shaped like those of woad, growing upright, with many upright stalks, near five feet high, having a single leaf at each joint, of the same shape, but smaller and decurrent, and dividing at top into two or three branches, each terminated by a single head of yellow flowers, in a silvery calyx. The leaves have veins prominent on both their sides. Native of the Levant and Siberia; flowering from June to August, but rarely producing good seeds in England.

37. Centaurea conifera, or cone centaury: calyxes scariose; leaves tomentose, next the root lanceolate, on the stem pinnatifid; stem simple; root perennial, single, sending out in the spring several entire leaves, and afterwards a single stalk, more than a foot high, having one divided hoary leaf at each joint; at the top comes out a single, large, scaly, head, shaped like a pine cone, very taper at the top, where it closely surrounds the florets, which just emerge from the calyx, are of a bright purple colour, and appear in June. Native of the South of Europe; cultivated by Mr. Miller, who received the seeds from Verona.

IV. Stoebæ: with the spines of the calyx palmated.

38. Centaurea sonchifolia, or sowthistle-leaved centaury: calyxes palmate-spiny; leaves subdecurrent, spinulous, repand-toothed. Found on the coast of the Mediterranean: introduced about 1780 by M. Thouin.

39. Centaurea seridis: calyxes palmate-spiny; leaves decurrent, tomentose, oblong, the lowest sinuate-toothed. This is a tomentose plant, hardly a foot high, with the stems branching a little. Native of Spain; perennial.

40. Centaurea Romana: calyxes palmate-spiny; leaves decurrent, unarmed; radical leaves pinnatifid, the end lobe largest. Root biennial; stems three feet in height; flowers large, red, the calyxes strongly armed with spines. It flowers in July, and the seeds ripen in September. It is a native of the Campania of Rome.

41. Centaurea sphærocephala: calyxes palmate-spiny; leaves ovate-lanceolate, petioled, toothed; root annual; the stem rises two feet high, dividing at top into three or four branches, which are terminated by pretty large heads of flowers, with woolly calyxes strongly armed with spines. It flowers in July, and in warm seasons sometimes ripens the seeds in September. Native of Spain and Barbary. This, and the foregoing sort, were cultivated by Mr. Miller in 1768.

42. Centaurea Isnardi: calyxes palmate-spiny; leaves lyrate-toothed, hispid, almost stem clasping; flowers sessile, terminal; root perennial; stems several, ascending, about a foot in length, commonly square, hairy, furrowed; flowers purple, solitary, and appear in June and July; they are composed of from forty to forty-five regular florets in the disk, and fifteen to eighteen neuter florets in the ray, comprised in a conic calyx; cultivated in 1717, in the royal garden at Paris; the seeds came from Holland.

43. Centaurea napifolia, or turnip-leaved centaury: calyxes palmate-spiny; leaves decurrent, sinuate, spinulous, radical leaves lyrate. Root annual; stem branching, three feet high; lower leaves not much unlike those of the turnip, rounded at the end, and the base cut into many segments, diminishing gradually to the top of the stem, and winged. Native of the Archipelago; cultivated in 1759 by Mr. Miller.

44. Centaurea aspera, or rough centaury: calyxes palmate, three-spined; leaves lanceolate-toothed. The winged stems, dark-coloured though villose leaves, and bushy habit of the plant, distinguish this from all others. Grows about Montpellier, in Tuscany, and Portugal.

V. Calcitrapæ: with the spines of the calyx compound.

45. Centaurea benedicta, or blessed thistle: calyxes double, spiny, woolly, involucred; leaves semidecurrent, toothletted, spiny. Root annual; stem erect, roundish, channelled, rough, from one to two feet high, often branched towards the top; leaves long, elliptical, rough, bright green above, underneath whitish, and reticulated. Native of Spain and the Levant; flowering from June to September; cultivated in 1597, as appears from Gerarde. This plant obtained the appellation of *benedictus* from its being supposed to possess extraordinary medical powers; for, exclusive of those qualities usually ascribed to bitters, it was thought to be a powerful alexipharmic, and capable of curing the plague, and other malignant febrile disorders. It was also reputed to be good against worms, as well as against all sorts of poison. Simon Paulli declares that it has no equal in consolidating putrid and stubborn ulcers, and even cancers. He relates the case of a woman whose breasts were wasted by a cancer to the very ribs, and yet was cured by washing them with the distilled water of this plant, and sprinkling them with the powder of its leaves; and Arnoldus de Villa Nova relates, that he saw the putrid and hollow ulcers of a man, who had all the flesh of his legs consumed to the very bone, and who had tried all other medicines in vain, cured by the following recipe: Take the bruised leaves of this plant, and boil them with some generous wine, then add some melted hog's lard; let them boil a little more, and then put in some wheat flour, stirring it about all the while with a spatula, till it comes to the consistence of an ointment; lay this warm on the ulcers twice a-day. In spite however of all these high commendations, we do not find this plant considered as of any great importance in the modern materia medica. In loss of appetite however, where the stomach has been injured by irregularities, it is allowed that the good effects of the infusion of carduus benedictus have been often experienced; the decoction of it also in water or posset-drink still maintains its popular reputation as a gentle vomit, for which purpose it is to be drunk in pretty large quantities.

46. Centaurea eriophora, or woolly-headed centaury: calyxes double-spiny, woolly; leaves semidecurrent, entire, and sinuate; stem proliferous. Native of Portugal; flowering in July; cultivated in 1768 by Mr. Miller.

47. Centaurea Ægyptiaca: calyxes double-spiny, somewhat woolly; leaves sessile, lanceolate, entire, and toothed; stem proliferous, a foot high. Native of Egypt; annual.

48. Centaurea calcitrapa, or star-thistle: calyxes subdouble, spiny, sessile; leaves pinnatifid, linear, toothed; stem hairy. Root annual; stem from a foot to eighteen inches and two feet in height, hairy, light green, very much branched, with thorns or prickles; branches alternate, spreading. Native of England, Swisserland, and the southern parts of Europe. Linnæus affirms that it grows abundantly about London, and in the very city itself. It is extremely common about Cambridge, and is said to have been used by the brewers instead of hops. The plant and root are both very bitter, and are sometimes administered abroad in agues, &c.

49. Centaurea calcitrapoides, or Phœnician centaury: calyxes subdouble, spiny; leaves stem-clasping, lanceolate, undivided, serrate. Linnæus calls it the daughter of the foregoing, but with undivided leaves. Found near Nismes, and in Palestine.

50. Centaurea

50. Centaurea folstitialis, or St. Barnaby's thistle: calyxes double, spiny, solitary; branch-leaves decurrent, unarmed, lanceolate; radical leaves lyrate, pinnatifid. Annual; native of the South of Europe; discovered by Mr. Crowe, in a graffy field at Arminghall, two miles from Norwich.

51. Centaurea melitensis, or cluster-headed centaury: calyxes double, spiny, crowded, terminal: leaves decurrent, lanceolate, sinuous, unarmed. Grows about Montpellier, and in the isle of Malta; annual. What we commonly call the folstitialis is this sort.

52. Centaurea sicula: calyxes ciliate, spiny, terminal; leaves decurrent, lyrate, unarmed, hoary. Native of Sicily; perennial.

53. Centaurea centauroides: calyxes ciliate, spiny; leaves lyrate, pinnate, quite entire, the end division largest. Native of Italy, Spain, and Montpellier.

54. Centaurea collina: calyxes ciliate, unarmed, spiny; radical leaves bipinnatifid; stem acute, angled. Scopoli mentions several varieties. D'Asso observes, that the divisions of the leaves end in a harmless spine; and that the neuter florets in the ray are quadrifid. Native of Montpellier, Spain, Carniola, Italy, and Messina; perennial.

55. Centaurea rupestris, or rock centaury: calyxes ciliate, spiny; leaves bipinnate, linear. This is allied to the foregoing species, in having the scales of the calyx brown ciliate, terminated by a weak simple spine, shorter than the scale itself; but the inmost scales are scariose. The stem is little branched, and scarcely angular; almost all the leaves are bipinnate, linear, and except about the edge even, but by no means lanceolate, with the pinnas branched like a stag's horn. Native of Italy; perennial.

VI. Crocodiloidea: spines simple. 56. Centaurea verutum, or dwarf centaury: calyxes most simply spiny; teeth two, opposite; leaves lanceolate, entire, decurrent; root annual; stem erect, eighteen inches high and upwards. Native of Palestine.

57. Centaurea salmantica, or lyre-leaved centaury: calyxes smooth, with a subspiny setule standing out; leaves lyrate, runcinate, serrate. Native of the South of Europe; perennial; cultivated in 1596 by Gerarde.

58. Centaurea cichoracea, or succory-leaved centaury: calyxes setaceous, spiny; leaves decurrent, undivided, serrate, spiny. Radical leaves a short span in length, three or four inches over in the widest part, entire, with only a few irregular toothlets or small spines; stem-leaves smaller, narrower, with toothlets or short spinules round the edge, acuminate. Stem clothed to the top with leaves, and terminated by a small head, the scales of which finish in oblong recurved spinules. Native of Italy, in Monte Argentario.

59. Centaurea muricata: calyxes very simply spiny; lower leaves pinnatifid, upper lanceolate; peduncles very long; stems tender, dividing into many branches, with very small leaves on them. Native of Spain; annual.

60. Centaurea perigrina: calyxes setaceous, spiny; leaves lanceolate, petioled, toothed at bottom. The stems rise near three feet high, with entire leaves at each joint; they are terminated by single large heads of flowers, of a gold colour, inclosed in a prickly calyx; appearing in July and August, but never producing seeds in this country. Grows naturally in Austria and Hungary, from both which countries Miller received the seeds before 1759.

61. Centaurea radiata, or rayed centaury: calyxes almost unarmed and awned, radiate; leaves pinnatifid. Native of Siberia.

62. Centaurea nudicaulis, or naked-stalked centaury: calyxes setaceous, spiny; leaves undivided, the upper ones a little toothed; stem almost naked, one-flowered, simple. Native of Provence, Spain, and Italy; perennial.

63. Centaurea crocodilium, or blush centaury: calyxes scariose, very simply spiny; leaves pinnatifid, quite entire, the outmost division larger toothed. Native of Syria; annual.

64. Centaurea pumila, or dwarf centaury: calyxes very simply spiny; leaves tooth-pinnate, villose; stem none. Found in Egypt by Hasselquist.

65. Centaurea Tingitana, or Tangier centaury: calyxes spiny at the edge; leaves lanceolate, undivided, serrate, subspiny. Native of Tangier; perennial.

66. Centaurea galactites, or white-veined centaury: calyxes setaceous, spiny; leaves decurrent, sinuate, spiny, tomentose beneath. This has the appearance of a thistle, but the neuter florets determine it to be a centaurea. Observed by Ray in Sicily, Malta, and about Montpellier.

VII. New species. 67. Centaurea triumfetti: calyxes serrate, with white cilias; leaves deeply pinnatifid, with two pinnas for the most part, decurrent. It differs from No. 14, not only in having the leaves constantly laciniate, but the cilias of the scales white; however it may be nothing more than a remarkable variety. Found about Mont Cenis, &c. perennial.

68. Centaurea kartschiana: calyxes ciliate, spiny; leaves pinnate; pinnas sessile, lanceolate, decurrent, ending in a point. It differs from No. 23, in its habit, and other marks.

69. Centaurea alata, or upright wing-stalked centaury: calyxes ciliate; scales flat, appressed, ciliate at the end; stem-leaves oblong, decurrent. Stems four feet high, smooth, a little angular, and branched at top. The flowers are of a fine yellow, and grow in a sort of panicle at top; the calyx smooth, green. Native of Tartary, as supposed. Cultivated many years in the Paris garden, and introduced in 1781 into the royal garden at Kew.

70. Centaurea intybacea, or succory-leaved centaury: calyxes ciliate; scales flat, obtuse, ciliate at the end; leaves pinnatifid; disk equal to the ray. Stem two feet high, upright, hard, striated, branched; flowers purple, flesh-coloured, or white. This sort is perennial, and native of the South of Europe, on the borders of fields and in dry pastures. It was introduced here in 1778.

71. Centaurea diluta, or pale-flowered centaury: calyxes ciliate; scales acuminate, somewhat thorny; leaves oblong and pinnatifid; floscules of the ray longer than the disk. Introduced in 1781. This also is a native of the South of Europe: these, with the 69th, were introduced by Monf. Thouin.

72. Centaurea strobilacea: calyxes scariose, spiny, serrate, ciliated; leaves dotted beneath, pinnated; pinnas lanceolate, falcated, erect. The flowers are pale yellow; the plant has no smell; the taste is bitterish; perennial.

73. Centaurea hybrida: calyxes ciliated, ending in a spine; leaves pinnated, branch-leaves linear, lanceolate, undivided, decurrent. This seems to be a mule between No. 50 and No. 16. It has the habit of the latter, and the same height; the leaves are pinnated like that, but the branch-leaves are linear, lanceolate, undivided, and decurrent. This species perfects its seeds. Grows on the hills about Turin; biennial.

74. Centaurea nicæensis: calyxes ciliate, spiny; the leaves ovate, rough; radical leaves petioled, toothed; stem-leaves embracing, decurrent. Stems striate, angular, eighteen inches high, alternately branched; the whole plant is dark green, and roughish. Found about Nice; biennial.

75. Centaurea cæspitosa: calyxes palmate, spiny; leaves sinuate-toothed, the lower ones petioled, the upper ones half stem-clasping. Roots perennial, woody, dry, perpendicular, black on the outside; stems dividing from the very bottom into numerous procumbent branches; they are thickish, round, from a foot to two feet in length; the flowers have a strong disagreeable smell. Native of Italy, on the sea-shore near Naples, forming very thick tufts in the sand.

76. Centaurea elegans: stem simple; leaves undivided, linear; axillas one-flowered, and one terminal flower. Height eighteen inches; stem round; axillary flowers on a peduncle shorter than the leaf; flower blue; annual. Found in the vineyards of Unelia, by Dana.

77. Centaurea aurea, or great golden centaury: calyxes most simply thorned, thorns spreading; floscules equal; leaves

leaves hirſute, the lower pinnatifid. Native of the ſouth of Europe. There are more ſpecies of this extenſive genus in Vahl and other authors.

Propagation and Culture. The numerous ſpecies of this genus may be increaſed without great difficulty; thoſe which are annual by ſeeds, and ſuch as are perennial both that way and by parting the roots. The ſeeds of the greater part may be ſown either in ſpring or autumn in a bed of light earth, either to remain where they are, and in that caſe only to be thinned and kept clean from weeds, or to be pricked out, when of a proper ſize, into a bed of freſh earth about ſix inches aſunder, there to remain till autumn, when they ſhould be planted where they are to continue. Moſt of the ſpecies are hardy, and none of them are very tender; ſome however require a little protection in this climate.

The ſeeds of ſweet ſultan are commonly ſown upon a hot-bed in the ſpring, to bring the plants forward, and in May they are tranſplanted into the borders of the flower garden; but if the ſeeds are ſown in a warm border in autumn, they will live through the winter; and thoſe plants may be removed in the ſpring into the flower-garden, and will be ſtronger, and come earlier to flower, than thoſe which are raiſed in the ſpring. The ſeeds may alſo be ſown in the ſpring on a common warm border, where the plants will riſe very well, but theſe will be later in flowering than either of the other: the autumnal plants will begin to flower in the middle of June, and will continue flowering till September; and the ſpring plants will flower a month later, and continue till the froſt ſtops them. Their ſeeds ripen in autumn.

Great centaury may be propagated by parting the roots. As it requires much room, it is not proper for ſmall gardens; but in large open borders, or on the verges of plantations, with other tall-growing plants, it makes a good figure.

Perennial blue-bottle is now become a common plant in large gardens, from the facility with which it is increaſed. The roots indeed creep ſo much, that it is apt to become troubleſome. It will grow in any ſoil and ſituation.

There are great varieties of colours in the flowers of the common annual blue-bottle, and ſome of them are finely variegated. The ſeeds are ſold under the name of bottles of all colours. They will riſe in any common border, and require no other care but to be kept clean from weeds, and thinned where they are too cloſe, for they do not thrive well when they are tranſplanted. If the ſeeds be ſown in autumn, they will ſucceed better, and the plants will flower ſtronger than thoſe which are ſown in ſpring.

The ſureſt method of cultivating the carduus benedictus is to ſow the ſeeds in autumn; and, when the plants come up, to hoe the ground, to cut up the weeds, and thin the plants; and in the following ſpring to hoe it a ſecond time, leaving the plants a foot aſunder; they will ripen their ſeeds in autumn, and ſoon after decay. See CNICUS, and STÆHELINA.

CENTAU'RI, *ſ.* in fabulous hiſtory, a people of Theſſaly, half men and half horſes. They were the offspring of Centaurus, ſon of Apollo, by Stilbia, daughter of the Peneus. According to ſome, the Centaurs were the fruit of Ixion's adventure with the cloud in the ſhape of Juno, or, as others aſſert, of the union of Centaurus with the mares of Magneſia. This fable of the exiſtence of the Centaurs, monſters ſupported upon the four legs of a horſe, is ſaid to have ariſen from the ancient people of Theſſaly having firſt tamed horſes, and having appeared to their neighbours mounted on horſeback, a ſight very uncommon at that time, and which, when at a diſtance, ſeems only one body, and conſequently one creature. Some derive the name *απο του κεντειν ταυρους*, *goading bulls*, becauſe they went on horſeback after their bulls which had ſtrayed, or becauſe they hunted wild bulls with horſes. Some of the ancients have maintained, that monſters like the Centaurs can have exiſted in the natural courſe of things. Plutarch *in Sympoſ.* mentions one ſeen by Periander tyrant of Corinth; and Pliny 7, c. 3, ſays, that he ſaw one embalmed in honey, which had been brought to Rome from Egypt in the reign of Claudius. The battle of the Centaurs with the Lapithæ is famous in hiſtory. Ovid has elegantly deſcribed it, and it has alſo employed the pen of Heſiod, Valerius Flaccus, &c. and Pauſanias *in Eliac.* ſays; it was repreſented in the temple of Jupiter at Olympia, and alſo at Athens by Phidias and Parrhaſius according to Pliny 36, c. 5. The origin of this battle was a quarrel at the marriage of Hippodamia with Pirithous, where the Centaurs, intoxicated with wine, behaved with rudeneſs, and even offered violence to the women that were preſent. Such an inſult irritated Hercules, Theſeus, and the reſt of the Lapithæ, who defended the women, wounded and defeated the Centaurs, and obliged them to leave their country, and retire to Arcadia. Here their inſolence was a ſecond time puniſhed by Hercules, who, when he was going to hunt the boar of Erymanthus, was kindly entertained by the Centaur Pholus, who gave him wine which belonged to the reſt of the Centaurs, but had been given them on condition of their treating Hercules with it, whenever he paſſed through their territory. They reſented the liberty which Hercules took with their wine, and attacked him with uncommon fury. The hero defended himſelf with his arrows, and defeated his adverſaries, who fled for ſafety to the Centaur Chiron. Chiron had been the preceptor of Hercules, and therefore they hoped that he would deſiſt in his preſence. Hercules, though awed at the ſight of Chiron, did not deſiſt, but, in the midſt of the engagement, he wounded his preceptor in the knee, who, in the exceſſive pain he ſuffered, exchanged immortality for death. The death of Chiron irritated Hercules the more, and the Centaurs that were preſent, were all extirpated by his hand. *Diod. Heſiod, Homer, Ovid, &c.*

CENTAU'RIUM, *ſ.* in botany; ſee AGERATUM, CENTAUREA, CHIRONIA, CNICUS, ERANTHEMUM, SERRATULA. CENTAURIUM LUTEUM; ſee CHLORA, THESIUM. CENTAURIUM MINUS; ſee ACHYRANTHES, CHERONIA, GENTIANA, ERANTHEMUM, EXACUM, and SAROTHRA.

CENTAU'RUS, in aſtronomy, the Centaur, one of the forty-eight old conſtellations, being a ſouthern one, in form half man and half horſe; from the Greek fable of Chiron the Centaur, who was the tutor of Achilles and Eſculapius. The ſtars of this conſtellation are, in Ptolomy's catalogue 37, in Tycho's 4, and in the Britannic catalogue, with Sharp's appendix, 35.

CENTAU'RUS, *ſ.* a ſhip in the fleet of Æneas, which had the figure of a Centaur. *Virgil.* But, according to others, the ſhip was ſo named, from its ſimilitude to the ark, which, Mr. Bryant ſays, was ſometimes called *centaurus*; from whence many of the Arkites were called *centauri*, and were reputed of the Nepheline race. The ſame learned author obſerves, that ſhips ſeem of old to have been denominated from the ark *centauri*, and *bucentauri*; and that the Venetians at this day call their principal galley *bucentaur*.

CEN'TAURY, *ſ.* in botany; ſee CHLORA, GENTIANA.

CENTEL'LA, *ſ.* in botany; ſee HYDROCOTYLE.

CENTENA'RIUS, *ſ.* An officer who had the government or command, with the adminiſtration of juſtice, in a village. The centenarii as well as vicarii were under the juriſdiction and command of the court. We find them among the Franks, Germans, Lombards, Goths, &c. *Centenarius* was alſo uſed for an officer who had the command of one hundred men, moſt frequently called a *Centurion*.

CEN'TENARY, *ſ.* [*centenarius*, Lat.] The number of a hundred. In every *centenary* of years from the creation, ſome ſmall abatement ſhould have been made. *Hakewill.*

CENTE'NIUM O'VUM, *ſ.* with naturaliſts, a ſort of hen's egg much ſmaller than ordinary, vulgarly called a *cock's egg*; from which it has been fabulouſly held that the cockatrice or baſiliſk is produced. The name is taken from an opinion, that theſe are the laſt eggs which hens lay,

lay, having laid one hundred before; whence *centeninum*, the hundredth egg. These eggs have no yolk, but in other respects differ not from common ones, having the albumen, chalazes, membranes, &c. in common with others. In the place of the yolk is found a little substance like a serpent coiled up, which doubtless gave rise to the fable of the basilisk's origin from thence. The cause is ascribed by Hervey to this, that the yolks in the vitellary of the hen are exhausted before the albumina.

CEN'TENARY, *s.* [*centenarius*, Lat.] The number of a hundred.—In every *centenary* of years from the creation, some small abatement should have been made. *Hakewill.*

CEN'TER, *s.* See CENTRE.

CENTE'SIMA USU'RA, that wherein the interest in an hundred months became equal to the principal, i. e. where the money is laid out at one per cent. per month; answering to what in our style would be called 12 per cent. for the Romans reckoned their interest not by the year, but by the month.

CENTE'SIMAL, *s.* [*centesimus*, Lat.] Hundredth; the next step of progression after decimal in the arithmetic of fractions.—The neglect of a few *centesimals* in the side of the cube, would bring it to an equality with the cube of a foot. *Arbuthnot.*

CENTESIMA'TION, *s.* a milder kind of military punishment, in cases of desertion, mutiny, &c. when only every hundredth man is executed.

CENTIFO'LIOUS, *adj.* [from *centum* and *folium*, Lat.] Having an hundred leaves.

CENTILO'QUIUM, *s.* a collection of a hundred sentences, opinions, or sayings. The centiloquium of Hermes contains a hundred aphorisms, or astrological sentences, supposed to have been written by some Arab, but fathered on Hermes Trismegistus. It is only extant in Latin, in which it has several times been printed. The centiloquium of Ptolemy is a famous astrological piece, frequently confounded with the former, consisting likewise of a hundred sentences or doctrines, divided into short aphorisms, intitled in Greek καρπος, as being the fruit or result of the former writings of that celebrated astronomer, viz. his *quadripartitum* and *almagestum*; or rather, because that herein is shewn the use of astrological calculations.

CEN'TIPES, in entomology. See SCOLOPENDRA.

CENTLI'VRE (Susanna), a celebrated comic writer, born at Holbeach in Lincolnshire. Losing her mother, her father, whose name was Freeman, married a second wife, who treated Susanna with such severity, that, on a company of strolling comedians coming to Stamford, she joined them, and took a final leave of her father's house. She acquired some merit on the country stage; but, having a greater inclination to wear the breeches than the petticoats, she struck chiefly into the men's parts. Several gay adventures are related of this lady in her youth; one of which was, that she spent a considerable time in Cambridge, at the chambers of a gentleman of fortune, disguised under a man's habit; so that, it seems, she had, what the generality of her sex have not, the benefit of an university education. Afterwards she went to London, where she took care to improve the charms of her person and her genius. She learned French, and read a great deal of poetry; for which she was so particularly turned, that, as her biographers tell us, she composed a song before she was seven years old. She is the author of 15 plays, and several little poems, for some of which she is said to have received considerable presents from very great personages: from prince Eugene a very handsome and weighty gold snuff-box; and from the duke d'Aumont the French ambassador another, for a masquerade which she addressed to him. Her talent was comedy, particularly the contrivance of plots and incidents. Steele in one of the Tatlers, speaking of her "Busy Body," recommends it in these terms: "The plot and incidents of the play are laid with that subtlety and spirit, which is peculiar to females of wit; and is seldom well performed by those of the other sex, in whom craft in love is an act of invention, and not, as with women, the effect of nature and instinct. She died December 1, 1723, after being thrice married; and has since been mentioned by Pope in the Dunciad, for having written, as his commentator says, a ballad against his Homer, before he began it. She kept for many years a constant correspondence with many gentlemen of eminence and wit; particularly with Steele, Rowe, Budgell, Sewell, &c. She had a small wen on her left eye-lid, which gave her a masculine air. She died in Spring-gardens, at the house of her husband Joseph Centlivre, who had been one of queen Anne's cooks, and had fallen in love with her at Windsor, about 1706, where she acted the part of Alexander the Great.

CENT'NER, *s.* with assayers, a weight divided into a hundred parts. See BALANCE, vol. ii. p. 642; and the article WEIGHT.

CEN'TO, *s.* [*cento*, Lat.] A composition formed by joining scraps or extracts from other authors.—It was quilted, as it were, out of shreds of divers poets, such as scholars call a *cento*. *Camden.*

CEN'TO POZ'ZI, a town of Italy, in the kingdom of Naples, and province of Bari: three miles north of Matera.

CENTOR'BI, a town of Sicily, in the valley of Demona, at the foot of Mount Ætna, near which is found a stone which dissolves in water like soap: nineteen miles west-north-west of Jaci.

CENTO'RIO (Ascanius), of an illustrious family of Milan, bore arms in the sixteenth century, in which he was as much the philosopher as the soldier. He took advantage of the leisure afforded him by the peace, for reducing to order the military and historical memoirs he had collected during the tumult of war. They are very much esteemed in Italy, not less for their excellence than their rarity. They appeared at Venice in 1565 and 1569, in 2 vols. 4to. The former, in six books, treats of the wars of Transilvania, and the other of those of his own time; in eight books.

CE'NTRAL, *adj.* [from *centre*.] Relating to the centre; containing the centre; placed in the centre, or middle. Thus we say central eclipse, central forces, central rule, &c.

CENTRAL ECLIPSE, is when the centres of the luminaries exactly coincide, and come in a line with the eye. See ASTRONOMY, vol. ii. p. 398.

CENTRAL FORCES, are forces having a tendency directly towards or from some point or centre; or forces which cause a moving body to tend towards, or recede from, the centre of motion. See MECHANICS.

CENTRAL RULE, is a rule or method discovered by Mr. Thomas Baker, rector of Nympton, in Devonshire, which he published in his Geometrical Key, in 1684, for determining the centre of a circle which shall cut a given parabola in as many points as a given equation, to be constructed, has real roots; and this he has applied with good success in the construction of all equations as far as the fourth power inclusive. The central rule is chiefly founded on this property of the parabola; that, if a line be inscribed in the curve perpendicular to any diameter, the rectangle of the segments of this line is equal to the rectangle of the intercepted part of the diameter and the parameter of the axis. The central rule has the advantage over the methods of constructing equations by Des Cartes and De Latteres, which are liable to the trouble of preparing the equations by taking away the second term; whereas Baker's method effects the same thing without any previous preparation whatever. See also Philos. Trans. No. 157.

CEN'TRALLY, *adv.* [from *central*.] With regard to the centre.—Though one of the feet most commonly bears the weight, yet the whole weight rests *centrally* upon it. *Dryden.*

CEN'TRE, *s.* [*centrum*, Lat. from κεντρον, Gr. a point.] The middle; that which is equally distant from all extremities. This is a word of very extensive application. In chemistry, it is the residence or foundation of matter. In

In medicine, it is the point in which its virtue resides. In anatomy, the middle point of some parts is so named, as *centrum nerveum*, the middle or tendinous part of the diaphragm, &c.

The heav'ns themselves, the planets, and this *centre*,
Observe degree, priority, and place. *Shakespeare.*

CEN'TRE, *s.* with builders, the frame of wood or timber on which the brick or stone of arches are turned, and from which they receive their form and curvature. See ARCHITECTURE, vol. ii. p. 86, 133, &c.

To CEN'TRE, *v. a.* To place on a centre; to fix as on a centre.

One foot he *centred*, and the other turn'd
Round through the vast profundity obscure. *Milton.*

To collect to a point.

By thy each look, and thought, and care, 'tis shown,
Thy joys are *centred* all in me alone. *Pope.*

To CEN'TRE, *v. n.* To rest on; to repose on; as bodies when they gain an equilibrium.—Where there is no visible truth wherein to *centre*, error is as wide as men's fancies, and may wander to eternity. *Decay of Piety.*—To be placed in the midst or *centre*:

As God in heav'n
Is centre, yet extends to all; so thou,
Centring, receiv'st from all those orbs. *Milton.*

To be collected to a point:

What hopes you had in Diomede, lay down;
Our hopes must *centre* on ourselves alone. *Dryden.*

CEN'TRE of ATTRACTION, or GRAVITATION, is the point to which bodies tend by gravity; or that point to which a revolving planet or comet is impelled or attracted, by the force or impetus of gravity.

CEN'TRE of a BASTION, is a point in the middle of the gorge, where the capital line commences, and which is usually at the angle of the inner polygon of the figure. Or it is the point where the two adjacent curtains produced interfect each other.

CEN'TRE of a CIRCLE, is the point in the middle of a circle, or circular figure, from which all lines drawn to the circumference are equal.

CEN'TRE of a CONIC SECTION, is the middle point of any diameter, or the point in which all the diameters interfect and bisect one another. In the ellipse the centre is within the figure; but in the hyperbola it is without, or between the conjugate hyperbolas; and in the parabola it is at an infinite distance from the vertex. See CONIC SECTIONS.

CEN'TRE of a CURVE, of the higher kind, is the point where two diameters meet. When all the diameters meet in the same point, it is called, by Sir Isaac Newton, the *general centre*.

CEN'TRE of an ELLIPSE, is the middle of any diameter, or the point where all the diameters interfect.

CEN'TRE of FRICTION, is that point in the base of a body on which it revolves, into which if the whole surface of the base and the mass of the body were collected, and made to revolve about the centre of the base of the given body, the angular velocity destroyed by its friction would be equal to the angular velocity destroyed in the given body by its friction in the same time. See FRICTION.

CEN'TRE of GRAVITY, is that point about which all the parts of a body do in any situation exactly balance each other. Hence, by means of this property, if the body be supported or suspended by this point, the body will rest in any position into which it is put; as also that, if a plane pass through the same point, the segments on each side will be equiponderate, neither of them being able to move the other. See GRAVITY.

CEN'TRE of GYRATION, is that point in which if the whole mass be collected, the same angular velocity will be generated in the same time, by a given force acting at any place, as in the body or system itself. This point differs from the centre of oscillation, in as much as in this latter case the motion of the body is produced by the gravity of its own particles, but in the case of the centre of gyration the body is put in motion by some other force acting at one place only.

CEN'TRE of an HYPERBOLA, is the middle of the axis, or of any other diameter, being the point without the figure in which all the diameters interfect one another; and it is common to all the four conjugate hyperbolas.

CEN'TRE of MAGNITUDE, is the point which is equally distant from all the similar external parts of a body. This is the same as the centre of gravity in homogeneal bodies that can be cut into like and equal parts according to their length, as in a cylinder, or any other prism.

CEN'TRE of MOTION, is the point about which any body, or system of bodies, moves, in a revolving motion.

CEN'TRE of OSCILLATION, is that point in the axis or line of suspension of a vibrating body, or system of bodies, in which, if the whole matter or weight be collected, the vibrations will still be performed in the same time, and with the same angular velocity, as before. Hence, in a compound pendulum, its distance from the point of suspension is equal to the length of a simple pendulum whose oscillations are isochronal with those of the compound one. See MECHANICS.

CEN'TRE of PERCUSSION, in a moving body, is that point where the percussion or stroke is the greatest, in which the whole percutient force of the body is supposed to be collected; or about which the impetus of the parts is balanced on every side, so that it may be stopt by an immoveable obstacle at this point, and rest on it, without acting on the centre of suspension.

CEN'TRE of a PARALLELOGRAM, the point in which its diagonals interfect.

CEN'TRE of PRESSURE, of a fluid against a plane, is that point against which a force being applied equal and contrary to the whole pressure, it will just sustain it, so as that the body pressed on will not incline to either side. This is the same as the centre of percussion, supposing the axis of motion to be at the interfection of this plane with the surface of the fluid: and the centre of pressure upon a plane parallel to the horizon, or upon any plane where the pressure is uniform, is the same as the centre of gravity of that plane.

CEN'TRE of a REGULAR POLYGON, or REGULAR BODY, is the same as that of the inscribed, or circumscribed circle or sphere.

CEN'TRE of a SPHERE, is the same as that of its generating semicircle, or the middle point of the sphere, from whence all right lines drawn to the superficies are equal.

CENTREVIL'LE, the chief town of Queen Anne's county, in North America, situate on the east side of Chesapeak-bay in Maryland. It lies between the forks of Corsica-creek, which runs into Chester-river, and has been but lately laid out. It is eighteen miles south of Chester, thirty-four south-east by east of Baltimore, and ninety-five south-west by south of Philadelphia. Lat. 39. 6. N.

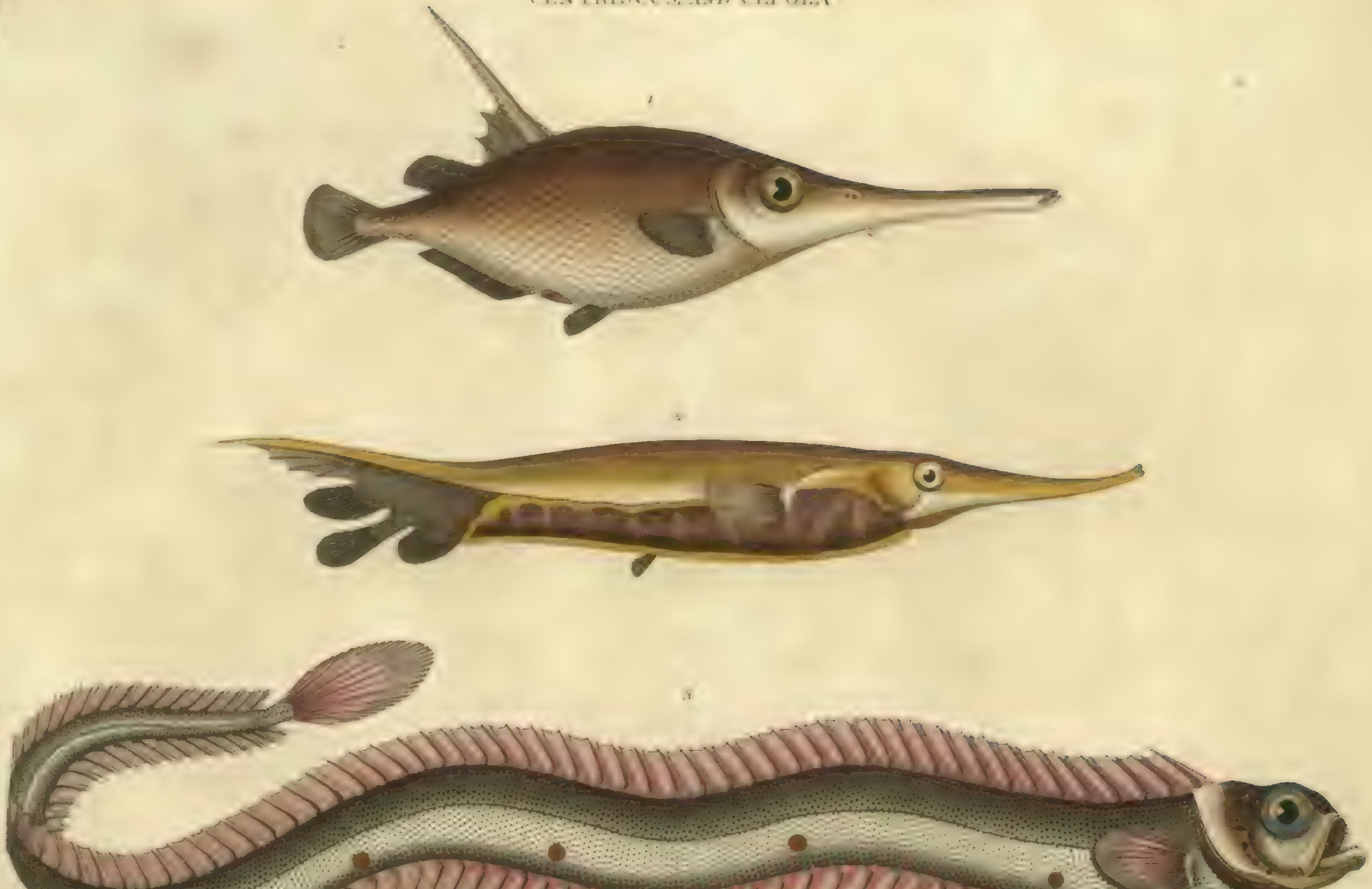
CEN'TRIC, *adj.* Placed in the centre:

Some, that have deeper digg'd in mine than I,
Say where his *centric* happiness doth lie. *Donne.*

CENTRI'FUGAL, *adj.* [from *centrum* and *fugio*, Lat.] Having the quality acquired by bodies in motion, of receding from the centre.

CENTRI'PETAL, *adj.* [from *centrum* and *peto*, Lat.] Having a tendency to the centre; having gravity. Hence, in mechanics, *centrifugal force*, is that by which a body revolving about a centre, or about another body, endeavours to recede from it. And *centripetal force*, is that by which a moving body is perpetually urged towards a centre, and made to revolve in a curve, instead of a right line. Therefore, when a body revolves in a circle, these two

CENTRISCUS, AND CEPOLA



1. The Bellows Fish. 2. The Snipe or Trumpet Fish 3. The Ribbon Fish.

two forces, viz. the centrifugal and centripetal, are equal and contrary to each other, since neither of them gains upon the other, the body being in a manner equally balanced by them. But when, in revolving, the body recedes farther from the centre, then the centrifugal exceeds the centripetal force; as in a body revolving from the lower to the higher apsis, in an ellipse, and respecting the focus as the centre. And when the revolving body approaches nearer to the centre, the centrifugal is less than the centripetal force; as while the body moves from the farther to the nearer extremity of the transverse axis of the ellipse: the two forces being equal to each other only at the very extremities of that axis. It is one of the established laws of nature, that all motion is of itself rectilinear, and that the moving body never recedes from its first right line, till some new impulse be superadded in a different direction: after that new impulse the motion becomes compounded, but it is still rectilinear, though not in the same line or direction as before. See MECHANICS.

CENTRIS'CUS, *s.* the TRUMPET FISH, in ichthyology, a genus belonging to the order of amphibia nantes. The generic characters are, the body is laterally compressed, and the head terminated like the beak of a snipe. Some are covered with bony plates like armour, others with scales. There are no teeth in the mouth; and the lower jaw is the longest. They live principally on worms, and are not above six or seven inches long; and chiefly abound in the Mediterranean and East-Indian seas. There are only two species known.

1. Centriscus scolopax, the trumpet or bellows fish. The scales on the body form the specific character: they are hard, sharp, and, standing pretty thick, make the fish rough if rubbed against the grain. There are four rays in the membrane of the gills, sixteen in the pectoral fin, five in the ventral, eighteen in the anal, nine in the tail, four in the first dorsal, seventeen in the second. The body is short and broad, laterally compressed, and very much resembles a pair of bellows in shape; it is of a pale-red colour. The head, which is broadish above, ends in a bent cylinder below; and the aperture of the mouth, which is small, is at the end of the long beak; the aperture is closed by the lower jaw, which shuts into the upper like the lid of a snuff-box. The nostrils are double, and lie near the eyes; the eyes are large, with a black pupil and a pale-red iris. The gill-covert is single; the aperture is large, and covers the membrane which lies underneath. This fish can hide its small ventral fins in a bony furrow which lies behind them; all the fins are of a grey colour. This fish haunts the Mediterranean sea; it is tender, well-tasted, and easy of digestion; but, being very thin, it is generally sold with other small fish at a low price. As the fins are very small in proportion to the other parts, so that it cannot swim fast enough to avoid its enemies, Providence has given it a moveable spine for its defence.

2. Centriscus scutatus, the armed snipe or trumpet fish. The smooth armour with which this fish is covered distinguish it specifically from the preceding. The osseous plates are so joined, that they look like one piece, and give the fish the appearance of the *solen siliqua*, or knife-handle; and it may be regarded as forming the connecting link between shell and other fish. There are eleven rays in the pectoral fin, five in the ventral, thirteen in the anal, twelve in the tail, three in the first dorsal, and eleven in the second. The head is long, terminating in a cylindrical snout or beak, turned up at the end; the mouth is small, and the under jaw is the longest. The eye has a black pupil, in a yellowish-white iris, and covered with a pellicle or membrane; the nostrils are double, and are near the eyes. The gill-covert is smooth, and transparent like horn; the aperture is large, and placed at the side. There is a sharp spine, which is a continuation of the back, and runs out beyond the tail; it is probably a weapon of defence. The back is of a brownish colour; the sides are brown mixed with a little silver, and reddish towards the belly; some white lines are formed by the joinings in the armour. The fish is very thin, and the sides end sharp at top. When held up to the light, one part near the back is transparent. The shell every where shines like gold. The under surface, which is brown, consists usually of ten or twelve plates; at the lower edge is a thin skin which reaches from the snout to the anal fin; and near this skin the pieces are separated, and the anus lies between them. The situation of the fins is remarkable in this fish; the pectoral fin is very far from the aperture of the gills, and the dorsal fins lie under the shell, close to the tail-fin. The pectoral, ventral, and dorsal, fins, are yellowish; the others brown. This fish is found in the East Indies, and grows six or eight inches long; it must be nourished by suction, as no tongue can be perceived; it feeds only on slime and some small aquatic animals. When the armour or shell is taken off from the belly, the flesh underneath is so thin as to weigh but a few grains; it is of a shining white colour. The stomach is small, long, and round; and little crabs are often found therein.

CEN'TRON, a village of Savoy, in the Tarantaise, formerly a capital town of a people called Centrones: three miles east-north-east of Moustier.

CENTRO'NIA, a name by which the *echini marini* have been classed by Dr. Hill.

CEN'TRY or SENTRY, *s.* See SENTINEL.

The thoughtless wits shall frequent forfeits pay,
Who 'gainst the *centry's* box discharge their tea. *Gay.*

CENTUMCEL'LÆ, in the ancient geography, Trajan's villa in Tuscany, on the coast, three miles from Algæ; with an excellent port, called *Trajanus Portus*; now *Civita Vecchia*.

CENTUM'VIRI, the members of a court of justice at Rome. They were originally chosen, three from the 35 tribes of the people, and though 105 they were always called Centumvirs. They were afterwards encreased to the number of 180, and still kept their original name. The pretor sent to their tribunal causes of the greatest importance, as their knowledge of the law was extensive. They were generally summoned by the Decemviri, who seemed to be the chiefest among them; and they assembled in the Basilica, or public court, and had their tribunal distinguished by a spear with an iron head, whence a decree of their court was called *hasta judicium*: their sentences were very impartial, and without appeal. *Cicero.*

CENTUN'CULUS, *s.* [the name of a plant in Pliny.] In botany, a genus of the class tetrandria, order monogynia, natural order of rotaceæ. The generic characters are—Calyx: perianthium four-cleft, spreading, permanent; divisions acute, lanceolate, longer than the corolla. Corolla: monopetalous, rotated. Tube subglobular; border four-cleft, flat; divisions subovate. Stamina: filaments four, almost the length of the corolla. Anthers simple. Pistillum: germ roundish, within the tube of the corolla. Style filiform, length of the corolla, permanent. Stigma simple. Pericarpium: capsule globular, unilocular, opening horizontally. Seeds: very many, very small.—*Essential Character.* Calyx: four cleft; corolla four-cleft, spreading; stamina short; capsule one-celled, opening horizontally.

There is but one species, called centunculus minimus, or bastard pimpernel. Root annual. Stem from half of an inch to an inch in height or more, simple or branched at bottom, rather upright, round and smooth. Leaves alternate, sessile, ovate, pointed, entire, smooth, somewhat fleshy, spreading; sometimes opposite towards the bottom, pellucid at the edge, brownish underneath. Flowers very minute, solitary, axillary, sessile. Calyx divided sometimes into four, but generally into five, narrow segments to the base. The whole corolla is only one line in diameter, and hyaline or of a clear water or glass colour: the segments equal and much pointed, very thin and transparent. The yellow anthers close the mouth of the tube; and the border does not expand, unless the sun shines strongly on it. The globular

globular capsules are like small coriander seeds, and sessile in the axils; they open into two hemispheres, and contain seven or eight seeds attached to a receptacle. These capsules contribute most to discovering this minute plant, found in Italy, France, Germany, Britain, Denmark, Scania; in sandy and gravelly places, that are a little moist. With us on Hounslow-heath, Ashford-common, near Hampton-court, Chislehurst, &c. Flowers from June to August. See CERASTIUM.

CEN'TUPLE, *adj.* [*centuplex*, Lat.] An hundred fold.

To CENTU'PLICATE, *v. a.* [*centuplicatum*, of *centum* and *plico*, Lat.] To make a hundred fold; to repeat a hundred times.

CENTU'RI, a small sea port of the island of Corsica.

To CENTU'RIATE, *v. a.* [*centurio*, Lat.] To divide into hundreds.

CENTURIA'TOR, *s.* A name given to historians, who distinguish times by centuries; which is generally the method of ecclesiastical history.—The *centuriators* of Magdeburg were the first that discovered this grand imposture. *Ayliffe.*

CENTU'RION, *s.* [*centurio*, Latin.] A military officer among the Romans, who commanded an hundred men. See ROME.

CENTURI'PÆ, CENTORIPA, or CENTURIPE, an ancient town in the south-west territory of Etna, on the river Cyamasorus: now *Centorbi.* It was a democratical city, which, like Syracuse, received its liberty from Timoleon. Its inhabitants cultivated the fine arts, particularly sculpture and engraving. The situation of the place is romantic: it is built on the summit of a vast group of rocks, which was probably chosen as the most difficult of access, and consequently the properest in times of civil commotion. The remains still existing of its ancient bridge are a proof of its having been a considerable city. Cicero speaks of it as such. It was taken by the Romans, plundered and oppressed by Verres, destroyed by Pompey, and restored by Octavius, who made it the residence of a Roman colony.

CEN'TURY, *s.* [*centuria*, Lat.] A hundred: usually employed to specify time; as, the second *century*.—The nature of eternity is such, that, though our joys, after some *centuries* of years, may seem to have grown older by having been enjoyed so many ages, yet will they really continue new. *Boyle.*—It is sometimes used simply for a hundred.—Romulus, as you may read, did divide the Romans into tribes, and the tribes into *centuries* or hundreds. *Spenser.*

CEN'TURIES of MAGDEBURG, a famous ecclesiastical history, ranged into thirteen centuries, carried down to the year 1298, compiled by several hundred protestants of Magdeburg, the chief of whom was Flacius Illyricus.

CENTUS'SIS, *s.* in Roman antiquity, a coin containing one hundred asses.

CE'OL, an initial in the names of men, which signifies a ship or vessel, such as those that the Saxons landed in. *Gibson.*

CEOR'LES, *s.* The name of one of the classes or orders into which the people were distinguished among the Anglo-Saxons. The ceorles, who were persons completely free, and descended from a long race of freemen, constituted a middle class between the labourers and mechanics on the one hand, and the nobility on the other. They seem in general to have been a kind of gentlemen farmers; and if any one prospered so far as to acquire the property of five hydes of land, upon which he had a church, a kitchen, a bell-house, and great gate, and obtained a seat and office in the king's court, he was esteemed a nobleman or thane. If a ceorl applied himself to learning, and attained to priest's orders, he was also considered as a thane; and his testimony had the same weight in a court of justice. When he applied to commerce, and made three voyages in a ship of his own, and with a cargo belonging to himself, he was also advanced to the dignity of a thane. But if a ceorl had a greater propensity to arms than to learning, trade, or agriculture, he then became the sithcunman, or military retainer, to some potent and warlike earl, and was called the *huscarle* of such nobleman. If one of these huscarles acquitted himself so well as to obtain from his patron either five hydes of land, or a gilt sword, helmet, and breast-plate, as a reward of his valour, he was then a thane. Thus the temple of honour stood open to the ceorls, whether they applied themselves to agriculture, commerce, letters, or arms, which were the only professions esteemed worthy of a freeman.

CE'OS, CEA, CIA, or COS, in the ancient geography, one of the Cyclades, opposite to the promontory of Achaia, called *Sunium.* This island is commended by the ancients for its fertility and richness of pasture. The first silk stuffs, if Pliny and Solinus are to be credited, were wrought here. Ceos was particularly famous for the excellent figs it produced. It was first peopled by Aristæus, the son of Apollo and Cyrene, who being grieved for the death of his son Actæon, retired from Thebes, at the persuasion of his mother, and went over with some Thebans to Ceos, or Cos, at that time uninhabited. The island soon become so populous, that a law prevailed, commanding all persons upwards of sixty to be poisoned, that others might be able to subsist; so that those above sixty were obliged either to submit to the law, or abandon the country. Ceos had, in former times, four cities, viz. Julis, Carthæa, Coressus, and Præessa. The two latter were, according to Pliny, swallowed up by the earthquake; the other two flourished in Strabo's time. Carthæa stood on a rising ground, at the end of a valley, about three miles from the sea. The situation of it agrees with that of the present town of Zea. The ruins both of Carthæa and Julis are still remaining; those of the latter take up a whole mountain, and are called by the modern inhabitants Polis, *the city.* Near this place are the ruins of a stately temple, with many pieces of broken pillars, and statues of most exquisite workmanship. The city walls were of marble, and some pieces are still remaining above twelve feet in length. Julis was, according to Strabo, the birth-place of Simonides, Bacchylides, Erasistratus, and Aristo. Ceos was, with the other Greek islands, subdued by the Romans. The island is now called *Zea.*

CE'PA, *s.* in botany. See ALLIUM and PANCRATIUM.

CEPŒ'A, *s.* in botany. See SEDUM.

CEPHÆ'LIS, *s.* in botany. See COLLOOCCA.

CEPHALÆ'A, *s.* [from κεφαλη Gr. the head.] The flesh of the head which covers the skull. Also a long continued pain of the cerebrum and its membranes.

CEPHALA'GIA, or CEPHALALGIA, *s.* [from κεφαλη, *the head*, and αλγος, pain.] The HEAD-ACH. By some it is used to signify a dull pain of the head, which is of a short duration. But most frequently it is used as expressive of pain in the head in general, without regard to circumstances. For the causes and cure, see MEDICINE.

CEPHALAN'THUS, *s.* [κεφαλος and ανθος, head-flower.] BUTTON-WOOD, BUTTON-TREE, POND-DOGWOOD, &c. in botany, a genus of the class tetrandria, order monogynia, natural order of aggregatæ. The generic characters are—Calyx: perianthium common none, but the receptacle collecting many floscules into a globose head. Perianthium proper one-leafed, funnel-form, angular, border quadrifid. Corolla: universal equal. Proper monopetalous, funnel form, acute, quadrifid. Stamina: filaments four, inserted into the corolla; shorter than the border. Anthers globose. Pistillum: germ inferior. Style longer than the corolla. Stigma globose. Pericarpium: none. Seeds: solitary, long, attenuated at the base, pyramidal and lanuginous. Receptacle: common globular, villose. —*Essential Character.* Calyx common none; proper superior, funnel-form; receptacle globular, naked; seed one, lanuginous.

Species. 1. Cephalanthus occidentalis, or American button-wood: leaves in pairs or in threes. This shrub seldom rises higher than seven feet in this country. The branches

branches come out by pairs, opposite at each joint. The leaves are either in pairs opposite, or there are three at the same joint, standing round the branch; these are near three inches long, and one and a quarter broad, having a strong vein running longitudinally through the middle, and some small transverse veins from that to the borders; they are of a light green, and their foot-stalks change to a reddish colour next the branches; the ends of the branches are terminated by loose spikes of spherical heads, about the size of a marble, each of which is composed of many small flowers, of a whitish-yellow colour, fastened to an axis in the middle; these appear in July, and, in warm seasons, are succeeded by seeds, which have sometimes ripened in England. Gærtner describes the fruit as an inferior capsule, crowned with the permanent calyx, inversely pyramidal, smooth, coriaceous, reddish-straw or brick colour, four-celled, and divisible into four parts, two of the cells commonly abortive, but all valveless and never opening spontaneously. Seeds four or two, one in each cell, oblong, flattish or angular on one side, convex on the other, thicker at top and terminated by a callous epiphysis, acuminate at bottom, and of a ferruginous red colour. Linneus says that the seeds are lanuginose; and Miller affirms that the capsules are globular and villose; whereas those which he sent to Gærtner himself were quite smooth, and agreed with the figure described above. Introduced 1735, by Peter Collinson, Esq.

2. Cephalanthus angustifolius: leaves lanceolate-linear opposite. This is a middle-sized tree, with ascending branches. Leaves quite entire. Flowers pale, in small terminating heads: common receptacle, collecting the florets into a ball: the fruit a small compound berry.

3. Cephalanthus procumbens: stem procumbent, leaves ovate-lanceolate alternate. A thick shrub, with many long funicular branches. Leaves large, quite entire, tomentose, petioled. Flowers violet-coloured, dioecous, in long interrupted terminating racemes.

4. Cephalanthus montanus: leaves ovate crenate alternate. A large tree, with a hempen bark, and spreading branches. Flowers green, on solitary axillary peduncles, forming roundish heads, on a naked globular receptacle: the females have no corollax.

5. Cephalanthus stellatus: leaves stellate, lanceolate-linear. This is a middle-sized tree with ascending branches. Leaves by threes, quite entire, smooth. Florets white, terminating, collected into a ball; with a small ovate receptacle, and no common perianthium: the proper one is inferior, with four subulate segments. Corolla superior, with a four-cleft reflex border, four subsessile anthers, a long style, and one naked seed. Father Loureiro examined the living plants of all the species in their native soil; the first and fourth in China, the others in Cochin-china; and found them to differ very much, both from each other and Linnæus's generic character.

Propagation and Culture. The first sort is propagated chiefly by seeds, (though some have been raised from cuttings and layers;) these should be sown in pots, for the greater conveniency of removing them either into a shady situation, or where they may have shelter. If the seeds can be procured so early as to sow them before Christmas, the plants will come up the following summer; but, if they are sown in the spring, they generally remain a year in the ground; therefore, in such case, the pots should be placed in the shade that summer, and in the autumn following removed under a common frame to shelter them from frost, and the spring following the plants will come up. The first year, it will be necessary to shade the plants in hot, dry weather, while they are young, at which time they are often destroyed by being too much exposed; nor should the watering be neglected; for these plants naturally grow on moist ground. The next autumn, when the leaves begin to drop, the young plants may be transplanted into nursery-beds, which should be a little defended from the cold winds; and, if the soil be moist, they will succeed much better than in dry ground. In these nursery-beds the plants may remain a year or two, according to the progress they may have made, or the distance at which they were planted; then they may be taken up in October, and transplanted where they are to remain. It may also be performed in the spring, especially if the ground be moist into which they are removed, or that the plants be duly watered, if the spring should prove dry, otherwise there will be more hazard of their growing when removed at this season. These plants make a pretty variety among other hardy trees and shrubs, being extremely hardy in respect to cold; but they delight in a moist light soil, where they will grow very fast, and their leaves will be larger than in dry land. The other sorts are not at present known in Europe. See NAUCLEA.

CEPHALE'NIA, in the ancient geography, an island of the Ionian sea between Ithaca and Zacynthus, whose inhabitants went with Ulysses to the Trojan war, and was known in Homer's time by the names of Samos and Epirus Melæna. It had anciently four cities, the names of which, according to Thucydides, were Same, Prone, Cranii, and Palæ. It is now called CEPHALONIA.

CEPHA'LIC, *adj.* [κεφαλή.] That is medicinal to the head.—*Cephalic* medicines are all such as attenuate the blood, so as to make it circulate easily through the capillary vessels of the brain. *Arbuthnot on Aliment.*—I dressed him up with soft folded linen, dipped in a *cephalic* balsam. *Wiseman.*

CEPHALI'TIS, *f.* [from κεφαλη, Gr. the head.] A phrensy, or inflammation of the parts within the head.

CE'PHALON, a Greek of Ionia, who wrote an history of Troy, besides an epitome of universal history from the time of Ninus to Alexander, which he divided into nine books, inscribed with the name of the nine muses. He affected not to know the place of his birth, expecting it would be disputed like Homer's. He lived in the reign of Adrian.

CEPHALO'NIA, a considerable island in the Mediterranean, near the coast of Livadia to the north-east; and near the coast of Morea to the south-east; opposite to the Gulf of Lepanto; about forty miles in length, and from ten to twenty in breadth. It was anciently called Samos and Epirus Melauna. It has been subject to the Venetians from the year 1449. The chief articles of commerce are oil, muscadine wine, and a species of grape called currants. The air is very warm, the trees are covered with flowers all the winter, and bear ripe fruit twice a year, in April and November; but those which grow in the latter month are smaller than the others. Corn is sown in the winter, and reaped in June. Lat. 38. 20. to 38. 50. N. lon. 38. 15. to 39. E. Ferro.

CEPHALO'NIA, the capital of the island so called; the see of a bishop, united to Zant. This town was much damaged by an earthquake in 1766. Lat. 38. 30. N. lon. 38. 35. E. Ferro.

CEPHALONO'SUS, *f.* [from κεφαλη, Gr. the head, and νοσος, a disease.] A disease of the head. It is usually applied to that disorder called the Hungarian fever, in which the head is principally affected.

CEPHALO'TUS, *f.* in botany. See THYMUS.

CE'PHALUS, in fabulous history, son of Deionius, king of Thessaly, by Diomede, daughter of Xuthus, married Procris, daughter of Erechtheus, king of Athens. Aurora fell in love with him, and carried him away; but he refused to listen to her addresses, and was impatient to return to Procris. The goddess sent him back; and, to try the fidelity of his wife, she made him put on a different form, and he arrived at the house of Procris in the habit of a merchant. Procris for a time resisted; but at length suffered herself to be seduced by the gold of this stranger, who discovered himself the very moment that Procris had yielded up her virtue. This circumstance so ashamed Procris, that she fled from her husband, and devoted herself to hunting in the island of Eubœa, where she was admitted among the attendants of Diana, who presented her with a dog always sure of his prey, and a dart which never missed its

its aim, and always returned to the hands of its mistress of its own accord. Some say that the dog was a present from Minos, because Procris had cured his wounds. After this, Procris returned in disguise to Cephalus, who was willing to disgrace himself by some unnatural concessions to obtain the dog and the dart of Procris. Procris discovered herself at the moment that Cephalus shewed himself faithless, and a reconciliation was easily made between them. They loved one another with more tenderness than before, and Cephalus received from his wife the presents of Diana. As he was particularly fond of hunting, he every morning early repaired to the woods, and after much toil and fatigue laid himself down in the cool shade, and earnestly called for Aura, or the refreshing breeze. This ambiguous word was mistaken for the name of a mistress; and some informer reported to the jealous Procris, that Cephalus daily paid a visit to a mistress, whose name was Aura. Procris too readily believed the information, and secretly followed her husband into the woods. According to his daily custom, Cephalus retired to the cool, and called after Aura. At the name of Aura, Procris eagerly lifted up her head to see her expected rival. Her motion occasioned a rustling among the leaves of the bush that concealed her; and, as Cephalus listened, he thought it to be a wild beast, and he let fly his unerring dart. Procris was struck to the heart, and instantly expired in the arms of her husband, confessing that ill-grounded jealousy was the cause of her death. According to Apollodorus, there were two persons of the name of Cephalus; one, son of Mercury and Herse, carried away by Aurora, with whom he dwelt in Syria, and by whom he had a son called Tithonus. The other married Procris, as mentioned above. *Ovid.*

CE'PHEUS, a king of Æthiopia, father of Andromeda, by Cassiope. He was one of the Argonauts, and was changed into a constellation after his death. *Ovid.*—Apollodorus mentions one, son of Aleus, and another, son of Belus. The former he makes king of Tegea, and father of Sterope; and says, that he, with his twelve sons, assisted Hercules in a war against Hippocoon, where they were killed. The latter he calls king of Æthiopia, and father of Andromeda.

CE'PHEUS, *s.* a constellation of the northern hemisphere, being one of the forty-eight old asterisms. The stars of this constellation, in Ptolemy's catalogue are 13, in Tycho's 11, in Hevelius's 51, and in the Britannic catalogue 35.

CEPHI'SUS and CEPHISSUS, a celebrated river of Greece, that rises at Lilæ in Phocis, and after passing at the north of Delphi and mount Parnassus, enters Bœotia, where it flows into the lake Copais. The Graces were fabled as being particularly fond of this river, whence they are called the goddesses of the Cephisus. There was a river of the same name in Attica, and another in Argolis. *Strabo.*

CE'PI COR'PUS, in law, a return made by the sheriff upon a capias, or other process to the like purpose, that he hath taken the body of the party.

CE'PIC, a town of Istria: four miles south of Pedena.

CE'POLA, *s.* in icthyology, the RIBBON-FISH; a genus belonging to the order of thoraciæ. The generic characters are—Body long, narrow, and thin, like a ribbon. Linnæus in the 12th edition of his Syst. Nat. has made a separate genus of the *cepola*, which, in his earlier editions, he had classed under the serpent-shaped fishes, *ophidium*. That eminent naturalist describes but one species, *cepola tænia*; in which the bluntness of the head forms the specific character. There are six rays in the membrane of the gills, fifteen in the pectoral fin, six in the ventral, sixty in the anal, ten in the tail, and sixty-six in the dorsal. The head is broadest at top; the mouth large, opening obliquely; the under jaw is the longest, and both are armed with sharp teeth; the tongue is thin, broad, and rough. The eyes are large, standing at the top of the head; the pupil is black, the iris silver mixed with blue; there is a round hole in the inner edge of each eye. The aperture of the gills is wide; the covert single; before the aperture are five minute holes, and several of the same kind near the eye; they probably secrete a viscous or slimy matter. This fish has an extremely slender and tapering shape; the body being twelve inches in length, and scarcely one in thickness: it is of a silvery colour, and semi-transparent, so that the vertebræ of the back appear, and can easily be numbered. The cepola has no scales; the sides are adorned with lineal rows of silvery spots. The pectoral fins are small, and their rays so slender, that they are almost imperceptible. About an inch behind the head, rises the dorsal fin, which is produced till it joins the tail, where it meets the anal fin, which begins so near the throat, that the anus is situated almost immediately below the angle of the lower jaw. The fins display a great brilliancy of colour, being of a most beautiful red, with five spots of a deeper or brighter cast, placed on each side of the body. This fish is sold in the markets of Rome; but its flesh, according to Rondeletius, is of a very indifferent quality.

CERAM', an island in the Eastern Indian Sea, about fifty leagues long, and twenty broad. It is supposed to contain 30,000 fighting men; but the internal parts are little known. Along the coasts, the Dutch have had influence and power enough to destroy the clove trees of the island, more effectually to secure the clove-trade to themselves. Lat. 4. S. lon. 127. to 131. E. Greenwich.

CERAM' LAOUT, an island of the Eastern Indian Sea, near the island of Ceram, above five miles long, and hardly three wide; mountainous and uninhabited. It has a bay on the north coast.

CERAM'BYX, *s.* in entomology, a genus of insects belonging to the order of coleopotera; and of which Linnæus enumerates no less than eighty-three species. Their antennæ are formed of articulations or joints, gradually diminishing in size from the base to their extremity. The thorax is either armed with spines, or gibbous, made uneven by small elevations. The elytra are narrow, and throughout of equal breadth; and the species admit of the following subdivisions: 1. With the thorax on each side armed with moveable spines. 2. With the thorax margined, and the sides armed with spines. 3. With the thorax round, and armed with fixed spines. 4. With the thorax nearly cylindrical, and unarmed, the spines wanting. 5. With the thorax of a roundish form, and depressed on the upper side. The musk-beetle, or goat-chaffer, frequently found in the willow, is a carambyx. The larvæ of these insects mostly subsist on the inner bark of trees, and in which situation they mostly undergo their transformations.

In the annexed plate are given five remarkable species of cerambyx; some of which, in warm countries, grow to an enormous size. Fig. 1, is the cerambyx giganteus, mentioned in Fabricius 8, p. 161. The present figure was taken of its natural size from the real insect, by Mr. Drury; it measured six inches and three-quarters in length, and was brought from Cayenne, in South America. The head and thorax are black; all the rest of the insect is a rich chesnut-brown, somewhat mealy in front; the jaws are placed in an horizontal position, with the extremities bending inward, or towards each other. The eyes are black, and so situated as to discern objects both above and below at the same time; the antennæ are thickest at their base, and are about half the length of the insect, gradually diminishing in size to their extremities. The thorax is smooth, and convex at top, the middle appearing like polished steel; the sides are rough, like shagreen, and are armed with two short or pointed spines like horns; it is also margined. The scutellum, or escutcheon, is small, and shaped like a bell; the elytra are deeply margined on their sides and suture, and have five longitudinal ribs, with their surfaces rough like fish-skin. The under sides of the abdomen are covered with a dark brown pile, exactly like velvet. The legs are terminated with strong articulations and forked spines, which assist it in its passage over smooth surfaces,

The gigantic Cerambix of Cayenne contrasted with the smaller species

surfaces, and in seizing and securing its prey. The habits and economy of this gigantic insect are not known.

Fig. 2, is the cerambyx bajalus; and fig. 3, the meridianus, two species belonging to England. Fig. 4, is the cerambyx pustulatus, from Jamaica; and fig. 5, cerambyx verrucosis, a very beautiful species, native of Barbadoes.

CERAN'THUS, *s.* in botany. See CHIONANTHUS.

CERA'SA, *s.* in botany. See CORDIA and PRUNUS.

CERA'SO AFFINIS, *s.* in botany. See CORDIA, EBRETIA, and PRUNUS.

CERAS'TES, in zoology, the trivial name of a species of viper. See COLUBER.

CERAS'TIUM, *s.* [κεραστιον, a little horn; the capsules being generally long, and somewhat in that shape.] MOUSE-EAR, or MOUSE-EAR CHICKWEED; in botany, a genus of the class decandria, order pentagynia, natural order of caryophillei. The generic characters are—Calyx: perianthium five-leaved; leaflets ovate-lanceolate, acute, spreading, permanent. Corolla: petals five, bifid, obtuse, erect-expanding, length of the calyx. Stamina: filaments ten, filiform, shorter than the corolla, the alternate ones shorter. Anthers roundish. Pistillum: germ ovate. Styles five, capillary, erect, length of the stamens. Stigmas obtuse. Pericarpium: capsule ovate-cylindric, or globular, obtuse, unilocular, gaping with a five-toothed tip. Seeds: very many, roundish.—*Essential Character.* Calyx five-leaved; petals bifid; capsule unilocular, gaping at the tip.

Species. I. With oblong capsules. 1. Cerastium perfoliatum, or perfoliate mouse-ear: leaves connate. None of the mouse-ear chickweeds make much appearance, and therefore they are only cultivated in botanic gardens. Some of them are common weeds in most parts of Europe: the smoother sorts however are not disagreeable to cattle, and the seeds are useful to the small birds. The first sort was discovered by Tournefort in the Levant, from whence he sent the seeds to the royal garden at Paris: this is an annual plant, which rises with an upright stalk a foot high; the lower leaves have so much resemblance to those of Lobel's catchfly, that, when the plants are young, it is not easy to distinguish them. The stem-leaves are of the same shape, but smaller, placed by pairs, and embracing the stalks. The flowers come out at the top of the stalks, and also from the wings of the leaves, on the upper part of the stalks; they are white, and shaped like those of chickweed: appear in May and June, and are succeeded by beaked capsules, containing many roundish seeds. Linnæus observes that the pistils are shorter than in the other sorts. Native of Greece. Cultivated in 1731, by Mr. Miller.

2. Cerastium vulgatum, or common or narrow-leaved mouse-ear: leaves ovate; petals equal to the calyx; stems diffused. This species may be distinguished from the third and fourth by the following circumstances: It is perennial, and is a larger, more spreading plant, and more common. Sometimes it is but thinly covered with hairs, and has been found quite smooth. It varies in height from an inch to two feet, also in the breadth of its leaves, and the size of its corolla. The stronger the plant the smaller the petals, and *vice versa*, than in *C. viscosum*; the leaves less lanceolate and more ovate (the reverse is generally observable with us). The peduncles are not viscid. Stems more copious, more decumbent, flowering later, continuing longer. The outer leaflets of the calyx not membranous at the edge. Linnæus marks it as annual, in which he is followed by Hudson and Lightfoot: others make it perennial. It flowers during the whole summer from May, on walls, by road sides, among rubbish, and in meadows.

3. Cerastium viscosum, clammy or broad-leaved mouse-ear: erect villose-viscous. This is annual. It is distinguished by its upright growth, its broad hoary leaves, the narrowness of its petals, and the crouded or clustered appearance of its flowers before they blow; its leaves also are in general paler. Stem branched at bottom, covered with hairs, each of which is terminated by a gland exuding a viscid juice. In meadows, on walls, dry banks and ant-hills, varying in size from three inches to a foot; flowering in April and May.

4. Cerastium semidecandrum, or least mouse-ear: flowers five-stamened, petals emarginate. Stamens sometimes only five, according to Haller. Linnæus says there are always ten stamens. Petals shorter than the calyx, acutely cut in at top, and frequently irregularly jagged or gnawed, much broader than in the foregoing. Calyx thickly covered with hairs, having glands at their extremities; membrane terminating the leaflets remarkably long. Stems from two to six inches high, purplish, covered with glandulous hairs. Annual. Grows on walls and heaths; flowering early, and soon disappearing.

5. Cerastium pentandrum, or five-stamened mouse-ear: flowers five-stamened, petals entire. Very small, resembling the foregoing; from which it differs in the colour being green not hoary, in having only five fertile stamens without any barren ones, five styles, the petals much shorter than the calyx, lanceolate and acute, not acutely emarginate. Native of Spain.

6. Cerastium arvense, or corn mouse-ear: leaves linear-lanceolate or obtuse smooth, corolla larger than the calyx. Root perennial, creeping; stems numerous, four or five inches high; the whole plant is often very hairy. Flowers from May and June to September, in corn-fields, dry pastures and heaths, banks, &c. Found near Croydon in Surry, about Newmarket, Bury, and Norwich; in Cambridgeshire frequent.

7. Cerastium dichotomum, or forked mouse-ear: leaves lanceolate; stem dichotomous very much branched, capsule erect. Stems about six inches high, dichotomous; the flowers come out in the middle of the divisions, and are shaped like those of chickweed. The whole plant is clammy. It grows on arable land in Spain, is annual, flowers in May, and the seeds ripen in July.

8. Cerastium alpinum, or Alpine mouse-ear: leaves ovate-lanceolate; stem divided; capsules oblong. Stems many, six or eight inches high, somewhat hairy; flowers in a terminal umbel, six or eight together; peduncles erect, somewhat hairy, as is the calyx. Found on high mountains in many parts of Europe; Snowden, and others parts of Wales.

II. With roundish capsules. 9. Cerastium repens, creeping mouse-ear, or sea-pink: leaves lanceolate; peduncles branching; capsules roundish. This sends out many weak stalks which trail upon the ground, and put out roots at their joints; the leaves are about two inches long, and little more than half an inch broad, very hoary; those next the root are much smaller than the upper ones. The flowers come out from the side of the stalks upon slender peduncles, which branch out into several smaller, each supporting a white flower. The petals are often quadrifid or quinquefid. It grows naturally in France and Italy, and was formerly cultivated in the English gardens, under the name of sea-pink, as an edging for borders; for which use it was by no means fit on account of its creeping. It is supposed to increase the milk of kine and sheep very much; whence the Neapolitans call it *erba lattaria*, milk-weed. Cultivated 1759, by Mr. Miller.

10. Cerastium strictum: leaves linear acuminate smooth; peduncles one-flowered subtomentose; capsules globular. This species is a native of the mountains of Switzerland, Austria, the Vaudois, Mont Cenis, &c. Perennial.

11. Cerastium suffruticosum; stem perennial procumbent; leaves linear-lanceolate subhirsute. In the southern countries of Europe.

12. Cerastium maximum: leaves lanceolate scabrous; petals crenated; capsules globular. Found in Siberia, near the river Jenisa; by Gmelin. Annual.

13 Cerastium aquaticum, or water mouse-ear: leaves cordate sessile; flowers solitary; fruits pendulous. Root perennial. Stems from one to two feet high, weak, round or scarce perceptibly ancipital, smooth, jointed. Grows in moist places and banks of ditches and rivers; flowering in July and August.

14. Ceraſtium latifolium, or broad-leaved mouſe-ear: leaves ovate ſubtomentoſe; branches one-flowered; capſules globular. The whole plant, except the petals and capſules, is covered with long, ſoft, ſhining, hairs. The lower leaves ovate; the upper ovate-lanceolate. Branches terminated by one or two flowers; flowers large. According to Haller, the ſtems are ſcarcely ever more than three inches high. Found on the high mountains of the Valais, next the glaciers; and on the higheſt rocks in Wales and Scotland; flowering in May and June. Perennial.

15. Ceraſtium tomentoſum, or woolly mouſe-ear: leaves oblong tomentoſe; peduncles branching; capſules globular. The whole plant white with a thick down. Stems in a thickly matted tuft, dichotomous, with ſometimes a ſingle flower on a long peduncle from the diviſion; the diviſions branched but ſpreading, each branch bearing a ſort of umbel. Native of Granada, Iſtria, France, Swiſſerland, Ripton-wood in Huntingdonſhire. Flowers in May and June. Perennial. It varies with broader and narrower leaves.

16. Ceraſtium manticum: ſmooth; ſtem ſtriated; leaves lanceolate; peduncles very long; capſules globular. Root, ſlender, annual; ſtem upright, round, half a foot high, commonly ſingle, but ſometimes branched. It is an annual plant, native of the neighbourhood of Verona, and the Griſons.

17. Ceraſtium refractum: leaves lanceolate ſmooth; petioles broken. Stems many, a finger's length, ſmooth or ſomewhat hairy, two-flowered. Native of the higher Alps, and mont St. Bernard.

18. Ceraſtium dioicum, or Spaniſh mouſe-ear: hirt viſcid; leaves lanceolate; flowers dioecous, petals three times larger than the calyx. Native of Spain; perennial. Cultivated 1766, in the botanic garden at Oxford.

Propagation and Culture. If the ſeeds of the annual ſorts be ſown in autumn, they will more certainly grow than thoſe which are ſown in the ſpring; or, if the ſeeds be permitted to ſcatter, the plants will come up and live through the winter, and will require no other care but to keep them clean from weeds. The other perennial ſorts may eaſily be increaſed by parting the plants, which put out roots at the joints of the branches, and run ſo much, as to overpower moſt other weak vegetables: they ſhould be introduced therefore with caution, unleſs where it is wiſhed to have a bank, wall, or heap of ſtones entirely covered.

CERASTI'UM UMBELLA'TUM, *ſ.* in botany. See HOLOSTEUM.

CE'RASUS, *ſ.* in botany. See CASSINE, MALPIGHIA, and PRUNUS.

CE'RATE, *ſ.* [*cera*, Lat. wax.] A medicine for healing wounds. Cerates chiefly differ from plaſters in conſiſtence, being a ſofter kind of plaſter, or harder kind of ointment. This property of its conſiſtence is very convenient: when mercury is made up in plaſters, a ſufficient quantity is not abſorbed from them to produce any valuable effect; but in a cerate it powerfully reſolves and diſcuſſes, and when thus applied to venereal tophs and nodes, they often yield to it. See PHARMACY.

CE'RATED, *adj.* [*ceratus*, Lat.] Waxed; covered with wax.

CERA'TIA, *ſ.* in botany. See CERSIS, DENTARIA, and ERYTHRINA.

CERA'TIÆ AFFI'NIS, *ſ.* in botany. See MIMOSA.

CERA'TION, *ſ.* a name given by the ancients to the ſmall ſeeds of ceratonia, uſed by the Arabian phyſicians as a weight to adjuſt their doſes of medicines; as the grain weight with us took its riſe from a grain of barley. Ceration was alſo a ſilver coin, equal to one third of an obolus.

CERATOCAR'PUS, *ſ.* [from κερας and καρπος, Gr. horned fruit.] In botany, a genus of the claſs monoecia, order monandria, natural order of holoraceæ. The generic characters are—I. Male flowers. Calyx: perianthium one-leafed, tubular, wider at top, thin, coloured, bifid: the upper ſegments ſharp, the lower emarginate. Corolla: none. Stamina: filaments ſingle, capillary, ſcarce longer than the calyx, inſerted into the receptacle. Anther twin, oval, upright. II. Female flowers on the ſame plant. Calyx: perianth one-leafed, obovate, compreſſed, keeled on both ſides, permanent, two horned: horns ſtraight, ſubulate divaricate. Corolla: none. Piſtillum: germ oblong, ſuperior. Styles two, capillary. Stigmas ſimple, ſtanding out between the horns of the calyx. Pericarpium none: but the calyx grown larger. Seed: oblong, attenuated at bottom, compreſſed.—*Eſſential Character.* Male. Calyx: one-leafed, bifid, (two-leaved, G.) Corolla, none. Female. Calyx: one-leafed, keeled, permanent, two-horned. Styles two. Seeds: ſingle, compreſſed, incloſed in and covered by the calyx.

Only one ſpecies, ceratocarpus arenarius. It is an annual branching plant, with very narrow, ſharp, graſſy, leaves. Three male flowers ſeſſile in each diviſion of the ſtem; females ſolitary, ſeſſile in each axilla of the leaves. It has no proper pericarp, but the calyx when ripe becomes a ſort of oblong-triangular compreſſed ſheath, with a ridge on each ſide, and two innocuous ſpines diverging almoſt horizontally at the end. Within this is a ſingle obovate ſeed, compreſſed, and at bottom very ſharp-pointed, which does not drop from its covering. It is a native, of the rude deſerts of Tartary.

CERATOCEPHALOI'DES, *ſ.* See BIDENS, COREOPSIS, COTULA, CERATOCEPHALUS, and SPILANTHUS.

CERATOI'DES, *ſ.* See AXYRIS, CERATOCARPUS, and DIOTIS.

CERATO'NIA, *ſ.* [from κεράτιον, Gr. a horn or pod.] The CAROB-TREE, or ST. JOHN'S BREAD; in botany, a genus of the claſs polygamia, order trioecia, natural order of lomentaceæ. The generic characters are—I. Male. Calyx: perianthium five-parted, very large. Corolla none. Stamina: filaments five, ſubulate, very long, ſpreading. Anthers large twin. II. Female. Diſt. Calyx: perianthium one-leafed, divided by five tubercles. Corolla none. Piſtillum: germ lying concealed within a fleſhy receptacle. Style long, filiform. Stigma headed. Pericarpium: legume very large, obtuſe, compreſſed, coriaceous, with a great many tranſverſe partitions, the interſtices filled with pulp. Seed: ſolitary, roundiſh, compreſſed, hard, gloſſy. Hermaphrodite flowers on a diſtinct tree.—*Eſſential Character.* Hermaphrodite. Calyx: five-parted; corolla none; ſtamens five; ſtyle filiform; legume coriaceous, many ſeeded. Dioecous: male and female ſeparate.

Of this there is but one ſpecies, known by the name of Ceratonia ſiliqua, or carob tree. This tree ſometimes grows to a conſiderable ſize. Leaves pinnate; leaflets roundiſh, entire, thick, rigid, nerved, dark green above, paler beneath, three inches in breadth and ſomewhat more in length. Legume four inches or more in length, very little bent, compreſſed, becoming four-cornered when dry, of a duſky ferruginous colour, ſmooth, fleſhy, many-celled, valveleſs; cells eight or more, each inveſted with a papery lamina, and containing one obovate, ſwelling, lens-ſhaped, ſmooth, ſeed of a ferruginous cheſtnut colour. The hermaphrodite flowers have a one-leafed perianthium, deeply five-cleft, coloured; the ſegments unequal and blunt. Corolla one petalled, wheel-ſhaped, entire, waved about the edge, coriaceous, permanent. Filaments five, fixed to the margin of the corolla, and ſcarcely longer than it. Anthers large. Piſtillum in the middle of the corolla, pedicelled: germ linear, compreſſed, ſomewhat ſickle-ſhaped: ſtyle none: ſtigma ſeſſile, orbicular, flat, marked with a groove from the middle running into the germ. The male flowers have alſo a one-leafed perianthium deeply ſix-cleft; the ſegments unequal, ovate, concave. Corolla waved or obſcurely crenate, in other reſpects like that of the hermaphrodite. Filaments ſix, three times as long as the corolla, ſpreading, fixed to the angles of the notches under the margin of the corolla: anthers large, four-celled. Piſtil none, but a mere rudiment. Native of Syria, Paleſtine,

Palestine, Egypt, Cyprus, Candia, Sicily, Apulia, Spain, &c. Cultivated 1570. Ignorance of eastern manners and natural history, induced some persons to fancy that the locusts on which John the baptist fed, were the tender shoots of plants, and that the wild honey was the pulp in the pod of the carob, whence it had the name of *St. John's bread:* there is better reason to suppose that the shells of the carob pod might be the husks which the prodigal son desired to partake of with the swine.

Propagation and Culture. This tree is propagated from seeds, which, when brought over fresh in the pods, will grow very well, if they are sown in the spring upon a moderate hot-bed; and when the plants are come up they should be carefully transplanted each into a separate small pot filled with light rich earth, and plunged into another moderate hot-bed, observing to water and shade them until they have taken root; after which you must let them have air, in proportion to the heat of the weather. In June you must inure them to the open air by degrees; and in July they should be removed out of the hot-bed, and placed in a warm situation, where they may remain until the beginning of October, when they should be removed into the greenhouse, placing them where they may have free air in mild weather; for they are pretty hardy, and require only to be sheltered from hard frosts. When the plants have remained in the pots three or four years, and have gotten strength, some of them may be turned out of the pots in the spring, and planted into the full ground, in a warm situation, near a south wall, where they will endure the cold of our ordinary winters very well, but must have some shelter in very hard weather. The leaves always continue green, and, being different in shape from those of most other plants, afford an agreeable variety when intermixed with oranges, myrtles, &c. in the greenhouse. See MIMOSA.

CERATOPHYL'LUM, *s.* [κέρας and φυλλον, Gr. horned leaf.] In botany, a genus of the class monoecia, order polyandria, natural order inundatæ. The generic characters are—I. Male flowers. Calyx: perianthium many-parted; divisions subulate, equal. Corolla none. Stamina: filaments double the number of divisions of the calyx (sixteen to twenty), hardly conspicuous. Anthers oblong, erect, longer than the calyx. II. Female flowers, on the same plant with the males. Calyx: perianthium many-parted; divisions subulate, equal. Corolla none. Pistillum: germ ovate, compressed; style none; stigma obtuse, oblique. Pericarpium none. Seed: nut ovate, unilocular acuminate.—*Essential Character.* Male. Calyx: many-parted; corolla none; stamina sixteen to twenty. Female. Calyx: many-parted; corolla none; pistillum one; style none; seed one, naked.

Species. 1. Ceratophyllum demersum, or prickly-seeded hornwort: leaves two-fold dichotomous; fruits three-thorned. Root perennial, striking deep in the mud; stem much branched; leaves in whorls, about eight in a whorl, the lower whorls about half an inch distant, but closer upwards, and extremely crowded towards the top; flowers few, in the bosoms of the leaves; seed-vessel with one long thorn at the extremity, and two shorter on the opposite sides near the base. Grows in ditches and slow streams, flowering in August and September, in Europe; also in Japan; common in Jamaica, called there morass-weed, and used to cover fish, &c. when carried to any distance.

2. Ceratophyllum submersum, or smooth-seeded hornwort: leaves three-fold dichotomus; fruits thornless. Linnæus allows this to be so nearly allied to the foregoing, as to be little else than a variety. Villars says, that it is thicker than the other, that it seems to creep wholly at the bottom of the water, and that it is whiter by means of a varnish of mud that covers it. Found in the ditches on the side of the road from Chichester to the isle of Selsey.

Propagation and Culture. These plants can be cultivated ingardens, no other way than by sowing the seeds or planting them in ponds, muddy streams, pots or boxes, with earth at bottom and filled with water.

CERAU'NIA, [from κεραυνος, Gr. thunder.] The thunder-stone; so called because it was supposed to be produced by thunder. See THUNDER-BOLT.

CER'BERA, *s.* [from *Cerberus*; so named on account of its poisonous qualities.] In botany, a genus of the class pentandria, order monogynia, natural order of contortæ. The generic characters are—Calyx: perianthium, five-leaved, acuminate, spreading; leaflets ovate-lanceolate. Corolla: monopetalous, funnel form. Tube clavated; border large, five-parted; divisions oblique, obtuse, more gibbous on one side than the other; mouth of the tube pentagonal, five-toothed, converging in the form of a star. Stamina: filaments five, subulate in the middle of the tube. Anthers erect, converging. Pistillum: germ roundish; style filiform, short; stigma headed, bilobate. Pericarpium: drupe very large, roundish, fleshy; excavated on the side by a longitudinal furrow, and with two specks or points. Seed: nut two-celled, four-valved, retuse.—*Essential Character.* Contorted; drupe one-seeded.

Species. 1. Cerbera ahouai, or oval-leaved cerbera: leaves ovate. The first sort grows naturally in the Brazils, and also in the Spanish West Indies in plenty; and there are some of the trees growing in the British islands of America; this rises with an irregular stem to the height of eight or ten feet, sending out many crooked diffused branches, which toward their tops have thick succulent leaves about three inches long, and near two broad, of a lucid green, smooth, and very full of a milky juice, as is every part of the shrub. The flowers come out in loose bunches at the end of the branches; they are of a cream colour, having long narrow tubes cut into five obtuse segments, which seem twisted, so as to stand oblique to the tube; these when they spread open have the appearance of the flowers of oleander. It flowers in July and August, but never produces fruit in England. The wood of this tree stinks most abominably, and the kernels of the nuts are a most deadly poison: the Indians are not acquainted with any antidote to it; nor will they use the wood for fuel. They put small stones into the empty nuts, string them, and fasten them about their legs when they dance. Cultivated 1739, by Mr. Miller.

2. Cerbera manghas: leaves lanceolate, nerves transverse. A milky tree. Leaves alternate, scattered at the tops of the branches, broad-lanceolate, petioled, smooth quite entire, a foot in length; flowers in terminal, branched, unequal racemes. Seeds resembling large chestnuts, poisonous and vomiting. According to Miller, it rises to the height of twenty feet, sending out many branches towards the top. Native of the East Indies, some parts of the Spanish West Indies, and of the Society Islands.

3. Cerbera thevetia, or linear-leaved cerbera: leaves linear, very long, crowded. This is an elegant shrub or small tree, about twelve feet in height; the stem is round, unarmed, abounding in a poisonous milky juice, dividing at top into many weak branches, which are generally simple, loose, round, smooth, covered with scars from the leaves which have dropped, and covered with a green smooth bark, which as they grow older becomes rough, and changes to a grey or ash-colour. Leaves on very short petioles, scattered at the ends of the branchlets. Native of the West Indies, in woods or coppices near the coast. Miller says, that he received it from our islands there by the name of French physic-nut; that it flowers here in July and August, but never produces fruit in England. It was introduced in 1735, by Mr. Robert Millar.

4. Cerbera parviflora: leaves stellate obovate. Native of the Friendly Islands, and Savage Island, in the South Seas.

5. Cerbera salutaria: leaves and fruits oval. This is a middle-sized tree, with a milky juice, and spreading branches. Flowers white, inodorous. Seed not poisonous. Native of Cochin-China, near the coast.

Propagation and Culture. These plants may be propagated from their nuts, which must be procured from the countries where they grow naturally; these should be put into

into small pots filled with light earth, and plunged into a hot-bed of tanners bark in the spring, and treated in the same manner as other tender exotic seeds, giving them now and then a little water to promote their vegetation. When the plants are come up about two inches high, they should be transplanted each into a separate pot, filled with light sandy earth, and plunged again in a hot-bed of tanners bark, observing to shade the glasses in the heat of the day, until the plants have taken new root; they must also be frequently refreshed with water, but it must not be given in too large quantities. As the summer advances, these plants should have air admitted to them in proportion to the warmth of the season; and, when they have filled these small pots with their roots, they should be turned out and transplanted into other pots of a larger size, but they must not be too large; for the roots of these plants should be confined, nor should the earth in which they are planted be rich, but a light sandy soil is best for them; after they are new potted they should be plunged into the hot-bed again, observing to water them now and then, as also to admit air under the glasses every day in proportion to the warmth of the season. When the plants are grown about a foot high, they should have a larger share of air in order to harden them before the winter, but they should not be wholly exposed to the open air. In the winter these plants should be placed in a warm stove, and during that season they should have very little water given to them, especially in cold weather, lest it should rot their roots. In the following spring these plants should be shifted again into other pots, at which time you should take away as much as you conveniently can of the old earth from their roots, and afterwards cut off the decayed fibres; then put them into pots filled with the same light sandy earth, and plunge them into the bark-bed again, for these plants will not thrive well unless they are constantly kept in tan: and, as they abound with milky juice, they should be sparingly watered, for they are impatient of moisture, especially during the winter season. When by any accident the tops of these plants are injured, they frequently put out shoots from their roots, which, if carefully taken up and potted, will make good plants.

CER'BERUS, *s.* one of the new constellations formed by Hevelius out of the unformed stars, and added to the forty-eight old asterisms. It contains only four stars, which are enumerated under Hercules, in the Britannic catalogue.

CER'BERUS, in fabulous history, a three-headed mastiff, born of Typhon and Echidna, and placed to guard the gates of hell. He fawned upon those who entered, but devoured all who attempted to get back. He was, however, mastered by Hercules, who dragged him up to the earth; where in struggling a foam dropped from his mouth, which produced the poisonous herb called *aconite*, or *wolf's bane*. Some have supposed that *Cerberus* is the symbol of the earth, or of all-devouring time: and that its three mouths represent the present, past, and future. The victory obtained by Hercules over this monster, denotes the conquest which this hero is said to have acquired over his passions. Mr. Bryant supposes that the notion both of Cerberus and Hades being subterraneous deities, took its rise from the temples of old being situated near vast caverns, which were esteemed passages to the realms below. Eusebius from Plutarch says, that Cerberus was the Sun; but it was properly Kir-Abor, the place of the Sun, the parent of light. The same temple had different names from the diversity of the god's titles, who was there worshipped. It was called Tor-Caph-El, which the Greeks changed to Τρικεφαλος: it was also called Tor-Keren, Turris Regia, which they expressed Τρικαρηνος; and hence arose the notion that Cahen-Ades, or Cerberus, was a triple-headed monster.

CER'BOLI, a small island, or rock, in the Mediterranean, near the coast of Tuscany, a little to the north of the island of Elva.

CER'CA, a town of Italy, in the Veronese, belonging to the state of Venice: four miles west Legnano.

CER'CELE, *s.* a cross or device in armorial bearings; for which See HERALDRY.

CERCENAS'CO, a town of Piedmont, in the marquisate of Saluzzo: twenty-one miles south-south-west of Turin.

CERCHA'RO, a town of Italy, in the kingdom of Naples, and province of Calabria Citra: six miles north-north-east of Cassaro.

CERCHIA'RI, a river of Italy, in the kingdom of Naples, which runs into the Gulf of Tarento, nine miles east-north-east of Cassano.

CERCHNA'LEUM, [from κερχω, Gr. to make a noise.] A wheezing, or bubbling noise made by the trachea in breathing.

CER'CIS, *s.* [κερκις, *spathula*, a name of Theophrastus's.] The JUDAS-TREE; in botany, a genus of the class decandria, order monogynia, natural order of lomentaceæ. The generic characters are—Calyx: perianthium one-leafed, very short, bell-shaped, gibbous below, melliferous; mouth five-toothed, erect, obtuse. Corolla: pentapetalous, inserted into the calyx, resembling a papilionaceous corolla. Wings: petals two, bent upwards, affixed by long claws. Standard: petal one, roundish, clawed beneath the wings, and shorter than the wings. Keel: petals two, converging into a cordate figure, including the organs of generation, affixed by claws. Nectary, a style-shaped gland, below the germ. Stamina: filaments ten, distinct, subulate, bent downwards, of which four are longer than the rest, covered. Anthers: oblong, incumbent, rising upwards. Pistillum: germ linear-lanceolate, pedicelled. Style of the length and situation of the stamens. Stigma: obtuse, ascending. Pericarpium: legume oblong, obliquely acuminate, unilocular. Seeds: some roundish, connected to the superior suture.—*Essential Character*—Calyx: five-toothed, gibbous below. Corolla: papilionaceous. Standard: short, beneath the wings. Legume.

Species. 1. Cercis siliquastrum, or common judas-tree: leaves cordate-orbicular smooth. This species is by the Spaniards and Portuguese called the tree of love: it rises with an upright trunk to the height of twenty feet, covered with a dark brown bark, dividing upwards into many irregular branches, with leaves placed irregularly on the branches, on long foot-stalks; they are of a pale green on their upper, and of a greyish colour on their under, side, and fall off in autumn. The flowers come out on every side the branches, and many times from the stem of the tree in large clusters, arising from the same point, on short peduncles; they are of a very bright purple colour, and make a fine appearance, especially when the branches are covered pretty thick with them: they come out in the spring with the leaves, and are in full beauty before the leaves have attained half their size. The flower is papilionaceous, and having an agreeable poignancy, is frequently eaten in salads. When the flowers fall off, the germ becomes a long flat pod, containing one row of roundish seeds, a little compressed; but these do not often succeed the flowers in this country upon standard trees, for the birds pick off the flowers when fully open; but, where they have been planted against good aspected walls, the pods, in warm seasons, have ripened very well. These trees are usually planted with other flowering trees and shrubs for ornaments to pleasure-gardens, and, for their singular beauty, deserve a place as well as most other sorts; for, when they are arrived to a good size, they are productive of flowers, so as that the branches are often closely covered with them; and the singular shape of their leaves makes a very pretty variety in the summer, and they are seldom damaged by insects. This tree flowers in May, when planted in the full air, but against warm walls it is a fortnight or three weeks earlier. The wood of this tree is very beautifully veined with black and green, and taking a fine polish may be converted to many uses. There are two varieties

rieties of this tree, one with a white, and the other hath a flesh-coloured, flower; but these have not half the beauty of the first. Native of the Levant, Spain, South of France, Italy near Rome, and on the Apennines, Japan, &c. Cultivated in 1596, by Gerard.

2. Cercis canadensis, or Canada judas-tree, or red bud-tree: leaves cordate pubescent, ovate, acute. This sort grows naturally in most parts of North America, where it is called *red bud*, from the red flower-buds appearing in the spring before the leaves come out; it grows to a middling stature in the places where it is a native, but in England rarely rises with a stem more than twelve feet high, but branches out near the root. The branches of this are weaker than those of the first sort; the leaves are downy, and terminate in points; whereas those of the first are smooth, and round at the end, where they are indented. The flowers of this are also smaller, and do not make so fine an appearance as those of the first; but the trees are equally hardy, and will thrive in the open air very well. The flowers of this sort are frequently put into salads by the inhabitants of America; and the French in Canada pickle the flowers, but these have little flavour. The wood of this tree is of the same colour and texture as that of the first. The young branches die wool of a very fine nankin colour. Cultivated 1730.

Propagation and Culture. These plants may be propagated by sowing their seeds upon a bed of light earth, towards the latter end of March, or the beginning of April, (and, if you put a little hot dung under the bed, it will greatly facilitate the growth of the seeds;) when the seeds are sown, sift the earth over them about half an inch thick; and, if the season prove wet, it will be proper to cover the bed with mats, to preserve it from great rains, which will sometimes burst the seeds, and cause them to rot; the seeds will often remain till the spring following before they come up, so the ground must not be disturbed till you are convinced that the plants are all come up; for some few may rise the first year, and a greater number the second. When the plants are come up they should be carefully cleared from weeds, and in very dry weather must be now and then refreshed with water, which will greatly promote their growth. The winter following, if the weather is very cold, it will be proper to shelter the plants, by covering them either with mats or dry straw in hard frosts, but they should constantly be opened in mild weather, otherwise they will grow mouldy and decay. About the beginning of April, you should prepare a spot of good fresh ground, to transplant these out, (for the best season to remove them is just before they begin to shoot;) then you should carefully take up the plants, being careful not to break their roots, and plant them as soon as possible, because, if their roots are dried by the air, it will greatly prejudice them. The distance these should be planted, must be proportionable to the time they are to remain before they are again transplanted; but commonly they are planted two feet row from row, and a foot asunder in the rows, which is full room enough for them to grow two or three years, by which time they should be transplanted where they are designed to remain; for, if they are too old when removed, they seldom succeed so well as younger plants.

The ground between the plants should be carefully kept clean from weeds in summer, and in the spring should be well dug to loosen the earth, that their roots may extend themselves every way; at that season prune off all strong side branches, (especially if you intend to train them up for standard trees,) that their top branches may not be checked by their side shoots, which often attract the greatest part of the nourishment from the roots; and, if their stems are crooked, you must place a strong stake down by the side of each plant, and fasten the stem to it in several places, so as to bring it straight, which direction it will soon take as it grows larger, and thereby the plants will be rendered beautiful. When they have remained in this nursery two or three years, they should be transplanted in the spring where they are designed to remain, which may be in wilderness quarters among other flowering trees, observing to place them with trees of the same growth, so as they may not be overhung, which is a great prejudice to most plants.

CERCO'DIA, *s.* in botany. See HALORAGIS.

CERCOPITHECI, *s.* the name given by Ray to monkies, or the class of apes with long tails. See SIMIA.

CERCO'SIS, [from κερκος, Gr. a tail.] A disease of the clitoris, when it is enlarged, and hangs from the vagina like a tail.

CER'CY LA TOUR, a town of France, in the department of the Nyevre, and chief place of a canton, in the district of Décise: eight miles E.N.E. of Décise.

CER'CYON, a king of Eleusis, son of Neptune, or, according to others, of Vulcan. He obliged all strangers to wrestle with him; and, as he was a dexterous wrestler, they were easily conquered and put to death. After many cruelties, he challenged Theseus in wrestling, and he was conquered and put to death by his antagonist. His daughter, Alope, was loved by Neptune, by whom she had a child. Cercyon exposed the child, called Hippothoon; but he was preserved, and placed upon his grandfather's throne by Theseus. *Ovid.*—On this passage Mr. Bryant observes, that *Cercyon* originally meant a temple wherein human sacrifices were offered, and that the Cercyonians were the priests deputed to this cruel office; most of whom he supposes were persons of great strength and stature, and of the race of Anak. Enemies and strangers who were taken or seized, appear to have been compelled to fight with these priests, either with the cestus, or by wrestling; and this was looked upon as a more specious kind of sacrifice. Ancient history affords numberless instances of this ungenerous and cruel treatment of strangers; and the laws of hospitality were evaded under the sanction of a sacrifice to the gods. These attributes of wrestling and boxing have been conferred upon many of the chief divinities. Hercules and Pollux (those imaginary beings) were of that number; yet they are represented upon earth as sturdy champions, a kind of honourable banditti, who righted some, and wronged many; who would suffer nobody to do any mischief but themselves. From these customs were derived the Nemean, Pythic, Olympic, and Delian, games.

CER'DA (John Lewis), a Spanish jesuit, native of Toledo. He distinguished himself by several productions, and the fame of his learning was so great, that Urban VIII. is said to have had his picture in his cabinet; and, when that pope sent his nephew cardinal Barberini ambassador into Spain, it was part of his business to pay Cerda a visit, and to assure him of the pope's esteem. Cerda's Commentaries upon Virgil, have been much esteemed, and usually read by critics and persons of taste in the belles lettres. There is also of Cerda's a volume of "Adversa Sacra," which was printed in folio at Lyons, 1626. He died in 1643, aged upwards of 80.

CERDA'GNE (La), a country on the Pyrenées, situated partly in Spain, in the province of Catalonia; and partly in France, in what was formerly called *Roussillon*; Puycerda is the capital of the former, as Mont Louis was of the latter.

CER'DON, a town of France, in the department of the Ain: four leagues south-east of Bourg en Bresse.

CERDO'NIANS, ancient heretics, who maintained most of the errors of Simon Magus, Saturninus, and the Manichees. They took their name from their leader *Cerdon*, a Syrian, who went to Rome in the time of pope Hyginus, and there abjured his errors; but in appearance only, for he was afterwards convicted of persisting in them, and expelled the church. Cerdon asserted two principles, the one good, the other evil: this last, according to him, was the creator of the world, and the god that appeared under the old law. The first, whom he called *unknown*, was the father of Christ; who, he taught, was incarnate only in appearance, and was not born of a virgin; nor did he suffer death but in appearance. He denied the resurrection,

tion, and rejected all the books of the Old Testament, as coming from an evil principle. Marcion, his disciple, succeeded him in his errors.

To CERE, *v. a.* [from *cera*, Lat. wax.] To wax.—Sew up the wound with a needle, and strong brown thread *cered*, about half an inch from the edges of the lips. *Wiseman.*

CEREA'LIA, festivals in honor of Ceres; first instituted at Rome by Memmius the edile, and celebrated on the 19th of April. Persons in mourning were not permitted to appear at the celebration; therefore they were not observed after the battle of Cannæ. They are the same as the Thesmophoria of the Greeks.

CEREBEL'LUM, *s.* [dim. of *cerebrum.*] That portion of the brain which is situated under the posterior lobes of the cerebrum.

CERE'BRUM, *s.* [from κάρα, Gr. the head.] The brain. The soft medullary substance contained within the skull. See ANATOMY, vol. i. p. 592, &c.

CE'RECLOTH, *s.* Cloth smeared over with glutinous matter, used for wounds and bruises.—The ancient Egyptian mummies were shrowded in a number of folds of linen, besmeared with gums, in manner of *cerecloth. Bacon.*

CEREFO'LIUM, *s.* in botany. See CHÆROPHYLLUM and SCANDIX.

CE'REMENT, *s.* [from *cera*, Lat. wax.] Cloths dipped in melted wax, with which dead bodies were infolded when they were embalmed:

Let me not burst in ignorance, but tell
Why canonized bones, hearsed in earth,
Have burst their *cerements*? *Shakespeare.*

CEREMO'NIAL, *adj.* Relating to ceremony, or outward rite; ritual.—Christ did take away that external *ceremonial* worship that was among the Jews. *Stillingfleet.*—Formal; observant of old forms:

Oh monstrous, superstitious puritan,
Of refin'd manners, yet *ceremonial* man,
That, when thou meet'st one, with enquiring eyes
Dost search, and, like a needy broker, prize
The silk and gold he wears. *Donne.*

CEREMO'NIAL, *s.* Outward form; external rite; prescriptive formality.—The only condition that could make it prudent for the clergy to alter the *ceremonial*, or any indifferent part, would be a resolution in the legislature to prevent new sects. *Swift.*—The order for rites and forms in the Roman church.

CEREMO'NIALNESS, *s.* The quality of being ceremonial; overmuch use of ceremony.

CEREMO'NIOUS, *adj.* Consisting of outward rites.—Under a different œconomy of religion, God was more tender of the *ceremonious* part of his worship. *South.*—Full of ceremony; awful:

O, the sacrifice,
How *ceremonious*, solemn, and unearthly
It was i' th' offering! *Shakespeare.*

Attentive to outward rites, or prescriptive formalities:

You are too senseless obstinate, my lord;
Too *ceremonious* and traditional. *Shakespeare.*

Civil; according to the strict rules of civility, formally respectful.—They have a set of *ceremonious* phrases, that run through all ranks and degrees among them. *Addison.*—Observant of the rules of civility:

Then let us take a *ceremonious* leave,
And loving farewel, of our several friends. *Shakespeare.*

Civil and formal to a fault.—The old caitiff was grown so *ceremonious*, as he would needs accompany me some miles in my way. *Sidney.*

CEREMO'NIOUSLY, *adv.* In a ceremonious manner; formally; respectfully:

Ceremoniously let us prepare
Some welcome for the mistress of the house. *Shakespeare.*

CEREMO'NIOUSNESS, *s.* Addictedness to ceremony; the use of too much ceremony.

CE'REMONY, *s.* [*ceremonia*, Lat.] Outward rite; external form in religion:

Bring her up to the high altar, that she may
The sacred *ceremonies* partake. *Spenser.*

Forms of civility.—The sauce to meat is *ceremony. Shakspeare.*—Not to use *ceremonies* at all, is to teach others not to use them again, and so diminish respect. *Bacon.*—Outward forms of state:

What art thou, thou idle *ceremony*?
What kind of god art thou, that suffer'st more
Of mortal grief, than do thy worshippers?
Art thou aught else but place, degree, and form?
Shakespeare.

Master of the CE'REMONIES, an officer instituted by James I. for the more honourable reception of ambassadors and strangers of quality. He wears about his neck a chain of gold, with a medal, having on one side an emblem of peace, with this motto: *Beati pacifici*; and on the other, an emblem of war, with *Dieu et mon droit.*

CEREN'CES, or CERANCE, a town of France, in the department of the Channel, and chief place of a canton, in the district of Coutances: two leagues and a half south of Coutances.

CE'RENS, a town of France, in the department of the Sarte: ten miles south of Le Mans.

CEREN'ZA, or GERENZA, a town of Italy, in the kingdom of Naples, situated on a rock, in the province of Calabria Citra, the see of a bishop, united to Cariali, suffragan of St. Severina: ten miles north of St. Severina.

CE'RES, in fabulous history, the goddess of corn and of harvests, was daughter of Saturn and Vesta. She had a daughter by Jupiter, whom she called Pherephata, *fruit-bearing*, and afterwards Proserpine. This daughter was carried away by Pluto, as she was gathering flowers in the plains near Enna. The rape of Proserpine was grievous to Ceres, who sought her all over Sicily; and, when night came, she lighted two torches in the flames of mount Ætna, to continue her search by night all over the world. She at last found her veil near the fountain Cyane; but no intelligence could be received of the place of her concealment, till at last the nymph Arethusa informed her that her daughter had been carried away by Pluto. No sooner had Ceres heard this, than she flew to heaven with her chariot drawn by two dragons, and demanded of Jupiter the restoration of her daughter. The endeavours of Jupiter to soften her by representing Pluto as a powerful god, to become her son-in-law, proved fruitless, and the restoration was granted, provided Proserpine had not eaten any thing in the kingdom of Pluto. Ceres upon this repaired to Pluto, but Proserpine had eaten the grains of a pomegranate which she had gathered as she walked over the Elysian fields, and Ascalaphus, the only one who had seen her, discovered it to make his court to Pluto. The return of Proserpine upon earth, was therefore impracticable; but Ascalaphus, for his unsolicited information, was changed into an owl. The grief of Ceres for the loss of her daughter was so great, that Jupiter granted Proserpine to pass six months with her mother, and the rest of the year with Pluto. During the inquiries of Ceres for her daughter, the cultivation of the earth was neglected, and the ground became barren; therefore, to repair the loss which mankind had suffered by her absence, the goddess went to Attica, which was become the most desolate country in the world, and instructed Triptolemus of Eleusis in every thing which concerned agriculture. She taught him how to plough the ground, to sow and reap the corn, to make bread, and to take particular care of fruit-trees. After these instructions, she gave him her chariot, and commanded him to travel

travel all over the world, and communicate his knowledge of agriculture to the rude inhabitants, who hitherto lived upon acorns and the roots of plants. Her beneficence to mankind made Ceres respected. Sicily was supposed to be the favourite retreat of the goddess, and Diodorus says, that she and her daughter made their first appearance to mankind in Sicily, which Pluto received as a nuptial dowry from Jupiter when he married Proserpine. The Sicilians made a yearly sacrifice to Ceres, every man according to his abilities; and the fountain of Cyane, through which Pluto opened himself a passage with his trident, when carrying away Proserpine, was publicly honoured with an offering of bulls, and the blood of the victims was shed in the waters of the fountain. Besides these, other ceremonies were observed in honour of the goddesses who had so peculiarly favoured the island. The commemoration of the rape was celebrated about the beginning of the harvest, and the search of Ceres at the time that corn is sown in the earth. The latter festival continued six successive days: and during the celebration, the votaries of Ceres made use of some free and wanton expressions, as that language had made the goddess smile while melancholy for the loss of her daughter. Attica, which had been so eminently distinguished by the goddess, gratefully remembered her favours in the celebration of the Eleusinian mysteries. Ceres also performed the duties of a legislator, and the Sicilians found the advantages of her salutary laws; hence, her surname of Thesmophora. She is the same as the Isis of the Egyptians, and her worship, it is said, was first brought into Greece by Erechtheus. She met with different adventures when she travelled over the earth, and the impudence of Stellio was severely punished. To avoid the importunities of Neptune, she changed herself into a mare; but the god took advantage of her metamorphosis, and from their union arose the horse Arion. The birth of this monster so offended Ceres, that she withdrew herself from the sight of mankind; and the earth would have perished for want of her assistance, had not Pan discovered her in Arcadia, and given information of it to Jupiter. The Parcæ were sent by the god to comfort her, and at their persuasion she returned to Sicily, where her statues represented her veiled in black, with the head of a horse, and holding a dove in one hand, and in the other a dolphin. In their sacrifices, the ancients offered Ceres a pregnant sow, as that animal often injures and destroys the productions of the earth. While the corn was yet in grass, they offered her a ram, after the victim had been led three times round the field. Ceres was represented with a garland of ears of corn on her head, holding in one hand a lighted torch, and in the other a poppy, which was sacred to her. She appears as a country-woman mounted on the back of an ox, and carrying a basket on her left arm, and holding a hoe; and sometimes she rides in a chariot drawn by winged dragons. She was supposed to be the same as Rhea, Tellus, Cybele, Bona Dea, Berecynthia, &c. The Romans paid her great adoration, and her festivals were yearly celebrated by the Roman matrons in the month of April, during eight days. These matrons abstained during several days from the use of wine and every carnal enjoyment. They always bore lighted torches in commemoration of the goddess; and whoever came to these festivals without a previous initiation, was punished with death. *Ceres* is metaphorically called *bread* and *corn*, as the word *Bacchus* is sometimes used to signify *wine*. *Apollod.*—Mr. Bryant, in his Analysis of Ancient Mythology, defines the word *Ceres* originally to mean a sacred tower where a perpetual fire was preserved; and, he says, the rites of this benefactress and law-giver, this innocent and rural goddess, were so cruel, that some of her temples were as much dreaded as those of Sylla and the Cyclops. The towers of Ceres were *P'urtain*, or πυρταια, so called from the sacred fires which were kept burning therein. The Greeks, through ignorance, interpreted this word πυρω ταμειον; and rendered what was the temple of Cerus, *a granary of corn*, and thus Ceres became the goddess of corn.

CERESO'LO, a town of Italy, in the duchy of Mantua; thirteen miles north-west of Mantua.

CE'RET, a town of France, and principal place of a district, in the department of the East Pyrenées, situated at the foot of the Pyrenées, on the river Tech, over which is a bridge of one arch, supposed to be the highest and boldest in France; it contains about 1900 inhabitants. It was here that the commissioners of France and Spain met, in 1660, to settle the bounds of the two kingdoms. A battle was fought near this town between the French republican army, and the Spaniards, on the 1st of May, 1794, in which the latter were defeated, with the loss of their camp, magazines, equipage, 200 pieces of cannon, and 2000 prisoners. Five leagues south-west of Perpignan. Lat. 42. 28. N. long. 20. 25. E. of Ferro.

CERE'TIA, *s.* in botany. See HYMENÆA.

CE'REUS, in botany. See CACTUS.

CERIGLIA'NO, or CIGLIANO, a town of Italy, in the kingdom of Naples, and province of Basilicata: ten miles south of Tricarico.

CERIGNO'LA, a town of Italy, in the kingdom of Naples, and province of Capitanata; remarkable for a victory obtained here in 1503, by Gonsalvo over the duke of Nemours, who was slain in the commencement of the battle: twenty miles south of Manfredonia.

CERI'GO, an island of the Grecian Archipelago, formerly well known by the name of *Cythera*, separated from Morea by a narrow strait: it is dry and mountainous, and produces neither corn, wine, nor oil, sufficient for the inhabitants; yet some of the vallies are fertile; sheep, hares, quails, turtles, and falcons, are abundant. It is about seven leagues in circumference, and serves as a rendezvous for pirates. Lat. 36. 28. N. lon. 40. 42. E. Ferro.

CERI'GO, a town, situated on the western coast of the island of Cerigo, defended by a castle, situated on a sharp rock, surrounded by the sea; with a small harbour: it is the see of a Greek bishop. Lat. 36. 26. N. lon. 40. 42. E. Ferro.

CERIGOT'TO, a small island in the Grecian Archipelago, between Cerigo and Candia, about five miles in circumference, and uninhabited. It was anciently called *Ægilia*. Lat. 36. 2. N. lon. 40. 59. E. Ferro.

CERIL'LA, among printers, a mark set under the letter *c* in French or Spanish; as ç, to denote it to be pronounced as an *s*, or *ss*.

CERIL'LY, a town of France, and principal place of a district, in the department of Allier: eleven miles south of Bourges, and seven west of Moulins.

CERI'NES, a sea-port town of the island of Cyprus, defended by a castle, whose walls are fallen to decay. It is the see of a bishop, suffragan of Nicosia. Lat. 35. 22. N. lon. 51. 10. E. Ferro.

CERIN'THE, *s.* [κηρος, wax, or κηριον, a honeycomb.] HONEYWORT; in botany, a genus of the class pentandria, order monogynia, natural order of asperifoliæ. The generic characters are—Calyx: perianthium five-parted; divisions oblong, equal, permanent. Corolla: monopetalous, bell-form. Tube short, thick. Border tube-bellied, rather thicker than the tube; mouth five-cleft; throat naked, pervious. Stamina: filaments five, subulate, very short. Anthers acute, erect. Pistillum: germ four-parted. Style filiform, length of the stamens. Stigma obtuse. Pericarpium: none. Calyx unchanged. Seeds two, bony, glossy, subovate, outwardly gibbous, bilocular. —*Essential Character.* Border of the corolla tube-bellied; throat pervious; seeds two, bilocular.

Species. 1. Cerinthe major, or great honeywort. Leaves stem clasping, corollas bluntish spreading. Stems eighteen inches high and more, round, smooth, branching, and leafy. Leaves glaucous, becoming blue by age, smooth, without prickles, but ciliated about the edge, dotted with white. Branches leafy, nodding; with flowers among the leaves, hanging on long peduncles. The tube of the corolla is yellow, but the border is purple: the toothlets

very short and revolute. Annual, flowering in June and July: Haller says it is perennial. There are several varieties. This is one of the most common herbs all over Italy; hence Virgil's expression of *Cerinthæ ignobile gramen*. It is no less common in Sicily; and is found also in the South of France, Swisserland, Germany, and Siberia. Cultivated in 1596, by Gerard. There is abundance of honey-juice in the tube of the flower, for which reason it is much resorted to by bees; this plant therefore is peculiarly proper to be planted near apiaries.

2. Cerinthe minor, or small honeywort: leaves stem-clasping entire, corollas acute closed. Very nearly allied to the foregoing, but the corolla five-cleft to one-third of the length, whereas that is only five-lobed at the edge. Scopoli makes but one species of them. The whole plant is smooth, and flowering the whole summer. Annual, when sown in the spring, but biennial when sown in autumn; in the wild state therefore biennial. Italy, Germany, Austria, Syria, Swisserland. Cultivated 1570, by Mr. Hugh Morgan.

Propagation and Culture. The species of this plant are propagated by seeds, which should be sown soon after they are ripe; for, if they are kept till spring, the growing quality of them is often lost; or at least they lie some months in the ground before they grow; the plants are hardy, and, if the seeds are sown in a warm situation, they will endure the winter's cold very well without shelter; these autumnal plants are also much surer to produce ripe seeds than those which are sown in the spring, which are generally late in the season before they flower; and consequently, if the autumn should not prove very warm, their seeds would not be perfected. The plants make a pretty variety for large borders in gardens, where, if they are suffered to drop their seeds, the plants will arise without any farther care; so that when a person is once furnished with the several varieties, he need be at no more trouble than to allow each of them a respective place where it may remain, and sow itself; and with this culture, there is a greater certainty of preserving the sorts than in any other management; nor will they perhaps be entirely lost in this way, if it should happen that the season should prevent their ripening seed, (as it sometimes proves;) for, when great quantities of the seeds have scattered upon the ground, some of them will be buried so deep, in stirring the earth, as not to grow the first year; which, upon being turned up to the air the succeeding year, will come up as well as new seeds. If the seeds are not taken as soon as they change black, they drop out of the calyx in a short time, and vegetate with the first warm weather. See ONOSMA and PULMONARIA.

CERIN'THIANS, ancient heretics, who denied the divinity of Christ. They took their name from Cerinthus, one of the first heresiarchs in the church, who was contemporary with St. John. They believed that Christ was a mere man, born of Joseph and Mary; but that in his baptism, a celestial virtue descended upon him, by means whereof he was consecrated by the holy spirit. They supposed it was by means of this celestial spirit, that he wrought his miracles; and which, as he received it from heaven, quitted him after his passion, and returned to the place from whence it came. It was partly to refute this sect that St. John wrote his gospel.

CERINTHOI'DES, *s.* in botany. See PULMONARIA.

CERIN'THUS, founder of the above-mentioned heresy, was contemporary with the apostles, and in his doctrine he ascribed the creation not to God, but to angels. He taught that circumcision ought to be retained under the gospel. He is considered as the head of the converted Jews, who raised in the church of Antioch the tumult of which St. Luke has given the history in the 15th chapter of the Acts. Some authors ascribe the book of the apocalypse to Cerinthus; adding, that he put it off under the name of St. John, the better to authorise his reveries touching the nature of Christ's mission upon earth; and it is even certain that he published some works of this kind under the title of *Apocalypse*.

CERISAY', a town of France, in the department of the Two Sevres, and chief place of a canton, in the district of Chatillon sur Seine: two leagues and a quarter south-south-east of Chatillon.

CERISIE'RS, a town of France, in the department of the Yonne, and chief place of a canton, in the district of St. Florentin: four leagues north-north-west of St. Florentin.

CERISO'LA, a village of Italy, in the principality of Piedmont, where the French gained a signal victory over the Spaniards on the 14th of April, 1544: five miles east of Carmagnola.

CERISY', a town of France, in the department of the Channel, and chief place of a canton, in the district of St. Lo: two leagues and a half north-east of St. Lo.

CERISY' LA SALLE, a town of France, in the department of the Channel, and chief place of a canton, in the district of Coutances: two leagues east of Coutances.

CERLIER', see ERLACH.

CER'NA, a river of Piedmont, which runs into the Sesia, three miles north-west of Vercelli.

CER'NACHE, a town of Portugal, in the province of Beira: four miles south of Coimbra.

CERNAY', a town of France, in the department of the Upper Rhine, and chief place of a canton, in the district of Befort: five leagues north-east of Befort.

CERNAY'-EN-DORMOIS, a town of France, in the department of the Marne: ten miles north of St. Menehold.

CERNE, or CERNE ABBAS, a small market-town in Dorsetshire, famous for its ancient abbey; and, in more modern times, for its brewery of strong beer; prodigious quantities of which it formerly exported to America, and the West-Indies. Here are three fairs annually, viz. on Mid-lent Monday, 28th of April, and 2d of October; market on Wednesdays. The town stands on the river Cerne, in a pleasant vale, surrounded with steep hills on the north; six miles and a half from Dorchester, and 121 from London. On a steep hill to the north of the town is the figure of a giant cut in chalk. His left hand is extended, and in his right he holds a club. Under the body are three rude letters, scarce legible, and there appears to have been more, now not to be traced. Over them is the date 748. The figure is said to be that of Cenric, son of Cuthred, king of Wessex, who was killed in battle that year. Others suppose it to be the figure of some idol, and say the letters under it are JAO. It covers near an acre of ground, and seems to have been projected by the strict rules of proportion. It is generally repaired about once in seven years, by cleaning the furrows, and filling them with fresh chalk. Various have been the opinions of antiquaries on it: some say it represents the Saxon god Heil, and must have been as ancient as 600. Dr. Stukely thinks it was done for the figure of Hercules, which he says was called Heil by the Saxons, and cut as a memorial of their arrival, in compliment to Eli, who expelled the Belgæ. Near it is a large coppice called Hell-wood.

CERNETZ', a town of Swisserland, in the community of Lower Engadine, with a mineral spring: twenty-four miles south-east of Coire.

CERNON', a town of France in the department of the Marne, and chief place of a canton, in the district of Chaalons: eight miles south of Chaalons.

CERNU', a town of Africa, in the kingdom of Morocco: seven miles from Safia.

CERNY', a town of France in the department of the Seine and Oise: seven miles east of Estampes.

CE'RO, a town of Italy, in the Veronese: six miles north-north-east Verona.

CEROU', a river of France, which runs into the Aveiron.

CEROPE'GIA, *s.* [κηροπηγιον, Gr. a candelabre, or lampstand.]

ſtand.] In botany a genus of the claſs pentandria, order monogynia, natural order of contortæ. The generic characters are—Calyx: perianthium very ſmall, five-toothed, acute, permanent. Corolla: monopetalous, with a large globoſe baſe which is terminated by a cylindrical oblong tube. Border very ſmall, five-toothed, acuminate, with the tip converging, gaping at the ſides. Stamina: filaments five, in the baſe of the corolla, very ſmall, incurved converging. Anthers ſmall. Piſtillium: germ very ſmall. Style ſcarce any. Stigmas two. Pericarpium: follicles two, cylindric, acuminate, very long, erect, unilocular, univalve. Seeds: numerous, imbricated, oblong, crowned with a pappus.—*Eſſential Character*. Contorted. Follicles two, erect. Seeds plumoſe. Border of the corolla converging.

Species. 1. Ceropegia candelabrum: umbels pendulous, flowers erect. A twining plant. Stems ſlender, round, green or reddiſh. Leaves oppoſite, ovate, thick, ſoft, ſmooth. The peduncle, and at firſt the flowers, hang down, but when open they erect themſelves, and, being placed in a circle, have the appearance of a ſet of lamps hanging up. The follicles or ſeed-veſſels hang down. Native of the Eaſt-Indies.

2. Ceropegia biflora: peduncles two-flowered. Stem twining. Leaves oppoſite, ovate, quite entire. Peduncles axillary, generally two flowered. Flowers oppoſite to the peduncles, not reflected, but extended ſtraight out. Native of the iſle of Ceylon. Perennial.

3. Ceropegia ſagittata, or arrow leaved ceropegia: umbels ſeſſile, leaves ſagittate. Stem twining, filiform, tomentoſe. Leaves oppoſite, on very ſhort petioles, ſagittate or cordate-linear, the edges revolute, tomentoſe on both ſides but paler underneath. Umbels axillary, many-flowered, the peduncle ſhorter than the umbel. Calyx five parted, linear, tomentoſe, half the length of the corolla, which is ſcarlet, ſubcylindric but leſs ſwelling at the baſe; the diviſions very ſhort, mucronate, converging. Native of the Cape. Perennial. Introduced 1775, by Mr. Francis Maſſon.

4. Ceropegia tenuifolia: leaves linear-lanceolate. Stems ſlender, milky, red, bay or green. Petioles very ſhort, oppoſite. Flowers axillary, from two to four together, on ſhort peduncles. Within reddiſh, or reddiſh brown, on the outſide yellowiſh-green. Native of the Eaſt Indies.

5. Ceropegia obtuſa: leaves blunt, ſtem twining. Stem perennial, filiform, ſmooth. Leaves oblong, quite entire, flat, few, oppoſite. Flowers pale, like thoſe of the firſt ſort, but on ſhorter peduncles. Fruits more ſlender, broken at a right angle as they are, ſmooth. Native of Cochin-China with the firſt, from which it differs more in the leaves than flowers.

6. Ceropegia cordata, leaves cordate, umbels pendulous. Stem long, round, climbing, branched, perennial. Leaves quite entire, ſmooth, oppoſite, on long petioles. Flowers greeniſh-yellow, in large hemiſpherical axillary umbels, on long peduncles. Calyx inferior, five-leaved; leaflets ovate acute ſmall ſpreading. Corolla five-parted; parts ovate converging. Nectary fleſhy upright five-cleft; with ten oblong glands ſtanding round the piſtil. Filaments none. Anthers five oblong converging. Germ longiſh, bifid. Style thick very ſhort. Stigma blunt emarginate. Native of Cochin-China, climbing in the hedges.

CERRE'RO. See CERRITO.

CERRE'TO, a town of Italy, in the province Umbria: fifteen miles weſt of Nurſia.

CER'RI, GLANS, and CER'RIS, *ſ.* in botany. See QUERCUS.

CERRI'TO, a town of Italy, in the kingdom of Naples, and province of Lavora, the reſidence of the biſhop of Teleſa: with a cathedral and collegiate church, and three convents: eighteen miles north-north-weſt of Benevento, and five north-north-eaſt of Teleſa.

CER'RO, a town of Italy, in the duchy of Milan: eighteen miles weſt Como.

CERT-MONEY, in law, head-money, paid yearly by the reſiants of ſeveral manors to the lords thereof, for the certain keeping of the leet; and ſometimes to the hundred: as the manor of Hook, in Dorſetſhire, pays cert-money to the hundred of Egerdon. In ancient records this is called *certum letæ*.

CER'TAIN, *adj.* [*certus*, Lat.] Sure; indubitable; unqueſtionable; undoubted; that cannot be queſtioned, or denied.—Thoſe things are *certain* among men, which cannot be denied without obſtinacy and folly. *Tillotſon.*—Reſolved; determined:

I with thee have fix'd my lot,
Certain to undergo like doom of death. *Milton.*

Undoubting; put paſt doubt:

This form before Alcyone preſent,
To make her *certain* of the ſad event. *Dryden.*

Unfailing; which always produces the expected effect.—I have often wiſhed that I knew as *certain* a remedy for any other diſtemper. *Meadows*.—Conſtant; never failing to be; not caſual:

Virtue, that directs our ways
Through *certain* dangers to uncertain praiſe. *Dryden.*

Regular; ſettled; ſtated:

Who calls the council, ſtates a *certain* day,
Who forms the phalanx, and who points the way? *Pope.*

In an indefinite ſenſe, ſome; as, a *certain* man told me this.—How bad ſoever this faſhion may juſtly be accounted, *certain* of the ſame countrymen do paſs far beyond it. *Carew.*

CER'TAINLY, *adv.* Indubitably; without queſtion; without doubt; without fail. *Certainly* he that, by legal means, cannot be ſecured, can be much leſs ſo by any private attempt. *Decay of Piety.*

CER'TAINNESS, *ſ.* The ſame with *certainty*.

CER'TAINTY, *ſ.* Exemption from doubt.—*Certainty* is the perception of the agreement or diſagreement of our ideas. *Locke.*—Exemption from failure; as the *certainty* of an event, or of a remedy.—That which is real and fixed.—Regularity; ſettled ſtate.

CERTAL'DO, or CASTRO CALTALDO, a town of Italy, in the territory of Sienna.

CER'TES, *adv.* [*certes*, Fr.] Certainly; in truth; in ſooth: an old word:

Certes, ſir knight, you've been too much to blame,
Thus for to blot the honour of the dead,
And with foul cowardice his carcaſe ſhame,
Whoſe living hands immortaliz'd his name. *Spenſer.*

CER'THIA, *ſ.* the CREEPER; in ornithology, a genus of birds belonging to the order of picæ; named in Greek, κεϱθιος, κεϱθια, κεϱδιος; in Italian, *cerzia*, *cenerina*, *picchio paſſerino*, *rampichino*: in German, *baum-lauffer* (tree-runner), *rindenkleber* (bark-climber), *birngrille* (brain-cricket): in Daniſh, *træ pikke*, *lichefſen*, in Swediſh, *krypare*. The generic characters are as follow: Bill arched, thin, ſomewhat triangular, and ſharp. Tongue pointed; feet ambulatory. There are fifty-five ſpecies, and four varieties, of this bird now aſcertained. They are ſpread over the whole globe; live chiefly on inſects; have minute noſtrils, and are conſpicuous by their tall legs, their large hind toe, and their long hooked nails: in moſt of them the tongue is ſharp, in ſome it is flat at the tip, in others ciliated, and in a few, tubulated. They creep very nimbly on trees, both in aſcending and deſcending, and on the upper and under ſide of the branches: they run ſwiftly along beams, claſping the edge with their little feet. They are diſtinguiſhed from the woodpeckers by their bill and tongue, from the titmice by the greater length of their bill, and from the nuthatches by its more ſlender and hooked form. Many foreign ſpecies of creepers reſemble much the humming-birds, by their diminutive ſize, by the rich colours of their plumage, by their ſlender

der incurvated bill, which is of a more lengthened and sharper form than that of the humming-bird, which is slightly inflated at the tip; the wings of the creepers are longer, and their tail contains twelve quills, while that of the humming-bird has only ten; and, lastly, the tongue of the creepers is not like that of the humming-birds, composed of two cylindrical half-tubes, which joined together form an entire tube, and is properly an organ of respiration, and more analogous to the feeler of an insect than the tongue of a bird.

As the creepers live upon the same insects with the woodpeckers, the nuthatches, and the titmice, and cannot, from the defect of their bill, extract the insects lodged under the bark, they follow those birds, which they make their providers, and dexterously snatch the little prey. And, since insects are their principal subsistence, we may readily suppose that the species are more prolific and varied in hot climates, where such provision abounds, than in the cold or temperate, which are less favourable to the multiplication of insects.

1. Certhia Familiaris, or common creeper; is nearly as small as the crowned wren, and is perpetually in motion: but the scene of its activity is extremely limited; it never migrates, and its ordinary abode is the hole of a tree. From this it emerges in pursuit of the insects harboured in the bark and the moss; and there the female breeds and hatches. The hen generally lays from five to seven eggs; they are cinereous, with points and streaks of a deeper colour. They hatch early in the spring, being neither obliged to construct its nest, nor to migrate. The throat of the common creeper is pure white, but generally assumes a rusty tint, which is always deeper on the flanks and the remote parts (sometimes all the under side of the body is white), the upper side variegated with rufous, with white, and with blackish; and these colours vary in their brightness and intensity, according to the age of the bird: the head is of a darker cast; the ring about the eyes, and the eyebrows, white; the rump rufous; the quills of the wings brown, the three first edged with grey, the fourteen following marked with a whitish spot, which forms on the wing a transverse bar of the same colour; the three last marked near the tip with a black spot between two white ones: the bill is brown above, and whitish below; the legs grey; the ground of the feathers deep cinereous.

There is a variety of this species called the great creeper. It differs only in size; its œconomy, its plumage, and its structure, are the same as in the common creeper. These birds are frequent in England, and inhabit America, as well as the old continent.

2. Certhia Muraria, or wall creeper. The various motions that the preceding species performs on trees, this performs on rocks and old walls; where it climbs, hunts, and breeds. Kramer remarks, that these birds haunt the mausoleums of the dead, and have been known to deposit their eggs in human sculls. Though they are larger than the common creepers, they are equally lively and active: flies, ants, and spiders, are their usual food. It inhabits Austria, Silesia, Switzerland, Poland, and Italy. They keep in pairs, like most birds that feed on insects; and, though solitary, they are neither weary nor melancholy: so certain it is, that cheerfulness depends more on the original disposition, than on the enlivening influence of society! In the male, there is a black mark under the throat, which extends to the fore part of the neck, and distinguishes the sex: the upper side of the head and body is of an ash colour, the under side of a deeper cast; the small superior coverts of the wings, a beautiful red. It is chiefly cinereous, with a fulvous spot on the wings.

3. Certhia Spanata, or red breasted creeper.—The song of this bird is said to resemble that of the nightingale. The head, the throat, and the fore part of the neck, are variegated with fulvous and glossy blue, changing into violet; the upper side of the neck and of the body, in the fore part, purplish chesnut, and in the hind part violet changing into gold green: the small coverts of the wings the same; the middle ones brown, terminated with purplish chesnut; the under side of the body crimson; the upper side chiefly purple.

4. Certhia Pusilla, or little Indian creeper; white below, and brown above, with some reflections of copper colour; it has a brown streak between the bill and the eye, and bright white eye-brows: the quills of the wings are of a deeper brown than the back, and edged with lighter colours; the quills of the tail blackish, the outermost terminated with white; the bill and legs, brown. It is only three inches and a half in length; the bill, eight or nine lines.

5. Certhia Senegalensis, or Senegal creeper; hath a gold, green, head and throat, and a red breast. Its back, and the small quills of the wings, violet black; its rump and tail like burnished steel, and verging on greenish; and the inferior coverts of the tail are of a dirty green.

6. Certhia Philippina, or philippine creeper. Its leading colour is greyish, with a greenish cast; the two middle tail quills very long: on the throat and the upper side of the head is a brilliant gold green, heightened with copper reflections: on the breast and the fore part of the neck is a beautiful shining read, the only colour which is seen in those parts when the feathers are quite regular and composed: each of the feathers, however, consists of three different colours, black at its origin, gold green at its middle, and red at its extremity; a proof that to describe the tints of the feathers is not sufficient to give an accurate idea of the colours of the plumage. Its length is five inches.

7. Certhia Chalybea, or collared creeper; native of the Cape of Good Hope. Its head is of a gold green, waving with rose copper; extending over the throat, and all the upper side of the body; it borders also the intermediate quills of the tail, which are of a glossy purple; not changeable on the superior coverts. The breast is marked with red, forming a sort of cincture whose upper edge is contiguous to the collar, or bar, of blue steel colour, waving with green: the rest of the under side is grey, with some yellow speckles on the top of the belly, and on the flanks: the quills of the wings are of a brown grey: length, four inches and a half. This bird sings, and lives on insects, and drinks the juices of flowers.

8. Certhia Zeylonica, or ceylonese creeper. Its most conspicuous colour is a deep and brilliant azure, which spreads below the neck, and on the throat; it has a beautiful green cap; the under side of its body is yellow; all the upper side, including the superior coverts of the wings, are ferruginous, or dull olive, and the same colour borders the quills of the tail and of the wings, and also their great coverts: length, four inches.

9. Certhia Olivacea, or olive creeper. The upper part of the body, including the coverts of the wings, is of a dull olive green, darkest on the crown of the head, and the same colour borders the quills of the wings and of the tail: all these quills are brown; the orbits are white; the throat and the under side of the body, dun grey: it is nearly as large as the common creeper.

10. Certhia Currucaria, or grey creeper. The upper side of the body is dun grey, and the under side yellowish; the breast darker: there is a deep violet bar, which rises from the throat and descends along the neck: the coverts of the wings are of a steel colour, and the same borders the quills of the tail, the rest of which are blackish: the lateral ones are terminated with dirty white; the quills of the wings, brown; the tail quills equal; the bill is stronger than in the other creepers, and the tongue terminated by two threads.

11. Certhia Jugularis, or small philippine creeper. It is brown grey above, and yellow below; and has a violet collar; the quills of the wings are brown grey, like the upper side of the body; those of the tail are deeper brown; the two outermost tipt with yellow. This bird is much smaller than the former, which it much resembles in plumage.

12. Certhia

CERTHIA.

1. The Red Spotted Indian Creeper. 2. The Black and Yellow Creeper. 3. The Cayenne Creeper. 4. The African Creeper.

12. Certhia Lotenia, or loten creeper; hath also a collar of a beautiful gold red; the small superior coverts are of the same hue; the throat, the head, the neck, all the upper side of the body, and the middle coverts of the wings, of a brilliant blue green: there is a streak of glossy black between the nostril and the eye; the breast, the belly, and all the under side of the body, of the same black, and also the quills of the tail and of the wings; the large coverts, and the quills of the tail, are bordered with gold green.

13. Certhia Omnicolor, or creeper of all colours: its plumage is green, tinged with all sorts of rich colours, amongst which that of gold green seems to predominate. Seba says, that its young often become the prey of large spiders; a danger to which the humming-bird also is liable, and even all the small birds that breed in climates inhabited by those formidable insects, and have not skill sufficient to guard the nest from their intrusions.

14. Certhia Afra, or African creeper. Sonnerat, who found this bird at the Cape of Good Hope, tells us that it sings as melodious as the nightingale, and that its voice is even softer. Its throat is of a fine carmine; its belly white; the head, the neck, and the anterior part of the wings, of a fine gold green, and silvery; the rump, sky blue; the wings and tail, snuff brown; length, about four inches.

15. Certhia Cruentata, or red-spotted Indian creeper; is distinguished by four large beautiful spots of bright red; the first on the crown of the head, the second behind the neck, the third on the back, and the fourth on the superior coverts of the tail; the quills of the tail and of the wings, are blue; the under side white; length, three inches and a quarter.

16. Certhia Violacea, or violet creeper. The head, the top of the back, and the throat, are of a bright violet, glossed with green; the fore part of the neck also bright violet, but glossed with blue: the rest of the upper side of the body is of an olive brown, which colour borders the great coverts of the wings, their quills, and those of the tail, the two middle quills of which are very long. The under side of the body is bright orange, more vivid on the anterior parts, and softening in the distant parts; length, about six inches.

17. Certhia Pulchella, or beautiful creeper. The breast is red, and all the body gold green, glowing and undulating with rose copper; the quills of the tail blackish, edged with gold green; their great coverts; brown; the lower belly mixed with a little white. Length, seven inches; the tail consists of ten lateral quills, nearly equal, and two intermediate ones, which are very long and narrow, and which project two inches beyond the others. It inhabits Senegal.

18. Certhia Famosa, or famous creeper; from the Cape of Good Hope. It is about the size of the linnet; its bill is a little incurvated, and the feet are furnished with long nails, particularly the middle and hinder ones: the eyes are black; the upper and under sides of the body of a fine brilliant green, glossed with rose copper, with some feathers of gold yellow under the wings; the great feathers of the wings and of the tail, are of a fine black, glossed with violet; the two middle quills of the tail are very long, and edged with green; on each side, between the bill and the eye, there is a streak of velvet black.

19. Certhia Mexicana, or Mexican creeper; in which red is the prevailing colour, though it has different shades; the crown of the head is lighter and more brilliant, and that on the rest of the body is deeper. The throat and fore part of the neck are green; the quills of the tail and of the wings are terminated with bluish; the thighs, of a light yellow. Its voice is said to be pleasant and agreeable; length, about four inches and a half.

20. Certhia Gutturalis, or guttural creeper. The throat and face are of a fine gold green; the fore part of the neck and breast, purple; the small coverts of the wings of a brilliant violet; the great coverts and the quills of the wings and of the tail are brown, tinged with rufous; the middle coverts of the wings, and all the rest both of the upper and under sides of the body, blackish brown; length, five inches.

21. Certhia Purpurea, or purple creeper; being of a beautiful uniform purple. Seba asserts that it sings pleasantly; length, four inches and a half.

22. Certhia Cyanea, or Cayenne creeper. The face of this beautiful bird is of a brilliant sea green: there is a bar on the eyes of velvet black; the rest of the head, the throat, and all the under part of the body, the lower part of the back, and the superior coverts of the tail, of an ultramarine blue, which is the only colour that appears when the feathers are regularly disposed, though each feather has three colours; brown at the base, green in the middle, and blue at the extremity; the top of the back, the part of the neck contiguous to the back, and the tail, velvet black: what appears of the wings, when they are closed, is of the same black, except a blue bar, which crosses their coverts obliquely: the inner side of the quills of the wings, and their inferior coverts, are of a fine yellow; so that the wings, which seem entirely black when at rest, appear variegated with black and gold when displayed, or in motion. It is four inches and a quarter in length; and inhabits Brasil, Guiana, and Cayenne.

23. Certhia Cærulea, or blue creeper, is also found in Cayenne, and differs from the preceding only in the shades of the plumage: the head is of a fine blue: there is a bar on the eyes of a velvet black: the throat, the wings, and the tail, are of the same black: all the rest is of a shining blue, verging upon violet; the blue feathers which cover the body are of three colours, the same as in the preceding. It constructs its nest with much art: the outside consists of coarse straw, and stiff stalks of herbs; the inside of softer materials: the shape resembles that of a retort: it is suspended from the end of a pliant branch, and the aperture faces the ground. The bird enters the neck, and creeps into the belly, of the retort, which is its proper nest. By this contrivance the young are guarded against the visits of spiders, lizards, and other intruders.

24. Certhia Spiza, or black-headed creeper. The plumage consists of three or four colours, which are disposed in distinct masses, without any intermixture or shading: a velvet black on the throat and head only; deep blue under the body; bright green on all the upper side, including the tail and the wings; but the tail is of a deeper shade: the inferior coverts of the wings are cinereous brown, edged with green, and the bill is whitish: length, five inches and a quarter. It is a native of America. The black-capped green creeper, the blue-green creeper, and the all-green creeper, mentioned by Latham, are varieties of this species.

25. Certhia Variegata, or variegated creeper; decorated with great variety and choice of elegant colours: bright red on the top of the head; fine blue on the back of the head; blue and white on the cheeks; two shades of yellow on the throat, the breast, and all the under side of the body; yellow, blue, white, blackish, on the upper side of the body, including the wings, the tail, and their superior coverts. It is an American bird, and nearly as large as the chaffinch.

26. Certhia Brasiliana, or Brasilian creeper; the throat and fore side of the neck are of a shining violet; the lower part of the back, the superior coverts of the tail, and the small ones of the wings, are violet, bordering on steel colour; the upper part of the neck and back, of a fine velvet black; the belly, the lower coverts of the tail and of the wings, and the great superior coverts of the wings, of a dull black; the top of the head, of a fine gold green; the breast, purple chesnut; length, three inches.

27. Certhia Flaveola, or black and yellow creeper; feeds on the sweet viscous juices of the sugar-cane, which it sucks through the cracks of the stalk. In this respect it resembles the humming birds; it is also exceedingly small; and from the relative length of its wings it approaches

approaches that of Cayenne, though it differs by the length of its legs and the shortness of its tail. The throat, the neck, and the upper side of the head and body, are of a fine black; the edges of the wings, the rump, the flanks, and the belly, of a fine yellow, which spreads and grows dilute on the lower belly, and becomes whitish on the inferior coverts of the tail. This species is diffused through Martinico, Cayenne, and St. Domingo, &c. but the plumage varies a little in these different islands, tho' nearly in the same parallel. In that of Cayenne, the head is blackish; there are two white eyebrows, which extend down the neck: the throat is light grey: the back and the superior coverts of the wings are of a deeper grey; the quills of the wings and of the tail ash grey, bordered with cinereous. Linnæus regards the Bahama creeper of Brisson as a variety of this species. Its plumage is indeed very similar; all the upper side is brown, including even the quills of the wings and of the tail; the latter are whitish beneath; the throat is light yellow. The name *luscinia*, which Klein bestows on it, shews that he regarded it as a singing bird.

28. Certhia Viridis, or green creeper. A blue stripe runs from the base of the bill, and descends down the neck on each side; a rufous spot on the throat; the plumage on the upper parts of the body greenish; on the under pale yellow, mixed with green; quills brown, the outer edges green: tail greenish brown: inhabits Corniola.

29. Certhia Pacifica, or great hooked-billed creeper. Length eight inches; bill an inch and three quarters, stout at the base, and very much hooked; the upper parts of the body are black; lower part of the back, rump, and upper tail coverts, fine deep yellow; the under parts of the body dusky: the under wing coverts snow white: the sides of the vent, and the thighs, are yellow: the tail and quills black: inhabits the Friendly Isles in the South Seas.

30. Certhia Obscura, or hook-billed green creeper. Length seven inches; bill an inch and three quarters long, and bent quite in the shape of a semicircle; the under mandible shortest by a quarter of an inch; the nostrils covered with a membrane; between the bill and eye is a streak of brown; the plumage in general is olive green, palest beneath, and somewhat inclined to yellow; quills and tail dusky, edged with yellow-green. It inhabits the Sandwich Islands, and is one of the birds whose plumage the natives use in constructing their feathered garments; which make some of the most beautiful dresses of these islanders.

31. Certhia Vestiaria, or hook-billed red creeper. Length six inches; bill three quarters of an inch, not so much hooked as in the last species; general colour of the plumage scarlet: wings and tail black: on the wing coverts next the body is a white spot. This beautiful bird inhabits the Sandwich Islands, and was first found by the English in the island of Atooi, where they are called *heorotaire*.

32. Certhia Falcata, or sickle-billed creeper. Length five inches and a half; bill an inch and three quarters, curved like a sickle: the upper parts of the head, neck, and body, are green: on the head a gloss of violet: beneath, as far as the breast, violet: tail of the same colour: the great coverts and quills are pale brown. This is in the British Museum; but from what country is unknown.

33. Certhia Cinerea, or cinereous creeper. Length nine inches; head, neck, upper part of the back, and breast, brownish ash-colour: lower part of the back, and rump, glossy green: wing coverts the same: quills brown: belly pale yellow: down the middle of the breast and belly a mixture of glossy green: vent white: tail black; the two middle feathers two inches and a quarter longer than the rest. It is a native of the Cape of Good Hope.

34. Certhia Fusca, or brown creeper. Length six inches; the plumage on the upper part of the body brown: sides of the neck the same, edged with white: throat and breast barred brown and white: belly very pale brown; tail at least two inches and a half long, even at the end, and of a brown colour: quills brown, with pale edges. Inhabits the regions about the South Seas.

35. Certhia Carunculata, or wattled creeper; in length seven inches and three quarters: the bill, divided for half its length into four segments, like threads: at the base of the under mandible is a kind of membrane like a small wattle, of a yellowish colour, and about one sixth of an inch in diameter; this is surrounded by a patch of yellow feathers, which extends under the eye: the irides are cinereous: the plumage brown olive green; the middle of the back darkest: the belly verging to ash-colour: the chin and throat are of a rusty orange-colour: the breast ferruginous. It inhabits Tongataboo, or Amsterdam Isle, in the South Seas. In Captain Cook's last voyage, after describing the bird, it is observed, that it was the only singing one found at Tongataboo; where the strength of its melody filled the woods at the dawn of day, in the evening, and at the breaking up of bad weather.

36. Certhia Ocrochlora, or yellow-cheeked creeper; about half the size of the common creeper: head, back, wings, and tail, green: cheek and throat deep yellow: breast and sides yellowish green, marked with bluish spots: belly yellow. It inhabits Surinam.

37. Certhia Cyanogastra, or blue-throated creeper. Size of a wren; length four inches and a quarter; the top and sides of the head, taking in the eyes, hind part of the neck, and back, are green: chin, throat, and breast, deep blue; belly pale blue; on each side of the neck, between the blue and green, yellowish white: quills and tail black. It inhabits Cayenne.

38. Certhia Aurantia, or orange-breasted creeper; in length four inches; bill curved; the head, throat, hind part of the neck, back, and wing coverts, are green: quills and tail dusky black: the fore part of the neck of an orange red: the breast and belly pale yellow: legs dusky. Inhabits Africa.

39. Certhia Sannia, or the mocking creeper. Length seven inches and a quarter; size of the lesser thrush; bill somewhat bent, slender, long, and dusky; nostrils large, and covered with a membrane: tongue sharp, penciliform at the tip: irides hazel: on the cheeks a narrow white spot: the head, especially on the crown, inclined to violet; the plumage in general is olive green, inclining to yellow on the under parts: the quills are brown; the secondaries edged with olive: the colour of the tail like that of the secondaries, and forked. It inhabits both the islands of New Zealand. It has an agreeable note; but at times so varies and modulates its voice, that it seems to imitate the notes of all other birds; hence it was called by the English, the *mocking-bird*.

40. Certhia Sanguinea, or crimson creeper. Length five inches; bill a little bent; the body in general crimson, the upper parts deepest: quills black: the secondaries margined with chesnut: belly dusky: vent white: the tail black; all the feathers rather pointed at the end; the shafts white. Inhabits the Sandwich Islands.

41. Certhia Peregrina, or olive-green creeper; in length five inches; bill very little curved, plumage olive-green, palest beneath: quills and tail the same, but more dusky; both edged with yellow: inhabits the Sandwich Islands. This is by some supposed to be the female of the last; which is by no means unlikely, as several birds, of which the male is red, the females are green.

42. Certhia Cinnamomea, or cinnamon creeper. Length five inches; bill very little bent, and black; the upper part of the plumage is the colour of cinnamon; the under parts white: the tail made like our European creeper, and of the same colour as the upper parts of the body. This is preserved in the British Museum.

43. Certhia Verticalis, or ash-bellied creeper; in length five inches and a half; tongue bifid: top of the head green: the upper parts of the neck, body, and wings, pale olive-green; the under very pale ash-colour: quills and tail brown, edged with green. Inhabits Africa.

44. Certhia Parietum, or indigo creeper; size of the last; irides rufous yellow: the top of the head, neck behind, the back, wings, and tail, are of a pale indigo blue: over the eye a white streak, and another of black, passing to the hind head: the throat is white: the breast, belly, and vent, rufous. Inhabits India.

45. Certhia Lepida, or yellow-bellied creeper; size of the canary-bird: bill black: irides red: the forehead deep changeable green: behind the eye is a greenish band, passing half-way down the side of the neck, where it is rounded at the end; parallel to and beneath this, is a second, of glossy violet, which is continued on to the wing: the throat is red brown: the lesser wing coverts violet, with a metalline gloss; the others the same, inclining to red: the quills brown: the back, rump, and tail, are changeable violet: breast, belly, and thighs, yellow.

46. Certhia Cantillans, or orange-backed creeper; only three inches in length; bill and irides black; the upper parts of the plumage are blue-grey; throat and fore part of the neck the same, but paler: on the upper part of the back is a spot of orange yellow: the breast and belly are also orange yellow: inhabits China.

47. Certhia Erythrocynchos, or tufted creeper; length four inches; bill black, incurvated: head, neck, and back, deep olive; the feathers edged with dusky: prime quills brown: belly and tail black: on each side of the breast a tuft of yellow feathers: legs black: inhabits Bengal.

48. Certhia Chrysoptera, or yellow-winged creeper; size very small; head and neck varied with dusky and gold: tongue long, capable of being darted into flowers, like that of the humming-bird: wing coverts of a fine yellow: quills, tail, and legs, black: inhabits Bengal.

49. Certhia Longirostra, or long-billed creeper; length five inches; tongue long and missile, as in the last described: crown and hind part of the neck light green: back, wings, and tail, dusky, edged with olive-green: fore part of the neck and breast white: inhabits Bengal.

50. Certhia Grisea, or barred-tailed creeper; size of a titmouse: the top of the head, neck, back, and wings, cinereous grey; throat, breast, and belly, pale rufous; quills brown; tail composed of ten feathers, cuneiform in shape; the two middle ones brown, with a black band at the end; the others grey, with a curved band of black near the tip: inhabits China.

Other recently-discovered species are: 51. Certhia Fulva, or fulvous creeper, from South America. 52. Certhia Undulata, or waved creeper. 53. Certhia Novæ Hollandiæ, or New-Holland creeper; it is black, and striped below with white. 54. Certhia Incana, or brownish creeper; from New Caledonia. 55. Certhia Armillata, or bracelet creeper, from Surinam.

CERTIFICANDO DE RECOGNITIONE STAPULÆ, in law, a writ commanding the mayor of the staple to certify to the lord chancellor a statute staple taken before him, where the party himself detains it, and refuseth to bring in the same. *Reg. Orig.* 152. There is the like writ to certify a statute-merchant; and in divers other cases. *Ibid.* 148, &c.

CERTIFICATE, *s.* [*certificat*, low Lat. he certifies.] Any testimony in writing.—A *certificate* of poverty is as good as a protection. *L'Estrange.*

CERTIFICATE, in law, a writing made in any court to give notice to another court of any thing done therein; which is usually by way of transcript. Sometimes it is made by an officer of the same court, where matters are referred to him, or a rule of court is obtained for it; containing the tenor and effect of what is done. The clerks of the crown, assize, and peace, are to make certificates into B. R. of the tenor of indictments, convictions, &c. under certain penalties, by the stat. 34 and 35 Hen. 8. c. 14. 3 W. & M. c. 9. If a question of mere law arises in the course of a cause in chancery, (as whether by the words of a will, an estate for life or in tail is created, or whether a future interest devised by a testator, shall operate as a remainder, or an executory devise,) it is the practice of that court, to refer it to the opinion of the judges of the court of king's-bench, or common-pleas, upon a case stated for the purpose; wherein all the material facts are admitted, and the point of law is submitted to their decision, who thereupon hear it solemnly argued by counsel on both sides, and certify their opinion to the chancellor. And upon such certificate, the decree is usually founded. 3 *Comm.* 453.

Trial by CERTIFICATE, is allowed in cases, where the evidence of the person certifying, is the only proper criterion of the point in dispute. Thus, the question whether one were absent with the king in his army out of the realm, in time of war, might be tried by the certificate of the marshal of the king's host under seal. *Litt.* 102. If in order to avoid an outlawry, it be alledged the defendant was in prison, &c. at Bourdeaux or Calais, this, when those places belonged to the crown of England, was allowed to be tried by the certificate of the mayor. 9 *Rep.* 31. 2 *Ro. Ab.* 583. And therefore by parity of reason, it should now hold that in similar cases arising at Jamaica, &c. the trial should be by certificate from the governor. 3 *Comm.* 334.

For matters within the realm; the customs of the city of London shall be tried by the certificate of the mayor and aldermen, certified by the mouth of the recorder, upon a surmise from the party alleging it, that it should be so tried; else it must be tried by the country, as it must also if the corporation of London be a party, or interested in the suit. 1 *Inst.* 74. 4 *Burr.* 248. If the recorder has once certified a custom, the court are in future bound to take notice of it. *Doug.* 380. In some cases the sheriff of London's certificate shall be the final trial; as if the issue be whether the defendant be a citizen of London, or a foreigner, in case of privilege pleaded to be sued only in the city courts. 1 *Inst.* 74. Of a nature somewhat similar to which is the trial of the privilege of either University, when the chancellor claims cognizance of the cause; in which case the charters confirmed by parliament, allow the question to be determined by the certificate of the chancellor under seal. But in case of an issue between two parties themselves, the trial shall be by jury. 2 *Ro. Ab.* 583. 3 *Comm.* 335.

In matters of ecclesiastical jurisdiction, as marriage, general bastardy, excommunication, and orders, these and other like matters shall be tried by the bishop's certificate. Ability of a clerk presented, admission, institution and deprivation of a clerk, shall also be tried by certificate from the ordinary or metropolitan. 2 *Inst.* 632. *Show P. C.* 88. But induction shall be tried by a jury; being the corporal investiture of the temporal profits. *Dy.* 229. Resignation of a benefice may be tried either way, but seems most properly to fall within the bishop's cognizance. 2 *Ro. Ab.* 583. 3 *Comm.* 336. The trial of all customs and practice of the courts shall be by certificate from the proper officer of those courts respectively; and what return was made on a writ by a sheriff or under-sheriff, shall be only tried by his own certificate. 9 *Rep.* 31. The certificate of the commissioners for stating the army debts, is conclusive evidence, if made by them, *sitting as commissioners.* 1 *Stra.* 481. 568. For certificates of *costs* of *bankrupts*, or relative to the settlement of the *poor*, see those articles. There is also another kind of certificate, which is required to be taken out annually, as an authority for wearing hair-powder, killing game, using armorial-bearings, &c. See GAME-LAWS, HERALDRY, &c.

To CERTIFY, *v. a.* [*certifier*, French.] To give certain information of.—This is designed to *certify* those things that are confirmed of God's favour. *Hammond.*—It has *of* before the thing told, after the person told; as, I *certified* you *of* the fact.

CERTIORA'RI, *s.* in law, an original writ, issuing out of the court of chancery or king's-bench, directed in the king's name to the judges or officers of inferior courts, commanding

commanding them to certify, or to return the records of a cause depending before them; that the party may have the more sure and speedy justice before the king, or such justices as he shall assign to determine the cause. This writ is either returnable in the king's-bench, and then hath these words, "send to us;" or in the common bench and then has "to our justices of the bench;" or in the chancery, and then hath "in our chancery, &c." A writ of certiorari may be had at any time before trial, to certify and remove indictments, with all the proceedings thereon from any inferior court of criminal jurisdiction, into the court of king's-bench, the sovereign ordinary court of justice in causes criminal. And this is frequently done for one of four purposes, 1. To consider and determine the validity of appeals and indictments, and the proceedings thereon; and to quash or confirm them accordingly. 2. To have the prisoner or defendant tried at the bar of the courts, or before justices of Nisi Prius when it is surmised that a partial or insufficient trial will probably be had in the inferior court. 3. To plead the king's pardon in the court of king's-bench. 4. To issue process of outlawry against the offender, in those counties or places where the process of inferior judges will not reach him. 2 *H. P. C.* 210. 4 *Comm.* 320.

A certiorari lies in all judicial proceedings, in which a writ of error does not lie; and it is a consequence of all inferior jurisdictions, erected by act of parliament, to have their proceedings returnable in the king's-bench. But without laying a special ground before the court, it cannot be sued out to remove proceedings in an action from the courts of the counties palatine. *Doug.* 749. It does not lie to judges of oyer and terminer to remove a recognizance of appearance. *Lucas* 278. Nor to remove a poor's rate. *Stra.* 932, 975.

A certiorari lies to justices of the peace and others, even in such cases, which they are empowered by statute finally to hear and determine and the superintendency of the court of king's-bench is not taken away without express words. 2 *Hawk. P. C. c.* 27. That a certiorari does not lie to remove any other than judicial acts, see *Cald.* 309. Where a certiorari is by law grantable for an indictment, at the suit of the king, the court is bound to award it; for it is the king's prerogative to sue in what court he pleases: but it is at the discretion of the court to grant or not, in case of private prosecutions, and at the prayer of the defendant: and the court will not grant it for the removal of an indictment before justices of gaol-delivery, without some special cause; or where there is so much difficulty in the case, that the judge desires it may be determined in B. R. &c. *Burr.* 2456. Also on indictments of perjury, forgery, or for heinous misdemeanors, the court will not generally grant a certiorari to remove at the instance of the defendant. 2 *Hawk. P. C. c.* 27. But in particular cases, the court will use their discretion to grant a certiorari; as if the defendant be of good character, or if the prosecution be malicious or attended with oppressive circumstances.

Where issue is joined in the court below, it is a good objection against granting a certiorari: and if a person doth not make use of this writ till the jury are sworn, he loses the benefit of it. *Stat.* 43 *Eliz.* c. 5. After conviction, a certiorari may not be had to remove an indictment, unless there be special cause; as if the judge below is doubtful what judgment is proper to be given, then it may. *Stra.* 1227. *Burr.* 749. And after conviction, &c. it lies in such cases where writ of error will not lie, 1 *Salk.* 149. The court on motion in an extraordinary case will grant a certiorari to remove a judgment given in an inferior court; but this is done where the ordinary way of taking out execution is hindered in the inferior court. 1 *Lill. Abr* 253. In common cases a certiorari will not lie to remove a cause out of an inferior court, after verdict. It is never sued out after a writ of error, but where diminution is alleged: and when the thing in demand does not exceed 5*l.* a certiorari shall not be had, but a writ of error or attaint. Stat. 21 Jac. 1. cap. 23. 12 Geo. I. c. 29. A certiorari is to be granted on matter of law only: and in many cases there must be a judge's hand for it. 1 *Lill.* 252. Certioraris to remove indictments, &c. are to be signed by a judge: and to remove orders, the fiat for making out the writ must be signed by some judge. 1 *Salk.* 150. Certiorari lies to the courts of Wales; and the cinque ports, counties palatine, &c. 2 *Hawk. P. C. c.* 27.

Things may not be removed from before justices of peace, which cannot be proceeded in by the court where removed; as in case of refusing to take the oaths, &c. which is to be certified and enquired into, according to the statute. 1 *Salk.* 145. And, where the court which awards the certiorari cannot hold plea on the record, there but a tenor of the record shall be certified; for otherwise if the record was removed into B R. as it cannot besent back, there would be a failure of right afterwards. 1 *Danv. Abr.* 792. But a record sent by certiorari into B. R. may be sent after by mittimus into C. B. And a record into B. R. may be certified into chancery, and from thence be sent by mittimus into an inferior court, where an action of debt is brought into an inferior court, and the defendant pleads that the plantiff hath recovered in B. R. and the plantiff replies *Nul tiel record, &c.* 1 *Saund.* 97, 99.

The court of B. R. will grant a new certiorari to affirm a judgment, &c. though generally one person can have but one certiorari. *Cro. Jac.* 369. A certiorari may not be had to a court superior, or that has equal jurisdiction, in which case day is given to bring in the record, &c. There are several statutes which restrain, and many which absolutely prohibit, a certiorari; in order to avoid frivolous and unfounded delays in justice. By stat. 12 Car. II. no certiorari shall be allowed in certain cases of transgression of the excise laws. By stat. 13 Geo. III. c. 78, no presentment, &c. of any highway shall be removed from the sessions, until it be traversed, except the right to repair be the question. Or by stat. 5 and 6 W. and M. c. 11, may come in question. But this means on the part of the defendant only, for on the part of the prosecution it lies before. No other proceedings under the highway-act may be removed by certiorari. But, if the sessions manifestly exceed their authority in making orders, they may be removed into the king's bench by certiorari and quashed. *Leach's Hawk.* P. C. ii. c. 27. By stat. 16 Geo. III. against deer-stealers, no certiorari shall issue, unless the party convicted shall become bound to the prosecutor in 200l. to pay full costs and damages within thirty days, and to the justice in 60l. to prosecute the certiorari with effect. But in appeal to the sessions, he may sue out a certiorari on six days' notice to prosecute. And the like in effect is enacted by stats. 4 and 5 W. and M. c. 23, concerning game. Also by stat. 1. An. c. 12. concerning the repair of bridges, no certiorari shall be allowed. Nor by stat. 8 Geo. II. for punishing destroyers of turnpikes. Nor by 12 Geo. II. for assessing county rates. Nor on 19 Geo. II. against cursing and swearing. Nor on 23 Geo. II. against seducing artificers. Nor on 25 Geo. II. against bawdy-houses. Nor on 29 Geo. II. against stealing lead, iron, &c. Nor on 30 Geo. II. for preserving fish in the Thames. Nor on 30 Geo. II. for restraining gaming in public houses. Nor on 31 Geo. II. for regulating bread. Nor on 2 Geo. III. for preventing thefts in bumb-boats. Nor on 10 Geo. III. against dog-stealers.

By stat. 1 and 2 P. and M. c. 13, no certiorari shall be granted to remove any recognizance, unless signed by the chief justice, or in his absence by one of the other judges. By stats. 5 and 6 W. and M. and 8 and 9 W. 3. a certiorari may be granted in vacation time by any of the judges of B. R. and security is to be found before it is allowed. No certiorari is to be granted out of B. R. to remove an indictment, or presentment, before justices of peace at the sessions before trial, unless motion be made in open court, and the party indicted find security by two persons

persons in 20l. each to plead to the indictment in B. R. &c. And, if the defendant prosecuting the certiorari be convicted, the court of B. R. shall order costs to the prosecutor of the indictment. In case of certiorari granted in vacation, the name of the judge and party applying to be indorsed on the writ. If on a certiorari to remove an indictment the party do not find manucaptors in the sum of 20l. to plead to the indictment and try it, according to the statute, it is no supersedeas. *Mod. Ca.* 33.

Certiorari, to remove convictions, orders or proceedings of justices, to be applied for within six calendar months, and upon six days' notice to the justices. 13 *Geo.* II. c. 18. It is said a certiorari to remove an indictment is good, although it bear date before the taking thereof: but on a certiorari the very record must be returned, and not a transcript of it; for if so, then the record will still remain in the inferior court. 2 *Lil.* 253. In B. R. the very record itself of indictments is removed by certiorari; but usually in chancery. if a certiorari be returnable there, it removes only the tenor of the record; and therefore, if it be sent from thence into the king's bench, they cannot proceed either to judgment or execution, because they have but such tenor of the record before them. 2 *Hale's Hist. P. C.* 215. In London a return of the tenor only is warranted by the city charters. 2 *Hawk. P. C.* c. 27. If a certiorari be prayed to remove an indictment out of London or Middlesex, three days' notice must be given the other side, or the certiorari shall not be granted. *Raym.* 71.

After a certiorari is allowed by the inferior court, it makes all the subsequent proceedings, on the record that is removed by it, erroneous. 2 *Hawk. P. C.* c. 27. But, if a certiorari for the removal of an indictment before justices of peace be not delivered before the jury be sworn for the trial of it, the justices may proceed. And the justices may set a fine to complete their judgment after a certiorari delivered. *Ld. Raym.* 1515. A certiorari removes all things done between the teste and return. And, as it removes the record itself out of the inferior court, therefore, if it remove the record against the principal, the accessary cannot be tried there. 2 *Hawk. P. C.* c. 29. And, if the defendant be convicted of a capital crime, the person of the defendant must be removed by habeas corpus, in order to be present in court, if he will move in arrest of judgment. And herein the case of a conviction differs from that of a special verdict. *Burr.* 930. Although, on a habeas corpus to remove a person, the court may bail or discharge the prisoner; they can give no judgment upon the record of the indictment against him, without a certiorari to remove it, but the same stands in force as it did, and new process may issue upon it. 2 *H. P. C.* 211. If an indictment be one, but the offences several, where four persons are indicted together; a certiorari to remove this indictment against two of them, removes it not as to the others, but as to them the record remains below. 2 *Hale's Hist.* 214. If a cause be removed from an inferior court by certiorari, the pledges in the court below are not discharged; because a defendant may bring a certiorari, and thereby the plaintiff may lose his pledges. *Skin. Rep.* 244. A certiorari from the king's bench is a supersedeas to restitution in a forcibly entry. 1 *Hawk. P. C.* c. 64.

The return of a certiorari is to be under seal: and the person to whom a certiorari is directed may make what return he pleases, and the court will not stop the filing of it, on affidavit of its falsity, except where the public good requires it: the remedy for a false return is action on the case, at the suit of the party injured; and information, &c. at the suit of the king. 2 *Hawk. P. C.* c. 27.

If the person to whom the certiorari is directed, do not make a return, then an alias, then a pluries, *vel causam nobis significes quare*, shall be awarded, and finally an attachment. *Cromp.* 116.

Form of a Certiorari.—"George III. &c. To the mayor and sheriffs of our city of Exeter, and to every of them, in our court at the Guildhall there, greeting: Whereas A. B. hath lately in our said court in the said city, according to the custom of the same court, impleaded C. D. late of, &c. in an action of debt upon demand of thirty pounds; and thereupon, in our said court before you, obtained judgment against the said C. for the recovery of the said debt: and we, being desirous for certain reasons, that the said record should by you be certified to us, Do command you, that you send under your seals the record of the said recovery, with all things touching the same, into our court before us at Westminster, on the day, &c. plainly and distinctly, and in as full and ample manner as it now remains before you, together with this writ; so that we on the part of the said A. may be able to proceed to the execution of the said judgment, and do what shall appear to us of right ought to be done." Witness, &c.

The return of a certiorari may be thus. First, on the back of the writ indorse these or similar words, "The execution of this writ appears in a schedule to the same writ annexed." Which schedule must be on a piece of parchment, (not paper, 1 *Barn. K. B.* 113,) by itself, and filed to the writ.

CER'TITUDE, *s.* [*certitudo*, Lat.] Certainty; freedom from doubt; infallibility of proof:

They thought at first they dream'd: for 'twas offence
With them, to question *certitude* of sense. *Dryden.*

CERTO'SA, a celebrated Carthusian monastery, in the territory of the Pavese, in the duchy of Milan, four miles from Pavia: its park is surrounded with a wall twenty miles in circumference, inclosing several small towns and villages.

CERVAN'TES. See SAAVEDRA.

CERVA'RIA, *s.* in botany. See ATHAMANTA and TRACHELIUM.

CERVA'RO, a town of Italy, in the kingdom of Naples, and province of Principato Citra: nine miles east-north-east of Policastro.

CERU'CHIS, *s.* in botany. See SPILANTHES.

CER'VERA, a river of Spain, which runs into the Segre, a little above Lerida, in Catalonia.

CER'VERA, a town of Spain, and capital of a viguery, to which it gives name, in the province of Catalonia. Here is an university, founded in 1717: seven leagues north-west of Tarragona.

CER'VERA, a town of Spain, in the province of Catalonia, situated on the coast of the Mediterranean, between Roses and Collioure.

CER'VERA, a town of Spain, in New Castile: six leagues from Cuença.

CERVET'TO, father to the celebrated violoncello performer of that name, and an extraordinary character in the musical world, came to England in the hard frost, and was then an old man. He soon after was engaged to play the bass at Drury-lane theatre, and continued in that employment till the era of Mr. Garrick's retiring from the stage. He died June 14, 1783, in his 103d year.

CER'VI, a small island of the Grecian Archipelago, near the coast of the Morea, on the east side of the entrance into the Gulf of Kolokitia: six miles north of Cerigo.

CER'VIA, a modern built town of Italy, in the province of Romania, near the Adriatic Sea, from whence canals are cut to admit the sea-water, which is here evaporated, and great quantities of salt made. It is the see of a bishop, suffragan of Ravenna: fifteen miles south-south-east of Ravenna, and 144 north of Rome.

CERVIA'NA, *s.* in botany. See PHARNACEUM.

CER'VICAL, *adj.* [*cervicalis*, Lat.] Belonging to the neck.—The aorta, bending a little upwards, sends forth the *cervical* and axillary arteries; the rest, turning down again, forms the descending trunk. *Cheyne.*

CERVICA'RIA, *s.* in botany. See CAMPANULA.

CERVIE'RES, a town of France, in the department of the Rhône and Loire: six leagues south-west of Roanne.

CERVINA'RA, a town of Italy, in the kingdom of Naples, and province of Principato Ultra: twelve miles south-west of Benevento.

CERVIO'NE, a town of the island of Corsica: twenty miles east of Corte.

CERVISPI'NA, *s.* in botany. See RHAMNUS.

CER'VON, a town of France, in the department of the Nyevre, and chief place of a canton, in the district of Corbigny: three miles east of Corbigny.

CERU'LEAN, or CERULEOUS, *adj.* [*cæruleus*, Lat.] blue; sky-coloured.—It afforded a solution with now and then a light touch of sky colour, but nothing near so high as the *ceruleous* tincture of silver. *Boyle.*

From thee the saphire solid ether takes
Its hue *cerulean.* *Thomson.*

CERULI'FIC, *adj.* Having the power to produce a blue colour.—The several species of rays, as the rubific, *cerulific*, and others, are separated one from another. *Grew.*

CERU'MEN, *s.* [Lat.] The wax or excrement of the ear. Its use is, to inviscate and stop insects from entering and irritating the membrana tympani. It is separated from the glands in that part of the ear where it is found; and is fluid when first discharged, but soon thickens by drying. Wax, under some circumstances, is found to occasion deafness.

CE'RUSE, *s.* [*cerussa*, Lat. from κηρος, wax, or from רצאז *razaz*, Arab. white-lead, or white paint.] A calx of lead produced by exposing this metal to the vapours of vinegar. To prepare this colour, the lead is cast into plates about one twentieth part of an inch thick, four or five inches wide, and two feet long. These are rolled up in a spiral form, in such a manner that the space of half an inch is left between each revolution. They are then placed in earthen pots which have three projections within, to prevent them from resting on the bottom. Some good vinegar is then poured in, so as to reach no higher than the lower edge of the leaden spiral, and the pots are then buried in dung beneath sheds. A great number of these are disposed beside each other, each pot being covered with a leaden plate and boards, by which contrivance the number of pots is multiplied by placing them above each other in strata. At the expiration of a month or six weeks they are taken out, and the white lead separated by unrolling the coils. It is then ground in mills, and dried in the shade for use. Some writers distinguish this calx by the name of white-lead, and apply the term ceruse to denote a mixture of white-lead and chalk. Lead is found native in the form of ceruse, or the white calx.

A patent for two new and ingenious methods of making *ceruse* or white-lead, was granted on the 18th of August 1797, to Archibald earl of Dundonald, the process whereof is described as follows: "Lead is to be brought to the state of a calx or oxide, the calx is to be mixed with muriat of potash or sal digestivum Sylvii, or with the oxygenated muriat of potash, or with the solution of either of these salts, in the proportion which shall be found requisite; this, for the most part, may be reckoned at one part of salt, by weight, to five parts of the calx of lead. The materials are to be intimately mixed by grinding, or otherwise, and are to be stirred at different times, to expose fresh surfaces to the action of the air; and are to be alternately wetted with water, (either impregnated, or not, with fixable air or carbonic acid,) and dried by exposure to atmospheric air, or to any air in which carbonic acid is contained, until the complete action of the materials, the one on the other, is effected: in this state, they consist of a ceruse or white-lead or carbonat of lead, and muriat of potash. The muriat of pot-ash is, by washing, to be separated from the ceruse or white-lead; to be concentrated by evaporation; and to be preserved, to act again on more of the calces of lead. Lastly, the white-lead is to be ground, levigated, and dried. It is proper here to state, that muriat of potash or salt of Silvius has, in most chemical treatises, been represented to be of little or no use in the arts; and, as it is a salt which very rarely occurs as a residuum from chemical mixtures or combinations, it might the more easily escape the notice and experiments of chemical persons, or of persons in search of discoveries connected with different branches of manufacture. Muriat of potash possesses properties different from muriat of soda or sea-salt: and, in the present instance, produces a change on the calces of lead, not effected when muriat of soda only is used. The application of muriat of potash to the calces of lead, for the production of ceruse or carbonat of lead, is not therefore to be confounded with the attempts of others to produce a carbonat of lead, by the mixture of muriat of soda with the calces of lead. When the muriat of potash, or, more properly speaking, its solution, is mixed with the calx of lead, a change takes place; the vegetable alkali of the muriat of potash is disengaged in a caustic state, while the muriatic acid enters into combination with the calx of lead, and forms muriat of lead. By the exposure of the materials to atmospheric air, or to air containing the carbonic acid, this acid is attracted by the caustic vegetable alkali, and, as it is received, is transmitted to the lead, forming therewith a carbonat of lead or ceruse; while, in return, the alkali takes back, from the muriat of lead, the muriatic acid, in a state more oxygegenated than that in which it existed in the muriat of potash when first applied. The muriat of pot-ash recovered is to be applied for making, with the calces of lead, more ceruse or carbonat of lead. It has been found most advantageous not to use the calx of lead very highly calcined: in this highly calcined state, I generally use a small proportion of lead in a metallic state along with the calx. The process of mixing lead with the calx or calces of lead, for making, with muriat of potash, ceruse or carbonat of lead, is to be included under the patent to which this specification refers. And I do hereby farther declare, that the other method or process for making ceruse or white-lead, for which the letters patent herein before recited have been obtained, is as follows: that is to say, in this method or process, muriat of soda or sea-salt is to be substituted for muriat of potash, and it, or its solution, is to be mixed in the same manner, with the calx or calces of lead, as in the first process or method herein before mentioned. To this mixture, after the proper degree of action has taken place, a sufficient quantity of vegetable alkaline salt is to be added, to give or procure to the lead the carbonic acid, which is more speedily done when the vegetable alkali is in a state of carbonat. The salts are then to be separated from the ceruse or carbonat of lead, by washing off the two salts, consisting of soda or mineral alkali, and muriat of pot-ash; or the soda may be separated before the pot-ash is added to the materials. Lastly, the ceruse or carbonat of lead is to be levigated, and dried. The muriat of pot-ash, when separated, is to be preserved, and applied to operate on more of the calx or calces of lead; and this comes under the description given in the first method or process herein before mentioned."

A patent was also granted to Mr. John Wilkinson, of Castle-head in Lancashire, on the 18th of June 1799, for the following method of making white-lead; which he describes thus: "Instead of corroding blue lead, by vinegar, in pots, with the heat of dung or bark, according to the present method of making it, I take litharge, and grind it exceeding fine in sea-water, or any other saline mixture; and, by repeated trituration, washing, and bleaching, ceruse or white-lead of the best quality, is obtained. The ceruse may be procured without the acid mixture, which is merely used to facilitate the process: levigation, repeated washings, and drying, being sufficient, upon allowing more time for the operation, by the medium of the common air.

The Camelopardalus, or Giraffe.

CE'RUSE of ANTIMONY. A white calx of this semi-metal, which separates from the water in which diaphoretic antimony has been washed.

CER'VUS, *s.* [κερας, from κερας, a horn, because of the exuberance of its horns.] The DEER; a genus of quadrupeds belonging to the order of pecora. The generic character are as follow: Horns solid, and mostly branching; which fall off, and are renewed every year. The lower jaw has eight fore-teeth; in general this genus wants tusks, but sometimes one tusk is found on each side in the upper jaw. The animals of this genus are all fond of living in woods; they fight with their horns, and strike with their fore feet; they are said to have no gall bladder; their flesh is universally wholesome, and that of some kinds, under the name of venison, is esteemed a great delicacy; some species are used by mankind for draught. Mr. Pennant has subdivided the genus into such as have the horns palmated, that is, spread out into broad flat boards, having processes or projections, named snags, fancifully supposed to resemble fingers, and the broad part to have some likeness to the palms of the hands; hence the name; and such as have rounded horns, likewise branched. It may be necessary to explain a few terms used in describing the horns of this genus: the beam is that part of the horn which rises from the forehead, like the stem of a tree; the palms are broad flat expansions of the horns in some species, which are beset round with processes like fingers, called snags; the branches are subdivisions of the horns, like those of trees; the brow antlers are particular processes in some species, which arise from the beams near the head, and project forwards. The horns grow from the points, and, when growing, are covered with a skin which is extremely vascular, and clothed with a fine velvet fur; from which circumstance the growing horns are named velvets; this skin dries, shrivels, and falls off, when the horns have attained their full size.

1. Cervus Camelopardalus, or giraffe; a very singular animal, having simple persistent horns, covered with skin, blunt and abrupt at the ends, and terminated with a tuft of black hair. In the lower jaw are eight broad, thin, fore-teeth; the outermost, in each side, being deeply divided into two lobes. It inhabits Senniar, Ethiopia, and the interior parts of Africa; though rarely in Abyssinia, and is never found in Guinea; it extends southwards to the country of the Hottentots behind the Cape of Good Hope. It feeds chiefly on the leaves and tender shoots of trees, but likewise grazes occasionally, at which time it is obliged to spread its fore feet very wide. It is gentle, timid, and shy; runs very aukwardly, and is easily taken, but is very scarce and rarely met with; when about to lie down, it kneels like the camel; when standing erect and holding up its head, it measures seventeen feet from the crown of the head to the ground, eighteen feet from the point of the nose to the end of the tail; it is only nine feet high at the rump, the neck is seven feet long, and the distance from the withers to the rump is six feet. This is a very handsome animal, of a mixed reddish and white colour, marked with numerous large dusky spots; the head somewhat resembles that of a horse, having middle-sized, erect, pointed, ears, and short erect horns about six inches long, which are covered with a hairy skin; these are blunt, as if cut off at the ends; the neck is long, thin, and erect, and is provided on the ridge with a short erect mane, which extends quite down to the back; the tail is long and round, reaching to the second joint of the hind legs, and is tufted with long, flowing, coarse hairs at the end. It is a vulgar error that the fore legs are longer than those behind, for the great disproportion between the height of the fore and hind parts, depends on the great depth of the shoulders, and the length of the neck.

M. le Vaillant, in his travels through the southern parts of Africa, gives the following account of this curious animal: "The giraffe has an undoubted pre-eminence over all other quadrupeds in respect to its height, reckoning from the point of the hoof to the tip of its horns: I use this expression to make myself understood; for, strictly speaking, the animal has no horns; but what are usually so termed, is simply a projection, or a continuation of two portions of the cranium, arising perpendicularly and parallel to each other between the ears, and about eight or nine inches in height. This projection terminates with a convex surface, edged with a tuft of straight bristly hairs. The female has four teats, and is smaller than the male. We are not to estimate this animal's strength in proportion to its size. It seems to consist of little more than neck and legs; the contrast, also, between the anterior and posterior parts, is equally remarkable. About the shoulders it is thick, deep, and strong; but the form of its posteriors is so thin and meagre, that they do not appear to be made for each other. The figure of this animal given in several authors is inaccurate; they represent the horns terminating in a point, and extend the hair from the shoulders to the origin of the tail, which are both contrary to fact."

The giraffe was known to the Romans in the early period of their history; it appears among the figures in the assemblage of *eastern* animals on the celebrated Prænestine pavement, made by the direction of Sylla, and is represented both grazing and browzing, in its natural attitudes. It was exhibited at Rome by Cæsar, among other animals in the Circæan games; and is finely and justly described by Oppian.

2. Cervus Alces, the elk; an inhabitant of Europe, America, and Asia as far as Japan. This animal is chiefly found in the northern parts of both continents, and frequents poplar woods and other forests, browzing on the twigs and branches of trees; the likewise often feed on marshy plants, and are said to be very fond of the anagyris fœtida, or stinking bean-trefoil. The elk is larger than a horse, measuring from fifteen to seventeen hands high; the head is coarse and large, with very long, upright, flouching, ears; a very broad, square, upper lip, deeply furrowed, and hanging much over the mouth; a very broad nose, with large nostrils; the horns have no brow antlers, the palms are very broad, plain on the inside, and having many sharp snags on the outside; the neck is short and flouching, with a short upright mane, and a hairy wattle on the throat; the shoulder is very high; the tail extremely short; the hoofs are much divided, and the spurious hoofs large and loose: the general colour is a hoary black, but greyest about the face. It is a mild animal, except in the season of love, when wounded, or when teazed with the gad-fly. Its pace is very ungraceful, consisting of a high shambling trot, during which their spurious hoofs make a loud rattling noise; but they go with great swiftness, and were formerly used in Sweden to draw sledges, with which they have been known to travel more than fifty miles a day. The hide is said to be so thick as to turn a musket-ball, and makes excellent buff leather. The flesh is very light and nourishing; the nose is esteemed a great delicacy; and the tongues, when salted, are much admired. Mr. Pennant mentions a species of elk, the horns of which are frequently dug up from peat-bogs in Ireland, but the living animal is unknown, having long been extirpated from that country; the horns are vastly larger than those of the elk, besides being very differently formed, and measure sometimes eight feet long each, and fourteen feet between their tips.

3. Cervus Tarandus, the rein deer; has long, rounded, slender, horns, which bend forwards, and are palmated at the ends. There are several varieties; as the common rein deer; the Greenland rein deer; the Canadian rein deer, &c. It chiefly inhabits the most northern mountains of Europe, Asia, and America, as far as Spitsbergen, Greenland, and Kamtschatka; it is found likewise in the more southern parts of Russia, and even in Sardinia, tho' smaller; the horns have likewise been found in marle pits in Scotland. In Lapland the wild rein deer inhabit the highest

highest mountains during summer, and descend into the desert plains in winter, from which they are again driven to the mountains in the summer to escape from the persecution of various insects. They feed much on a species of liver-wort called from them lichen rangiferinus, especially in winter, when they have to dig it out with their feet from below the snow, under which it lies buried. The male casts his horns immediately after the rutting season, about the end of November; and the female, which has horns like the male, though not so large, preserves hers till the middle of May, when she drops her fawns. She goes thirty-three weeks with young, and frequently has twins. In a domesticated state, the rein deer rarely exceeds sixteen years of age. When castrated, the male seldom loses his horns till nine years old. In a domestic state they are about three feet high, but the wild animals grow larger, sometimes four and a half feet at the shoulder. The horns of the rein deer, though long, are rather slender; the beams are very long, bend first a little backward, are then gradually curved, and the palms at the ends stand forwards; the brow antlers rise from the main beams close to the head, have short beams, broad palms, and numerous snags; and generally over these a branch rises from each main beam, which projects forwards, and is somewhat palmated at the end, with several snags. The upper parts of the body are of a brown ash colour, growing gradually lighter with age, till it becomes white at last; the space round the mouth, the whole under parts of the body, and the tail, are white; the orbits are surrounded with black; the fur is very thickly set, and on the fore part of the neck it is long and pendent; the tail is very short; the hoofs are large and concave; the male prepuce is much pendent; the female has six teats, the two posterior of which are impervious. To the Laplanders it is a substitute for the horse, the cow, the goat, and the sheep; and is their only wealth. The milk of the rein affords them cheese; the flesh, food; the skin, clothing; the tendons, bow-strings; and, when split, thread; the horns, glue; the bones, spoons. During the winter it supplies the want of a horse, and draws their sledges with amazing swiftness over the frozen lakes and rivers; or over the snow, which at that season covers the whole country. In running it makes a great clatter with the collision of the spurious hoofs, which are large and loose. It does not gallop in the manner represented by Mr. Ridinger, in the 35th plate of his Wilden Thiere; but has a rapid running pace. A rich Laplander is possessed of a herd of 1000 reins. In autumn they seek the highest hills, to avoid the Lapland gadfly, which at that season deposits its eggs in their skin; and is the pest of these animals, for numbers die that are thus visited. The moment a single fly appears, the whole herd instantly perceives it: they fling up their heads, toss about their horns, and at once attempt to fly for shelter amidst the snows on the loftiest Alps.

4. Cervus Dama, the fallow deer; with the horns compressed, branched, and bending forwards; having their extremities palmated. It inhabits Europe, and Asia as far as the northern parts of Persia and China, Greece, and Palestine, being the Jachmur of the Scriptures. This species is not so plentiful or universal as the stag; few are now found wild in Britain; but numbers are kept in parks, of which it forms the common stock. The colour varies, being sometimes reddish, sometimes deep brown, frequently spotted with white or grey, and rarely altogether white. It is gregarious, feeding always in flocks; is very easily confined to parks, and very readily made tame; it seldom lives above twenty years. The doe, or female, has no horns, goes eight months with young, and brings only one fawn in general, seldom two, and hardly ever three, at a birth. Though they leap remarkably well, yet they may either be kept in an inclosure, or fenced out by means of a cord fixed horizontally two or three feet above the ground.

5. Cervus Elaphus, the stag; distinguished by long, rounded, upright, branched, horns. Of this there are several varieties; as the maned or German stag, with a long shaggy mane on the lower part of the neck; the Corsican stag, with straight antlers; the Canadian stag, with very large horns; the Chinese stag, &c. These several varieties inhabit Europe, Barbary, the north of Asia as far as Japan, and North America. The colour is generally a reddish brown, with some black about the face, and a black list down the hind part of the neck and between the shoulders. In spring, they shed their horns, which fall off spontaneously, or by rubbing them against the branches of trees. It is seldom that both horns fall off at the same time, the one generally preceding the other a day or two. The old stags cast their horns first, which happens about the end of February or beginning of March. An aged stag, or one in his seventh year or upwards, does not cast his horns before the middle of March; a stag of six years sheds his horns in April; young stags, or those from three to five years old, shed their horns in the beginning, and those which are in their second year not till the middle or end, of May. But in all this there is much variety; for old stags sometimes cast their horns sooner than those which are younger. Besides, the shedding of the horns is advanced by a mild, and retarded by a severe and long, winter. When the stags have cast their horns, they separate from each other, the young ones only keeping together. They no longer haunt the deep recesses of the forest, but advance into the cultivated country, and remain among brushwood during the summer, till their horns are renewed. In this season, they walk with their heads low, to prevent their new horns from rubbing against the branches; for they continue to have sensibility till they acquire their full growth. The horns of the oldest stags are not half completed in the middle of May, and acquire not their full length and hardness before the end of July. Those of the younger stags are proportionally later both in shedding and being renewed. Soon after they have recovered their horns, they begin to feel the impressions of love. Towards the end of August or beginning of September, they leave the coppice, return to the forests, and search for the hinds. They cry with a loud voice; their neck and throat swell; they become perfectly restless, and traverse in open day the fields and the fallow grounds; they strike their horns against trees and hedges; in a word, they seem to be transported with fury, and run from one forest to another, till they find the female, whom they pursue and compel into compliance; for the female at first avoids and flies from the male, and never submits till she be fatigued with the pursuit. The old hinds likewise come in season before the younger ones. When two stags approach the same hind, they usually fight before they enjoy. If nearly equal in strength, they threaten, paw the ground, set up terrible cries, and attack each other with such fury, that they often inflict mortal wounds with the strokes of their horns. The combat never terminates but in the defeat or flight of one of the rivals. The conqueror loses not a moment in enjoying his victory, unless another rival approaches, whom he is again obliged to attach and repel. The oldest stags are always masters of the field; because they are stronger and more furious than the young ones, who wait patiently till their superiors tire, and quit their mistresses. Sometimes, however, the young stags accomplish their desires while the old ones are fighting, and, after a hasty gratification, fly off. The hinds prefer the old stags, not because they are most courageous, but because they are most ardent. They are likewise more inconstant, having often several females at a time; and, when a stag has but one hind, his attachment to her does not continue above a few days: he then leaves her, goes in quest of another, with whom he remains a still shorter time; and in this manner he passes from one to another till he is perfectly exhausted. This paroxysm of love lasts only three weeks, during which the stags take very little food, and neither sleep nor rest. Night and day they are either walking, running,

1. The Common Stag. 2. The maned or Gomer Stag.

running, fighting, or enjoying the hinds. Hence, at the end of the season, they are so meagre and exhausted, that they recover not their strength for a considerable time. They generally retire to the borders of the forests, feed upon the cultivated fields, where they find plenty of nourishment, and remain till their strength is re-established. The rutting season of old stags, commences about the beginning, and ends about the 20th, of September. In those of six or seven years old, it begins about the 10th of September, and concludes in the beginning of October. In young stags, or those in their third, fourth, or fifth year, it begins about the 20th of September, and terminates about the 15th of October; and, at the end of October, the rutting is all over, excepting among the prickets, or those which have entered into their second year; because they, like the young hinds, are latest of coming into season. Hence, at the beginning of November, the season of love is entirely at an end; and the stags, during this period of weakness and lassitude, are easily hunted down. The hinds go with young eight months and some days, and seldom bring more than one fawn at a time. They bring forth in May or the beginning of June, and so anxiously conceal their fawns, that they often expose themselves to be chased, with a view to draw off an enemy, and afterwards return to take care of their young, which they likewise hide from the stag, who would destroy it. All hinds are not fertile; for some of them never conceive. These barren hinds are grosser and fatter than those which are prolific, and also come soonest in season. The young are not called fawns or calves after the sixth month: the knobs of their horns then begin to appear, and they take the name of knobbers till their horns lengthen into spears, and then they are called brocks or staggards. During the first season they never leave their mothers. In winter, the stags and hinds, of all ages, keep together in flocks, which are more numerous in proportion to the rigour of the season. They separate in spring: the hinds retire to bring forth; and, during this period, the flocks consist only of knobbers and young stags. In general, the stags are inclined to associate, and nothing but fear or necessity obliges them to disperse.

The life of the stag is spent in alternate plenty and want, vigour and debility, health and sickness, without having any change introduced into his constitution by these opposite extremes. He lives as long as other animals which are not subjected to such vicissitudes. As he grows five or six years, he lives seven times that number, or from thirty-five to forty years. What has been reported concerning the extraordinary longevity of the stag, merits no credit. It is only a popular prejudice which prevailed in the days of Aristotle, and which that philosopher considered as improbable, because neither the time of gestation, nor of the growth of the young stag, indicated such long life. This authority ought to have abolished the prejudice; but it has been renewed, in the ages of ignorance, by a fabulous account of a stag taken by Charles VI. of France, in the forest of Senlis, with a collar, upon which was written this inscription, *Cæsar hoc me donavit*. The love of the marvellous inclined men to believe that this animal had lived a thousand years, and had his collar from a Roman emperor, rather than to suppose that he came from Germany, where all the emperors took the name of Cæsar. The stag has a fine eye, an acute smell, and an excellent ear. When listening, he raises his head, erects his ears, and hears from a great distance. When he is going into a coppice, or other half covered place, he stops to look round him on all sides, and scents the wind, to discover if any object is near that might disturb him. He is a simple, and yet a curious and crafty, animal. When hissed or called to from a distance, he stops short, and looks stedfastly, and with a kind of admiration, at carriages, cattle, or men; and, if they have neither arms nor dogs, he moves on unconcernedly, and without fear. He appears to listen, with great tranquillity and delight, to the shepherd's pipe; and the hunters sometimes employ this artifice to encourage and deceive him. In general, he is less afraid of men than of dogs, and is never suspicious, or uses any arts of concealment, but in proportion to the disturbances he has met with. He eats slow, and has a choice in his aliment; and, after his stomach is full, he lies down, and ruminates at leisure. He seems to ruminate with less facility than the ox. It is only by violent shakes that the stag can make the food rise from his first stomach. This difficulty proceeds from the length and direction of the passage through which the aliment has to go. The neck of the ox is short and straight, but that of the stag is long and arched; and therefore greater efforts are necessary to raise the food. These efforts are made by a kind of hiccup, the movement of which is apparent, and continues during the time of rumination. His voice is stronger, and more quivering, in proportion as he advances in years. The voice of the hind is shorter and more feeble. She never bellows from love but from fear. The stag, during the rutting season, bellows in a frightful manner: he is then so transported, that nothing disturbs or terrifies him. He is therefore easily surprised; as he is loaded with fat, he cannot keep long before his pursuers. But he is dangerous when at bay, and attacks the hounds with a species of fury. He drinks none in winter nor in spring, the dews and tender herbage being then sufficient to extinguish his thirst; but, during the parching heats of summer, to obtain drink, he frequents the brooks, the marshes, and the fountains; and in the season of love, he is so over heated, that he searches every where for water, not only to satisfy his immoderate thirst, but to bathe and refresh his body. He then swims easier than at any other time, on account of his fatness. He has been observed crossing very large rivers. It has even been alledged, that, attracted by the odour of the hinds, the stags, in the rutting season, throw themselves into the sea, and pass from one island to another, at the distance of several leagues. They leap still more nimbly than they swim; for, when pursued, they easily clear a hedge or a pale fence of six or seven feet high. Their food varies in different seasons. In autumn they search for the buds of green shrubs, the flowers of broom or heath, the leaves of brambles, &c. During the snows of winter, they feed upon the bark, moss, and excrescences of trees; and, in mild weather, they browse in the wheat fields. In the beginning of spring, they go in quest of the catkins of the trembling poplar, willow, and hazel-trees, the flowers and buds of the cornel tree, &c. In summer, when they have great choice, they prefer rye to all other grain, and the black berry-bearing alder to all other shrubs. The flesh of the fawn is very delicate; that of the hind and knobber very good; but that of the stag has a strong taste. The skin and the horns are useful parts of this animal. The skin makes a pliable and very handsome and durable leather. The horns are used by cutlers, for knife handles, &c. and by chemists, for distilling the volatile alkali, called spirits of hartshorn.

In America, stags feed eagerly on the broad-leaved kalmia; yet that plant is a poison to all other horned animals; their intestines are found filled with it during winter. The American stags grow very fat: their tallow is much esteemed for making candles. The Indians hunt and shoot them. As they are very shy animals, the natives cover themselves with a hide, leaving the horns erect; under shelter of which they walk within reach of the herd. De Brie, in his history of Florida, gives a very curious representation of this artful method of chase, when it was visited by the French in 1564. Their skins are an article of commerce imported by the Hudson's-Bay Company; but they are procured far inland by the Indians, who bring them from the neighbourhood of the lakes. In Britain the stag is become less common than formerly; its excessive viciousness during the rutting season, has induced most people to part with the species. Stags are still found wild in the Highlands of Scotland,

in herds of 4 or 500 together, ranging over the vast hills of the north. Formerly the great Highland chieftains used to hunt with the magnificence of an eastern monarch, assembling 4 or 5000 of their clan, who drove the deer into the toils or to the stations the lairds had placed themselves in: but, as this pretence was frequently used to collect their vassals for rebellious purposes, an act was passed prohibiting any assemblies of this nature. Stags are likewise met with in Ireland on the mountains of Kerry, where they add greatly to the magnificence of the romantic scenery round the lake of Killarney. The stags of Ireland during its uncultivated state, and while it remained an almost boundless tract of forest, had an exact agreement in habit with those that range at present through the wilds of America. They were less in body, but very fat; and their horns of a size far superior to those of Europe, but in form agreed in all points. The Siberian stags grow to a monstrous size; but in Russia they are extirpated. Their attachment to music has been noticed by our poet Waller, and by other writers. Playford, in his introduction to music, has the following curious remark: "Myself," says he, "as I travelled near Royston, met a herd of stags, about twenty, on the road, following a bagpipe and violin; which, while the music played, they went forward, but when it ceased, they stood still; and in this manner they were brought out of Yorkshire to Hampton-court." For the CHACE of the stag, see the article HUNTING.

6. Cervus Virginianus, the Virginian deer; has slender horns, bending much forwards, very slightly palmated at the extremities, with numerous branches on the interior edges, and having no brow antlers. It inhabits Carolina and Virginia; and has a considerable resemblance to the fallow deer, but is higher at the shoulders, and has a longer tail and longer legs; the colour likewise is lighter, being an ash-coloured or cinereous brown. It is gregarious, very restless, active, and easily domesticated; and in winter live much on the moss, or lichens, which grow on the trunks of trees. The flesh is dry, but useful to the Indians, who dry it for their winter provision. The skins are a great article of commerce, and make excellent pliable leather for gloves, &c. They are trained by the American Indians to decoy the wild deer, which they easily bring within musket-shot.

7. Cervus Axis, or deer, having erect rounded horns, with three snags or branches pointing upwards, and no brow antlers. Of this there are several varieties, viz.—The spotted axis, beautifully spotted with white: the horns are slender, and the first branch is near the base. This inhabits the banks of the Ganges and the island of Ceylon; it is about the size of a fallow deer; of a light red colour, beautifully marked with white spots, and having a white line along the lower part of the sides near the belly: the tail is longish, of a red colour above and white beneath. This animal is very easily tamed, and bears the climate of Europe, having bred at the Hague.—The middle axis, of an uniform light red colour: the horns rough, strong, and three-forked. Inhabits the dry hilly forests of Ceylon, Borneo, Celebes, and Java. Is about the size of a stag, being larger than the spotted axis; goes together in herds of several hundreds; and becomes very fat. The flesh is cut into small pieces, salted, and dried in the sun, for provision.—The white axis; resembles the former in every thing, except being entirely white. It inhabits with the former, and is esteemed a great rarity.—The larger axis; of a reddish brown colour, with very thick, large, strong, and rugged, three-forked horns. It inhabits the marshes of Borneo and Ceylon, and is as large as a horse; with whitish horns. The animals of this variety are called Elanden, or elks, by the Dutch, and Mejangan Banjee, or water stags, by the Javanese and Malays. Some of these are found among oxen, buffaloes, goats, hogs, &c. in Mindanao, Gilolo, Mandioly, Batchian, and the Papuas islands. The axis has the sense of smelling in a very nice degree, insomuch that, when tame, they will not eat bread which has been breathed on; they agree in this circumstance with several other animals of the same genus, and of the antelope and goat kinds.

8. Cervus Porcinus, the porcine deer; with slender three-forked horns; the upper parts of the body are brown, and the under parts ash coloured. It inhabits India and Borneo. The body is thick and clumsy, from which it had its name of hog deer; but the legs are fine and slender; the body and head measure three feet and a half long, is two feet two inches high at the shoulder, and two inches higher at the rump; the tail is eight inches long. It is caught in pit-falls, covered with some slight materials. There is another variety, called the hog stag, or spotted porcine deer; has slightly three-forked horns, the first snag being very near the head; the body is of a yellowish colour marked with white spots. It is said to have been brought from the Cape of Good Hope. This seems much the same with the porcine deer, described above, except the colour, and the spots: the size is very much the same; the nostrils are black, with a blackish band at the corners of the mouth; the colour of the head is mixed with grey, the fore-head and sides of the eyes being brown; the ears are very large, garnished within with white hairs, and on the outside covered with smooth brown hair, mixed with yellow; the top of the back is brownish; the tail is yellow above, and white below; and the legs are of a dark, or blackish, brown colour.

9. Cervus Muntjac, or rib-faced deer; has three longitudinal ribs extending from the horns to the eyes; and a tusk hanging out from each side of the upper jaw. It inhabits Java and Ceylon. This species is somewhat less than the roe, and resembles the porcine deer in shape. The horns are placed on a boney process, which rises three inches above the skull, and is covered with hair; they are three-forked, the uppermost snag or branch being hooked. In the Malay language it is called kidang, and munt-jak by the Javanese. It is very common, going about only in single families, and is much esteemed for its flesh.

10. Cervus Capreolus, the roe; has strong, short, rugged, upright, rounded horns, which are two-forked at the ends; the body is of a reddish brown colour; in size about four feet long; two feet three inches high before, and two feet seven inches high behind: weigh from fifty to sixty pounds. His figure is elegant and handsome; his eyes are brilliant, and more animated than those of the stag. His limbs are more nimble his movements quicker, and he bounds, seemingly without effort, with equal vigour and agility. His hair is always clean, smooth, and glossy. He never wallows in the mire like the stag, but delights in dry and elevated situations, where the air is purest. He conceals himself with great address, is most difficult to trace, and derives superior resources from instinct: for though he has the misfortune to leave behind him a stronger scent than the stag, which redoubles the ardour and appetite of the hounds, he knows how to withdraw himself from their pursuit, by the rapidity with which he begins his flight, and by his numerous doublings. He delays not his arts of defence till his strength fails him; but, as soon as he finds that the first efforts of a rapid chase have been unsuccessful, he repeatedly returns on his former steps: and after confounding, by these opposite movements, the direction he has taken, after intermixing the present with the past scent, he rises from the earth by a great bound, and, retiring to a side, he lies down flat on his belly; and, in this immoveable situation, he allows the whole troop of his deceived enemies to pass by him. The roe differs from the stag and fallow-deer in disposition, temperament, manners, and almost every natural habit. Instead of associating in herds, they live in separate families. The father, mother, and young, go together, and never mix with strangers. They are constant in their amours, and never

never unfaithful like the stag. As the females generally produce two fawns, the one male and the other female, these young animals, brought up and nourished together, acquire so strong an affection, that they never quit each other, unless one of them meets with a misfortune. This attachment is more than love; for, though always together, they feel the ardour of that passion but once a-year, and it continues only fifteen days, commencing at the end of October, and ending by the fifteenth day of November. They are not then, like the stag, overloaded with fat: they have no strong odour, no fury, in a word, nothing that can change the state of their bodies. During this period, they indeed suffer not their fawns to remain with them. The father drives them off, as if he meant to oblige them to yield their place to those which are to succeed, and to form new families for themselves. However, after the rutting season is past, the fawns return to their mother, and remain with her some time; after which they separate for ever, and remove to a distance from the place which gave them birth. The female goes with young twenty-two weeks, and brings forth about the end of April or beginning of May. She produces two at a time, which she also is obliged to conceal from the buck while very young. In ten or twelve days they acquire strength sufficient to enable them to follow her. When threatened with danger, she hides them in a close thicket, and, to preserve them, presents herself to every danger. Roe-bucks were formerly very common in Wales, and in the north of England, and in Scotland; but at present the species no where exists in Great Britain except in the Scottish highlands. In France they are more frequent; they are also found in Italy, Sweden, and Norway; and in Asia they are met with in Siberia. The first that are met with in Scotland are in the woods on the south side of Loch-Rannoch, in Perthshire; the last in those of Longwal, on the southern borders of Caithness; but they are most numerous in the beautiful forests of Invercauld, in the midst of the Grampian hills. They are unknown in Ireland. Wild roes, during summer, feed on grass; and are very fond of the *rubus saxatilis*, called in the Highlands the roe-buck berry; but in the winter, when the ground is covered with snow, they browse on the tender branches of the fir and birch. Charlevoix mentions roes in North America; but, as the other writers, Lawson, Catesby, Kalm, and Du Pratz, on the natural history of that country, do not speak of them, he is probably mistaken. There is a variety of this species called the white roe, exactly like the common roe, only that it is pure white, with black hoofs and nose. This animal, which is mentioned only by Buffon, is probably an accidental variety rarely to be seen.

11. Cervus Pygargus, the aha, or tail-less roe. It has no tail; and the horns are three-forked. It inhabits the woody mountains of Russia and Siberia beyond the Volga, and in Hircania. This species resembles the roe, but is considerably larger; it is of the same deep red colour, with a large bed of white on the rump and buttocks, extending up the back; the fur is excessively thick, and in spring is quite rough and erect; on the belly and limbs it is yellowish; the space round the nose, and the sides of the under lip, are black, but the point of the lip is white; the hairs of the eye-lids, and round the orbits, are long and black; the horns are very rugged at the bases, and full of knobs; the ears are covered on the inside with a very thick white fur. At the approach of winter, this animal becomes hoary, and descends into the plains; it is called dikeja roza by the Russians, saiga by the Tartars, which name is used in Russia for the Scythian antelope, and ahu, or aha, by the Persians.

12. Cervus Mexicanus, the Mexican deer; has strong, thick, rugged, horns, bending forwards, three-forked at their extremities, with one erect snag about two inches above the base: of a reddish colour. It inhabits New Spain, Guiana, and Brasil. This species is about the size of the roe; it is of a reddish colour, and is spotted with white when young. The head is large, with brilliant eyes, and a thick neck. The horns are apt to vary in the number of their branches; and the flesh is much inferior to other venison.

13. Cervus Guineensis, the grey deer; thus named by Mr. Pennant; and Guinea deer, by Dr. Gmelin; is an obscure species, and doubtful whether it belongs to the genus of deer, musk, or antelope, as the specimen described had no horns. It is only of the size of a cat, of a grey colour on the upper parts, and blackish underneath, having longish ears; with a large black spot above the eyes, a black line between the ears, a perpendicular black line on each side of the throat, the middle of the breast black, the fore legs and sides of the belly, as far as the hams, marked with black, and the under side of the tail black.

CER'VUS VO'LANS, a name given by some authors to the stag-fly, or horned beetle.

CE'RYX, *s.* the ancestor of the ceryces, a sort of public criers appointed to proclaim or publish things aloud in assemblies. The *ceryx* among the Greeks answered to the *præco* among the Romans; and in some measure to the *criers* of our courts. There were anciently two kinds of ceryces, *civil*, and *sacred*. The civil were appointed to call assemblies, and make silence therein; also to go on messages, and do the office of heralds. The sacred were a sort of priests, whose office was to proclaim silence in the public games and sacrifices, publish the names of the conquerors, proclaim feasts, &c. The priesthood of the ceryces was annexed to a particular family, the descendants of Ceryx, son of Eumolphus. To them it also belonged to lead the victims to slaughter; and, before the ceremonies began, they called silence in the assembly.

CE'SARE, *s.* among logicians, one of the modes of the second figure of syllogisms; the minor proposition of which is an universal affirmative, the other two universal negatives: thus,

Ce No immoral book ought to be read;
Sa But every obscene book is immoral;
Re Therefore no obscene books ought to be read.

CESARE'A, a town of Asiatic Turkey, in the province of Caramania: forty miles south-east of Yurcup.

CESARE'A, or COHANSEY CREEK, a river of North America, in the state of New Jersey, which runs into the Delaware: ten miles south-west of Bridge Town.

CESA'REAN, *adj.* The *Cesarean* section is cutting a child out of the womb, either dead or alive, when it cannot otherwise be delivered. Which circumstance first gave the name of *Cæsar* to the Roman family so called. See the article MIDWIFERY.

CESE'NA, a town of Italy, in the province of Romagna, the see of a bishop, suffragan of Ravenna: eighteen miles south of Ravenna, and twenty-five north-north-west of Urbino.

CESENA'TICA, a sea-port of Italy, in the Adriatic, in the province of Romagna, with a small harbour for fishing-boats: eight miles north-east of Cesena.

CE'SI, a town of Italy, in the province of Umbria: situated on the edge of a lofty mountain, or rock, exposed to the sun from its rising to its setting.

CE'SLES, a town of Hungary: five leagues north-north-east of Stul-Weissenburg.

CESPE'DES (Paul), a painter of Cordova, who acquired fame in the sixteenth century, both in Spain and Italy. His manner approaches to that of Corregio: the same exactness in the drawing, the same force in the expression, the same vigour in the colouring. It is impossible to contemplate without emotion his picture of the last supper in the cathedral of Cordova; where each of the apostles presents a different character of respect and affection for their master; who displays at once an air of majesty and kindness; and the Judas a false and malignant countenance. The talents of Cespedes were not wholly confined to painting; he was at the same time philosopher,

pher, antiquary, sculptor, architect; an adept in the Hebrew, Greek, Latin, Arabic, and Italian languages; a great poet, and a prolific author. He died in 1608, aged upwards of 70.

CESS, *s.* [probably corrupted from *cense*; see CENSE; though imagined by *Junius* to be derived from *saisire*, to seize.] A levy made upon the inhabitants of a place, rated according to their property.—The like *cess* is also charged upon the country sometimes for victualling the soldiers, when they lie in garrison. *Spenser.*—The act of laying rates. It seems to have been used by Shakespeare for bounds or limits, though it stand for rate, reckoning.—I pr'thee, Tom, beat Cutt's saddle, put a few flocks in the point; the poor jade is wrung in the withers out of all *cess*. *Shakespeare.*

To CESS, *v. a.* To rate; to lay charge on.—We are to consider how much land there is in all Ulster, that, according to the quantity thereof, we may *cess* the said rent, and allowance issuing thereout.

To CESS, *v. n.* To omit a legal duty. See CESSOR.

CES'SARES, a territory northward of Patagonia, in South America, in the 48th deg. of S. lat. inhabited by a mixed tribe of that name, descended from the Spaniards, being the people of three ships that were wrecked on this coast in 1540.

CESSA'TION, *s.* [*cessatio*, Lat.] A stop; a rest.—The day was yearly observed for a festival, by *cessation* from labour, and by resorting to church. *Hayward.*

True piety, without *cessation* tost
By theories, the practic part is lost. *Denham.*

Vacation; suspension.—The rising of a parliament is a kind of *cessation* from politics. *Addison.*—End of action; the state of ceasing to act.—The serum, which is mixed with an alkali, being poured out to that which is mixed with an acid, raiseth an effervescence; at the *cessation* of which, the salts, of which the acid was composed, will be regenerated. *Arbuthnot.*—A pause of hostility, without peace.—When the succours of the poor protestants in Ireland were diverted, I was intreated to get them some respite, by a *cessation*. *King Charles.*

CESSA'VIT, *s.* in law, a writ which lies by the stats. of Gloucester, 6 E. 1. and Westm. 2. 13 E. 1. when a man, who holds lands by rent or other services, neglects or ceases to perform his services for two years together; or where a religious house hath lands given it, on condition of performing some certain spiritual service, as reading prayers, or giving alms, and neglects it; in either of which cases if the cesser or neglect shall have continued for two years, the lord or donor and his heirs shall have a writ of *cessavit* to recover the land itself. *F. N. B.* 208. In some instances relating to religious houses, called *Cessavit de Cantariâ*. By the stat. of Gloucester, the *cessavit* does not lie for lands let upon fee-farm rents, unless they have lain fresh and uncultivated for two years, and there be not sufficient distress upon the premises, or unless the tenant hath so enclosed the land, that the lord cannot come upon it to distrain. 2 *Inst.* 298. For the law prefers the simple and ordinary remedies, by distress, &c. to this extraordinary one of forfeiture; and therefore the same statute has provided farther, that on tender of arrears and damages before judgment, and giving security for the future performance of the services, (that he will no more cease,) the process shall be at an end, and the tenant shall retain his land, to which the stat. of West. 2, conforms so far as may stand with convenience and reason of law. 2 *Inst.* 401.

The stats. 4 Geo. II. and 11 Geo. II. c. 19, seem evidently borrowed from the above ancient writ of *cessavit*. The former of these statutes permits landlords who have a right of re-entry for non-payment of rent, to serve an ejectment on their tenants when half a year's rent is due, and no sufficient distress on the premises. See EJECTMENT. And the same remedy is in substance adopted by the stat. 11 Geo. II. c. 16, which enacts, that where any tenant at rack rent shall be one year's rent in arrear, and shall desert the demised premises, leaving the same uncultivated or unoccupied, so that no sufficient distress can be had, two justices of the peace (after notice affixed on the premises for fourteen days) may give the landlord possession thereof; and the lease shall be void. See DISTRESS. By stat. West. 2, the heir of the demandant may maintain a *cessavit* against the heir or assignee of the tenant. But in other cases, the heir may not bring this writ for cessure in the time of his ancestor: and it lies not but for annual service, rent, and such like; not for homage or fealty. *New Nat. Br.* 463. The lord shall have a writ of *cessavit* against tenant for life, where the remainder is over in fee to another: but the donor of an estate-tail shall not have a *cessavit* against the tenant in tail; though if a man make a gift in tail, the remainder over in fee to another, or to the heirs of the tenant in tail, there the lord of whom the lands are holden immediate, shall have a *cessavit* against the tenant in tail, because that he is tenant to him, &c. If the lord distrains pending the writ of *cessavit* against his tenant, the writ shall abate. The writ *cessavit* is directed to the sheriff.

CESSENON', a town of France, in the department of Herault, and chief place of a canton, in the district of St. Pons-de Thomieres: three leagues north of Beziers.

CESSIBI'LITY, *s.* [from *cedo*, *cessum*, Lat.] The quality of receding, or giving way, without resistance.—If the subject strucken be of a proportionate *cessibility*, it seems to dull and deaden the stroke; whereas, if the thing strucken be hard, the stroke seems to lose no force, but to work greater effect. *Digby.*

CES'SIBLE, *adj.* [from *cedo*, *cessum*, Lat.] Easy to give way.—If the parts of the strucken body be so easily *cessible*, as without difficulty the stroke can divide them, then it enters into such a body, till it has spent its force. *Digby.*

CESSIEU'X, a town of France, in the department of the Isere, and chief place of a canton, in the district of La Tour du Pin: twenty-seven miles east-south-east of Lyons.

CES'SION, *s.* [*cession*, Fr. *cessio*, Lat.] Retreat; the act of giving way.—Sound is not produced without some resistance, either in the air or the body percussed; for if there be a mere yielding, or *cession*, it produceth no sound. *Bacon.*—Resignation; the act of yielding up or quitting to another.—A parity in their council would make and secure the best peace they can with France, by a *cession* of Flanders to that crown, in exchange for other provinces. *Temple.*

CES'SION, *s.* [*cessio*, Lat. to cease.] In law, a ceasing, yielding up, or giving over. When an ecclesiastical person is created bishop, or a parson of a parsonage takes another benefice, without dispensation or being otherwise not qualified, &c. in both cases their first benefices are become void, and are in the law said to be void by *cession*: and to those benefices that the person had who was created bishop, the king shall present for that time, whoever is patron of them; and, in the other case, the patron may present. *Cowel.* But cession in the case of bishops does not take place till consecration. *Dyer* 213. No person is entitled to dispensation, but chaplains of the king and others mentioned in the stat. 21 H. 8. c. 13; the brethren, and the sons of lords and knights, (not of baronets) and doctors and bachelors of divinity and law in the universities of this realm. 1 *Comm.* 392. Both the livings must have cure of souls; and the statute expressly excepts deaneries, archdeaconries, chancellorships, treasurerships, chantership, prebends, and sinecure rectories. In case of a cession under the statute, the church is so far void upon institution to the second living, that the patron may take notice of it, and present if he pleases; but it seems that a lapse will not incur from the time of institution against the patron, unless notice be given him; but it will from the time of induction. 2 *Wils.* 200. 3 *Burr.* 1504.

CES'SIONARY, *adj.* As, a *cessionary* bankrupt, one who has delivered up all his effects. *Martin.*

CESS'MENT, *n. s.* An assessment or tax.

CESSOR,

CES'SOR, *s.* [from *cessio*, Lat.] He who ceaseth, or neglects so long to perform a duty, that he thereby incurs the danger of the law.

CESTAYRO'LS, a town of France, in the department of the Tarn: three leagues north of Alby.

CES'TRUM, *s.* [κεςρα, Gr. a hammer.] In botany, a genus of the class pentandria, order monogynia, natural order of luridæ. The generic characters are—calyx: perianthium one-leafed, tubular, columnar, obtuse, very short: mouth five-cleft, erect, obscure. Corolla: monopetalous, funnel-form. Tube cylindric, very long, slender; throat roundish; border flat, plaited, five-cleft; divisions ovate, equal. Stamina: filaments five, filiform, attached longitudinally to the tube, emitting a toothlet inwards at the middle. Anthers roundish, quadrangular, within the throat. Pistillum: germ cylindric-ovate, length of the calyx. Style filiform, length of the stamens. Stigma thickish, obtuse, scarcely emarginate. Pericarpium: berry ovate, unilocular, oblong. Seeds very many, roundish.—*Essential Character.* Corolla: funnel-form. Stamens emitting a toothlet from their middle. Berry unilocular.

Species. 1. Cestrum nocturnum, or night smelling cestrum: filaments toothed; peduncles subracemed equal to the leaf. It rises with an upright stalk about six or seven feet high, covered with a greyish bark, and divides upwards into many slender branches, which generally incline to one side; and are garnished with leaves placed alternate, near four inches long, and one and a half broad, smooth on their upper side, of a pale green, and on their under side they have several transverse veins, and are of a sea-green colour, having short foot-stalks. The flowers are produced at the wings of the leaves, in small clusters, standing upon short peduncles, each sustaining four or five flowers, of an herbaceous colour. They appear in August, but are not succeeded by berries in this country: those which come from America are small, and of a dark brown colour. It is a native of the island of Cuba, whence Mr. Miller received the seeds by the title of *Dama de Noche*, or lady of the night. It is probably so called, from the flowers sending out a strong odour after sun-set. It was raised many years past in the curious garden of the duchess of Beaufort, at Badminton, and was thence communicated to several gardens in England and Holland, where it passed by the name of Badminton jasmin. Mr. Miller has another sort, which he says was sent him from Carthagena; it is probably not different from this; and if so it is found not only in the islands of the West Indies, but on the continent of South America.

2. Cestrum vespertinum, or cluster-flowered cestrum: filaments toothless, tube filiform, peduncles very short. A tree twelve feet in height: stem not very strong. Leaves alternate, on short petioles, length double the breadth, sharp, quite entire, green on both sides, with cross veins underneath, almost parallel, convex. The berries are blue. The bark and fruit are fetid. It is a native of the West Indies, and was cultivated in 1759 by Mr. Miller.

3. Cestrum diurnum, or day-smelling cestrum: filaments toothless, segments of the corolla roundish reflected; leaves lanceolate. This rises with an upright stalk to the height of ten or twelve feet, covered with a smooth light green bark, dividing at top into many smaller branches, with smooth leaves near three inches long, and one and a half broad, of a lively green colour, ranged alternately on the branches. Towards the upper part of the shoots come out the flowers from the wings of the leaves, standing in clusters close to the branches; they are very white, shaped like those of the first sort, and smell sweet in the day-time, whence it had the appellation of Lady of the Day. The berries of this are smaller than those of the first sort. It flowers in September, October, and November. It is a native of the Havanna, whence the seeds were sent to Mr. Miller by the name of *Dama di Dio*: but it had been cultivated before in 1732, by Dr. Sherard at Eltham.

4. Cestrum tomentosum: flowers crowded, sessile, terminal; branches, leaves, and calyxes, tomentose. The form of the leaves and flowers is the same as in the third species; but the calyxes, branches, and under surface of the leaves, are tomentose; the calyxes are larger; the corollas coloured, with a shorter tube, and a more enlarged border. It was found in South America, by Mutis.

5. Cestrum laurifolium, or laurel-leaved cestrum: filaments toothletted or naked; leaves elliptic coriaceous shining very much, peduncles shorter than the petiole. Stem shrubby, erect, round, with a rugged ash-coloured bark; eight or nine feet high; leaves five inches long, and two broad; the flowers emit a disagreeable odour, and are succeeded by oval berries of a violet colour, full of juice; they are reckoned very poisonous, and have the appellation of *poison-berries* in Jamaica, whence it was sent by Dr. Houstoun. Its fetid smell seems to imply that poisonous nature which Miller and Sloane attribute to it, and which other plants of this genus possess. It was cultivated in 1691, in the royal garden at Hampton-court, and flowers in August.

6. Cestrum auriculatum, or ear-leaved cestrum: filaments toothless, stipules lunate. This is a very fetid shrub, two fathoms in height; stems usually several from the same root, upright, round, somewhat branched, cinereous: branches alternate, upright, warted: shoots pubescent, green. Leaves five inches long, twenty lines broad: petioles, rounded on one side, flat on the other. Stipules axillary, surrounding the branchlets, of the same form with the leaves. Panicles terminating, consisting of axillary spikes at the base, erect, leafy, bracted, villose, three inches long: peduncles alternate: flowers crowded at the top of the peduncles, eight lines long, and four or five broad. The natives of Lima in Peru use it externally to cleanse foul ulcers, and internally in the venereal disease; they look upon it as a pectoral, but it seems to be a plant of suspicious character. Dombey observed it in wet places about Lima. It has been cultivated many years in the Paris garden. It flowers in winter, but seldom, and has never borne fruit. Introduced here about 1774.

7. Cestrum parqui: filaments toothletted or naked; floriferous stem panicled; stipules linear. This is a fetid shrub, one fathom in height. Introduced at Paris from seeds sent by Dombey from Chili, where it grows naturally.

8. Cestrum hirtum: flowers subspiked axillary, leaves subcordate ovate acute, underneath with the branchlets rough with hairs. Native of the West Indies; Jamaica, &c.

9. Cestrum nervosum: leaves lanceolate opposite, with transverse nerves; peduncles branching. Stem shrubby, five or six inches high, covered with a brown bark, and dividing at top into very small branches. Leaves about four inches long, and little more than one broad, smooth, of a light green. Flowers axillary, towards the ends of the branches, four or five on each peduncle. Native of Carthagena in New Spain, whence it was sent to Mr. Miller.

Propagation and Culture. The first and second sorts produce their flowers every year in England, the others seldom flower here; but, as they retain their leaves all the year, they make a pretty variety in the stove, during the winter season; and, when they flower, the branches are commonly well furnished at their joints with bunches of flowers. All these plants, growing naturally in very hot countries, require to be placed in a warm stove, especially in the winter. The first and third are hardier than the others. They may all be propagated from seeds, or by cuttings. Those which come from seeds are always the most vigorous, and straightest plants; but, as they do not produce seeds in England, the other method is generally practised, because their seeds are rarely brought hither.

hither. The best time to plant these cuttings is about the end of May, by which time the shoots will have had time to recover their strength, after their confinement during the winter season. The shoots which come out from the lower part of the stalks, should always be chosen for this purpose. These should be cut about four inches long, and five or six of them may be planted in each halfpenny pot; for the cuttings of most sorts of exotic plants will succeed better when they are planted in the small pots, than they do in larger. The earth should be fresh and light, but not full of dung: it must be pressed pretty close to the cuttings, and then they must be gently watered; after which the pots must be plunged into a moderate hot-bed of tanners bark, and every day shaded from the sun. They must also have fresh air admitted to them in warm weather, and two or three times a-week must be refreshed with water. With this management the cuttings will put out roots in five or six weeks, when they should be gradually exposed to the sun; and, when they begin to put out shoots, they must have a greater share of fresh air admitted to them, to prevent their drawing up weak; and their waterings should be oftener repeated, but given in small quantities, for their young tender fibres will not endure much wet. When they have made good roots, they should be carefully shaken out of the pots, and each put into a separate small pot, filled with the same sort of earth as before; then give them some water, to settle the earth to their roots, and plunge them again into the tan-bed; observing, if any of their leaves hang down, to shade them from the sun in the middle of the day, until they have taken fresh root; after which they should have a large share of air in warm weather, to strengthen them before winter. Their waterings in the summer should be frequent; and, if they are sprinkled all over their leaves, it will wash and cleanse them from filth, which will greatly promote their growth; but their roots must not be kept too moist. In the autumn the plants of the second and fifth sorts must be removed into the bark-stove, and plunged into the tan-bed, where they must be treated in the same manner as other tender exotic plants; but the first and third sorts may be treated otherwise, especially when they have obtained strength; yet the first winter they may be managed in the same way as the others. There must be great care had in watering these plants in winter, for they are all (except the third sort) very impatient of moisture. If the seeds of these are procured from the countries where they grow naturally, they should be sowed in small pots filled with the earth before directed, and plunged into a moderate hot-bed of tanners bark, giving them now and then a little water. Sometimes the seeds will come up the same year, but they very often lie in the ground till the spring following; so that, if the plants do not appear in six or seven weeks after the seeds are sown, they will not come up that season; in which case the pots may be plunged into the tan-bed of the stove, between the other plants, where they will be shaded from the sun, and but little water given them; in this situation they may remain till the following spring, when they should be removed, and plunged into a fresh hot-bed, which will bring up the plants in a short time, provided the seeds were good. When the young plants are fit to remove, they should be carefully shaken out of the pots, and each planted into a separate pot filled with the before-mentioned earth, and plunged into the hot-bed again, and afterwards treated in the same way as hath been directed for the plants raised from cuttings.

CESTU'I QUE TRUST, in law, is he in trust for whom, or to whose use or benefit, another man is enfeoffed or seized of lands or tenements. By stat. 29 Car. c. 3, lands of *cestui que trust* may be delivered in execution.

CESTU'I QUE VIE. He for whose life any lands or tenements are granted. *Perk.* 97.

CESTU'I QUE USE. He to whose *use* any other man is enfeoffed of lands or tenements. 1 *Rep.* 133. Feoffees to uses were formerly deemed owners of the lands; but now the possession is adjudged in *cestui que use*, and without any entry he may bring assise, &c. *Stat.* 27 *Hen.* VIII. c. 10.

CES'TUS, Lat. [from κεστὸς, Gr.] A marriage-girdle, that of old times the bride used to wear, and the bridegroom unloosed on the wedding-night. A leathern gauntlet garnished with lead, used by combatants, or in the exercises of the athletæ. The girdle of Venus and Juno, according to the poets.—Venus, without any ornament but her own beauties, not so much as her *cestus*. *Addison.*

CETA'CEOUS, *adj.* [from *cete*, whales, Lat.] These fishes are thus called, which bring forth a living animal instead of spawn; or which, like viviparous animals, respire by means of lungs, generate, conceive, bring forth young, and nourish them with milk.—He hath created variety of these *cetaceous* fishes, which converse chiefly in the northern seas, whose whole body being encompassed round with a copious fat or blubber, it is enabled to abide the greatest cold of the sea-water. *Ray.*

CE'TE, *s.* [κητος, from חטא or חוטה *chota*, Chald.] The name of Linnæus's seventh order of mammalia, or quadrupeds; comprehending the genus MONODON, or narval; BALÆNA, or whale; PHYSETER, or cachalot; and DELPHINUS, or dolphin; for the natural history, and different species, of each of which, see their respective titles. Nature on this tribe hath bestowed an internal structure in all respects agreeing with that of quadrupeds; and in a few others the external parts in both are similar. Cetaceous fishes, like land animals, breathe by means of lungs, being destitute of gills. This obliges them to rise frequently on the surface of the water, to respire, to sleep, and to perform several other functions. They have the power of uttering sounds, such as bellowing and making other noises denied to genuine fishes. Like land animals they have warm blood; like them they are furnished with organs of generation, copulate, bring forth, and suckle their young, showing a strong attachment to them. Their bodies beneath the skin are entirely surrounded with a thick layer of fat, analogous to the lard on hogs. The number of their fins never exceeds three, *viz.* two pectoral fins, and one back fin; but in some species the last is wanting. Their tails are placed horizontally, or flat in respect to their bodies; contrary to the direction of those of all other fishes. This situation of the tail, enables them to force themselves suddenly to the surface of the water to breathe, which they are so frequently constrained to do. Many of these circumstances induced Linnæus to place this tribe among his mammalia, or what other writers call quadrupeds. To have preserved the chain of beings entire, some writers think he should in this case have made the genus of phocæ or seals, and that of the trichecus or manati, immediately precede the whale, those being the links that connect the mammalia or quadrupeds with the fish: for the seal is, in respect to its legs, the most imperfect of the former class; and in the manati the hind feet coalesce, assuming the form of a broad horizontal tail. Yet, notwithstanding all these properties which the *cete* have in common with land animals, there still remain others which render it more natural to place them, with Ray, in the rank of fishes; the form of their bodies agrees with that of fish; they are entirely naked, or covered only with a smooth skin; they live constantly in the water, and have all the actions of fishes. But the illustrious Swede, having adopted the ingenious idea of employing the circumstance of their suckling young as a characteristic mark for a great number of animals, all of which have the blood propelled by two auricles and two ventricles, he found himself obliged to include these with the rest of the mammalia, to prevent disorder in his classification.

CE'TERACH, *s.* in botany. See ASPLENIUM.

CE'TINA, a town of European Turkey, in Dalmatia: fifty miles west-north-west of Mostar.

CE'TON,

CE'TON, a town of France, in the department of the Orne, and chief place of a canton, in the district of Bellesme: ten miles south-east of Bellesme.

CET'TE, a sea-port town of France, on the coast of the Mediterranean, in the department of Hérault, and chief place of a canton, in the district of Montpellier: the canal of Languedoc begins at this place: it is small, and hardly contains 700 inhabitants. It was taken in 1710, by a detachment of troops sent to assist the inhabitants of the Cevennes, then in arms against Louis XIV. This detachment was commanded by major-general Seissan, a native of Languedoc, and convoyed by the English fleet, under Sir John Norris; but the duke de Roquelare, with some militia, retook the place, and made about 300 men prisoners. Fourteen miles south-west of Montpellier, and ten north-east of Agde. Lat. 43. 23. N. lon. 21. 22. E. Ferro.

CE'TUS, the WHALE, a southern constellation, and one of the 48 old asterisms. In the neck of the whale is a remarkable star, Collo Ceti, which appears and disappears periodically, or rather grows brighter and fainter by turns, owing it is supposed to the alternate turning of its bright and dark sides towards us, as it revolves upon its axis, or else owing to the star having a flattish form. The period of its changes is about 312 days. The stars in the constellation cetus, in Ptolemy's catalogue, are twenty-two, in Tycho's twenty-one, in Hevelius's forty-five, and in the Britannic catalogue ninety-seven.

CE'TUS is represented by the poets, as the sea-monster which Neptune, at the suit of the nymphs, sent to devour Andromeda for the pride of her mother, and which was killed by Perseus. This term has also been used in a figurative or metaphorical sense, on many different occasions. The ark, in which mankind was preserved, has been described under the emblem of a large fish, which Pliny terms *fabulosa ceto*; and from this representation ships, which were unwieldy, and of great burthen, were often called cetenæ. In ancient times great depredations were committed by rovers at sea, who continually landed, and laid people under contribution upon the coast. Piracy and plunder were of old esteemed honourable. Many migrations were made by persons, who were obliged to fly, and leave their wives and effects behind them. Such losses were to be repaired, as soon as they gained a settlement. Hence, when they infested any country, and made their levies upon the natives, one of their principal demands was women; and of these the most noble and fair. Such depredations gave rise to the histories of princesses being carried away by banditti; and of king's daughters being exposed to sea-monsters. The monsters alluded to were nothing more than mariners and pirates, styled Cetei, Cereni, and Cetones, from Cetus, which signifies a sea-monster, or whale; and also a large ship. They were Ceteans, and Cetonians; some of whom settled in Phrygia, and Mysia, where they continued the like practices, and made the same demands. Their history seems alluded to by Homer in the passage, Od. iv. 518.

CE'VA, a city and fortress of Italy, in the principality of Piedmont, and comté of Asti, situated on the Tanaro, the capital of a marquisate, in a plain, surrounded on all sides with hills, at the extremity of the country, which extends from the Apennines to the Tanaro, and from thence to the northern part of the Maritime Alps. It was anciently celebrated for its cheese, made of ewes-milk. This cheese, called by the Italians *rubiola*, is much esteemed even now, and sold not only into Piedmont and the Milanese, but other parts more distant. The hills about Ceva produce excellent wine: great quantities of chesnuts grow at the foot of the mountains, and excellent truffles are found in the neighbouring plains. It was formerly an independent state, but a great part of the domain was sold to the town of Asti in 1295, whence, in the year 1531, it came to the house of Savoy. It was besieged by the French in 1543, but the enemy were compelled to retire without success. A sudden inundation, on the 6th of July, 1584, beat down great part of the walls, destroyed the bridges, houses, and churches, and drowned a great number of the inhabitants; and, in 1625 and the five following years, a pestilential disease carried off the greater part of the survivors. It has one collegiate church, and three convents. In April 1796, this city was taken by the French republicans under Buonaparte. Forty miles west Genoa, and twenty-five south-south-east Turin. Lat. 44. 20. N. lon. 25. 37. E. Ferro.

CEVER'TA, a town of Italy in the kingdom of Naples, and province of Calabria Ultra: ten miles north-north-east of Bova.

CEU'TA, a seaport town of Africa, on the south coast of the Mediterranean, in the kingdom of Fez, belonging to Spain, with a good harbour for small vessels, the see of a bishop, suffragan of Lisbon. This town was taken from the Moors in 1409, by John king of Portugal, and continued annexed to that crown till the revolution in 1640, when it fell to Spain, and was finally ceded to that country by the treaty of Lisbon, in 1688. It withstood a vigorous siege against the Moors in 1697: it is situated in the narrowest part of the Mediterranean, not above five leagues from Gibraltar. Lat. 35. 48. N. lon. 5. 25. W. Greenwich.

CEY'LON, an extensive island in the Indian ocean, situated to the south-east of the peninsula of India, from which it is only separated by a narrow sea, about sixty miles wide. This island is called by the Arabians, Serendib; but it was known to the ancients by the name of Tabrobana. The Portuguese were the first of the European nations who visited Ceylon. It was discovered by Laurence Almeyda, in 1505, who was driven accidentally from his cruize off the Maldive isles, by the violence of the currents, into a port called by the natives Gabalican. The ruling prince was then, and is now, styled emperor, and is lord paramount over the minor chiefs; he is styled most great, invincible, and tailed, the first of his race being said to have come from Siam, with a tail a foot long, pendent from behind; his posterity in due time (according to lord Monboddo's system) shed their tails, and became as capable of the arts of government as any European monarch whatsoever. Almeyda was received by the governor with the utmost courtesy. He sent Pelagio Souza, one of his officers, to the royal residence at Colombo, where he was introduced to the emperor. He met with a most favourable reception, formed a league with his imperial majesty, who agreed to pay Emmanuel annually 250,000 pounds weight of cinnamon; on condition, that the fleets of Portugal should defend his coasts from all hostile invasions. The Portuguese soon made themselves masters of the principal ports, and engrossed the whole trade of this valuable bark. The Moors, or Arabs, afterwards exerted every effort to prevent them from establishing themselves in Ceylon. This highly concerned the Arabs, who before that time were the sole venders of the cinnamon, which they carried to Suez, from whence it was conveyed over the isthmus, and from Alexandria to all parts of Europe; but all their endeavours were to no purpose; that rich trade became monopolized by these new rivals.

The Dutch first landed here in 1603, and visited the emperor. In 1632 they received a formal invitation from the ruling monarch to assist him against the Portuguese; and in consequence they appeared off the coast with a potent fleet. They confederated with the king of Ceylon, and after a struggle of several years, with great bloodshed, they expelled the Portuguese, whose power ended in the taking of Colombo, in 1656, after a siege of seven months, in which the Portuguese exerted all that spirit and valour which originally made them lords of the Indies. The emperor repaid the Dutch all their expences in cinnamon, and other productions of the island; and invested them with many privileges; but in return he found

found himſelf exactly in the ſame dependent ſtate as he was before his victories. The Dutch, becoming ſuperior, fortified every one of his ports. They had beſides a grant of coaſt round the iſland, twelve miles in breadth, reckoning from the ſea. The emperor maintained a magnificent court at Candy; but at any time his good allies were pleaſed, they could, by the ſole interdiction of the article ſalt, make him and his ſubjects ſubmit to any terms they choſe to dictate.

The form and extent of the iſle of Ceylon, are very much undetermined. The figure which is generally adopted in the maps, is that of a pear, with the ſtalk turned towards the north. The length from Dondrahead ſouth, to Tellipeli north, is about 280 miles; the greateſt breadth, or from Colombo to Trincoli, is about 160. The latitudes of the two extremes in length, are between 5° 50′, and 9° 51′. Its extremes of longitude are 79° 50′, and 82° 10′. The iſland riſes from the ſea on every ſide to the mountains, which run in chains, principally from north to ſouth. The higheſt and rudeſt tract is the kingdom of Conde Uda, which is impervious, by reaſon of rocks and foreſts, except by narrow paths, which are alſo impeded by gates of thorns, cloſely watched by guards. At the weſtern ſkirt of theſe mountains ſoars Hamalell, in the European language Adam's Peak. It riſes pre-eminent above all the reſt, in form of a ſugar loaf. On the ſummit is a flat ſtone, with an impreſſion reſembling a human foot, two feet long, ſaid to be that of our great and common anceſtor: this, however, is denied by Mr. Bryant, who thinks there are very few alluſions in ancient hiſtory to the antediluvian world. The Cingaleſe ſay, it is that of Buddo, their great deity, when he aſcended into heaven, from whom they expect ſalvation. The Mahometan tradition is, that Adam was caſt down from Paradiſe, and fell on this ſummit, and Eve near Judda, in Arabia. They were ſeparated 200 years, after which, as the legend goes, he found his wife, and conducted her to his old retreat; there he died, and was buried, and there are two large tombs. To this day many votaries viſit his imaginary ſepulchre; the Mahometans out of reſpect to our common father; the Cingaleſe under the notion above-mentioned. All the viſitants are obliged to be drawn up by chains, ſo rude and inacceſſible is the way to this rock of ſanctity. From this mountain ruſhes the great river Mavila-Ganga, or Ceyloneſe Ganges, which paſſes unnavigable, cloſe to Candy, a very long and rocky courſe, to the ſea at Trincomale. All the reſt of the iſle, except ſome marſhy flats adapted to the culture of rice, are broken into thouſands of hills, beautifully clothed with wood. The intervening valleys are often moraſſy, or conſiſting of a rich fat ſoil; but the fertility of the open parts is aſtoniſhingly great.

The ancient account given by Ptolemy of the mineral or foſſil productions, is now in a great meaſure confirmed. Iron and copper are found here, and alſo black lead. A gold mine is ſaid to be latent in one of the great mountains, but the working is prohibited by the emperor. Of gems, the ruby, ſapphire, topaz, the electric tourmalin, and the cat's eye, or pſeud-opal, and hyacinth, are met with. But what occaſions the neglect of the mines, and of the gems, is the attention to the great ſtaple of the iſland, the important bark of the cinnamon-tree. Dr. Thunberg is very exact in his account of the gems of Ceylon. They are dug up about Matura, and the liberty of ſearch is farmed for no more than 180 rix-dollars a year. Amethyſts, and an infinite variety of cryſtals and cryſtalline gems, are found in that neigbourhood. The inhabitants are called Cingaleſe; theſe are aboriginal, and differ totally in language from the people of Malabar, or any other neighbouring nation. Their features are more like Europeans than any other. Their hair is long, and moſt commonly turned up. They are black, but well made, with good countenances, and excellent morals. Their religion is derived from Buddo, a proſelyte of the great Indian Foe: his doctrine overſpread Japan and Siam, as well as that of Foe. It conſiſts of the wildeſt idolatry, and the idols, the objects of their worſhip, are the moſt monſtrous and fantaſtic. The pagodas or temples are numerous, and many of them, like ſeveral in India, are of hewn ſtone, moſt richly and exquiſitely carved. The civil government is monarchical. The emperor, in the time of Knox, was abſolute, and claimed the moſt undiſputable right over the lives and fortunes of all his ſubjects. He was a barbarous tyrant, and took delight in putting his ſubjects to the moſt cruel and lingering deaths. Elephants were often the executioners of his vengeance, and were directed to pull the unhappy criminals limb from limb with their trunks, and ſcatter them to the birds of the air, or beaſts of the field. The emperor's court was at Candy, nearly in the centre of the iſland; but he was, in Knox's time, by the rebellion of his ſubjects, obliged to deſert that city. The government is ſaid, by Wolff, to be at preſent very mild, and regulated by ſtatute laws, the joint production of divers wiſe princes, and are conſidered as ſacred by the Cingaleſe. It is poſſible that the tyrant, in the days of Knox, had deſtroyed the liberties of his country, which were afterwards reſtored. The author Robert Knox is a writer fully to be depended on; a plain honeſt man, who, in 1657, ſailed in one of the Eaſt India company's ſhips to Madras; and on his return, in 1659, was forced by a ſtorm into Ceylon, to refit: when his father (who was captain) went on ſhore, and, with ſixteen more of the crew, were ſeized by the emperor's ſoldiers, and detained. The captain died in a year's time, but his ſon lived nineteen years in the iſland, and ſaw the greateſt part of it. At length, with difficulty, he made his eſcape, and arrived in England, in September 1680. His hiſtory of the iſland, and of his adventures, were publiſhed in 1680; and appears to be the only authentic account of the internal parts, and the only one that can be entirely relied on.

There is in this iſland a race of wild men, called Wedas, or Bedas; they ſpeak the Cingaleſe language, but inhabit the depth of the woods, and the faſtneſſes of the mountains, and are, in all reſpects, as ſavage as animals in the ſtate of nature. They wear their hair long, collect it together, and tie it on the crown of the head in a bunch. Their complexions are, comparative to the other Cingaleſe, light: they inhabit the ſhade of the woods, and their ſkins, that way, eſcape the effect of the burning ſun. They live entirely on fleſh, or on roots; the firſt they eat raw or dried, or preſerved in honey. They live either in caves, or under a tree, with the boughs cut and laid round about them to give notice when any wild beaſts come near, which they may hear by their ruſtling and trampling upon them. They are like them, without law, and, as Wolff ſays, without religion. Knox rather aſſerts the contrary. The wilder ſort never ſhew themſelves; the tamer will enter into ſome kind of commerce with their civilized countrymen. Their dreſs is only a cloth wrapped round their waiſts, and brought between their legs. A ſmall axe is uſually ſtuck in the wrapper. They are ſkilful archers, and very nice in their arrows. The heads are of iron, made by the ſmiths of the civilized people. They have no other means of beſpeaking them, than leaving near the ſhop a pattern, cut out of a leaf, with a piece of fleſh by way of reward: if he does the work, they bring him more meat, otherwiſe they ſhoot him in the night.

This iſland was celebrated by Pliny for its race of elephants, which were larger, and more adapted for war, than thoſe of India. He alſo gives the methods of capture. They are, at preſent, taken by different methods; and, after being tamed, are ſent to the great annual fair at Jaffanapatam. The merchants of Malabar and Bengal, have notice of the numbers and qualities of the elephants to be ſet up to ſale; ſometimes 100 are ſold at one fair. A full grown beaſt, twelve or fourteen feet high,

high, will be sold at the rate of 2000 dollars. The horses of the island are descended from the Arabian breed These are kept in a wild state, in the adjoining islands, called ilhas de cavallos. They are at certain times forced into the ponds and rivers, and caught by people, who, in the most dexterous manner, fling over any part they please a noose. These are sent to a fair, immediately following the elephant fair, and sold for high prices. The peasants make no sort of use of horses; but in their place employ the buffalo, which they catch and tame for draught, and all their rural work.

The species of deer are very elegant; here are found the spotted axis, and the great, called by the Dutch, elk, as tall as a horse; and the rib-faced, with a tusk from each upper jaw, pointing downwards. The little Indian musk, called meminna, not larger than a hare, is a native of this isle; it also has, like the last, its tusks. Buffaloes and wild-boars are very numerous, and very fierce. To fight an enemy, to hunt the elephant, and catch the wild-hog, are the three points of valour among the Cingalese. Monkies swarm here; the wanderow is a species mentioned by Knox, with a great white beard from ear to ear, a black face, and dark grey body. There is a variety of the above quite white. The tail-less macauco, and the loris, are found here; also the jackal, and tiger, of the largest size. These animals are shot with crossbows, placed in their haunts. Pliny says, that tigers and elephants were made by the people the executioners of their kings, whenever they had offended them. They appointed a solemn hunting match, and exposed their monarch to the fury of those beasts. Bears are numerous even in this neighbourhood of the line. Wolf says, they are large and black, and feed on honey, as they do in Europe. The civet, and the mungo, or Indian ichneumon, are found here. This weesel is famous for its antipathy to the naja, or cobra de capello, and for its instant recourse to the antidote to the fatal bite, on its receiving a wound from that dreadful serpent. The plants it seeks relief from, are the ophiorrhiza mungos, strychnos colubrina, and ophioxylon serpentinum. The cobra de capello grows to a vast size in this island, and its bite is instant death. See a figure and description of it under the article COLUBER.

The burning-serpent, found in this island, seems to possess the dreadful poison of three species: it gives by its bite the symptoms of raging fire, like the torrida dipsas. It causes, at other times, the blood to flow through every pore, like the hæmorrhois; at other times, to cause swelling like the prester, and to incite racking pains; at length, by a happy numbness, death brings kindly relief to the miserable sufferer. Our countryman Ray, enumerates several of the Ceylonese serpents: one is the ochætulla, i. e. oculis infestus. The ninypolonga, or asp, which kills the person it bites by flinging him into an endless sleep. The vast boa, the anacandaia of the Ceylonese, is common here, and is compared for size to the mast of a ship. Quintus Curtius mentions it among the monstrous serpents which astonished the army of Alexander in his march into India. This is common to Africa, and the greater island of India. It is the serpent which Livy supposes to have given Regulus so much employ on the banks of the Bagrada. See a figure of it in vol. iii. under BOA. Crocodiles are also very numerous in Ceylon, and sometimes are found of the length of eighteen feet. The lacerta calotes is a singular lizard, with a serrated back. The lacerta gekko is a species justly dreaded for the poison which exudes from the ends of its toes, and which infects to a degree of fatality every thing it passes over; its urine and saliva are equally dangerous; its voice, which is acute, like that of a cricket, flings a whole company into consternation. The natives obtain from it a deadly poison for their arrows. They tie one of these animals pendent by the tail, and provoke it till it emits its deadly saliva on the point of the weapons, which kill with the slightest wound. This dreadful reptile seldom attains a foot in length.

The insects of Ceylon are of an uncommon size: scorpions have been found here eight inches long, exclusive of the legs; scolopendræ seven inches; and of spiders, the aranea avicularia, with legs four inches long, and the body covered with thick black hair, a species that makes a web strong enough to entangle the smaller species of birds, on which it feeds. See this enormous spider described, and a figure of it, in vol. ii. under ARANEA. The cerambyx, as large, or larger than the one figured in the preceding plate, is found in this island; and many others of the coleoptera are in the same frightful proportion.

The Ceylonese squirrel is remarkable for being three times the size of our squirrel, and having a tail twice as long as its body. The perfuming shrew is a native of this and other of the Indian isles. Its musky odour is so subtil, as to pervade every thing it runs over. It will totally spoil the wine in a well-corked bottle, by barely passing over the surface. The cordated bat, with its heart-shaped appendage to the nose; and the striped, or kiriwoula, inhabit Ceylon. The monstrous species called the ternate is also very frequent here. Many of these animals are, in all probability, common to the continent of India, and doubtless many more which have escaped the notice of travellers: there is all the appearance of Ceylon having been united with the Indian continent; and that the gulph of Manaar was once solid land. The Maldives, and Laccadives, seem likewise to have been fragments of the once far extended continent.

Birds in the greatest varieties, and of the most elegant plumage, swarm in Ceylon. That magnificent bird the peacock abounds in this island; its legs are much longer, and its tail of far greater length and brilliancy, in its native state, than they are with us. This most elegant and superb of the feathered creation, is confined (in the state of nature) to India, and adds highly to the beauty of the rich forests of that vast country, and some of its islands. Among the aquatic birds is the great white-headed ibis, which makes a snapping noise with its bill; it loses its fine roseate colour in the rainy season. The *plotus*, or anhinga, is the terror of passengers; it lurks in thick bushes by the water side, and, darting out its long and slender neck, terrifies them with the idea of some serpent going to inflict a mortal wound.

Ceylon is peculiarly happy in its vegetation; it abounds with all the choicest fruits, and most magnificent flowers; all the trees and plants of India seem crowded within its limits. Here we find the grand flowering Indian reed; the various species of amomum; the flabelliformis or fan palm; the papaw-tree, with large luxuriant fruit, like a melon; the zedoary, which retains its place in our dispensatory; the grandiflora or jasminum of Merian; the melocactus or melon-thistle; the most beautiful creeping cereuses; the prickly pear or Indian fig; the black and white pepper; and tamarind-tree; the arundo or bamboo-tree; many species of mimosa, the mirabilis, which has the quality of opening its flowers at four in the evening, and closing them in the morning till the same hour returns, when they again expand in the evening at the same hour; the bromelia or pine-apple grows spontaneously, amid the capsicum and nux vomica; the anacardium or cashew-nut tree; the cassia or senna, euphorbia, gambouge, and dolichos or cow-itch, which the natives use for lascivious purposes; the finest pomegranates, citrons, oranges, and myrtles; the celebrated and singular plant nepenthes; and the bread-fruit; the musca paradisea, which the Jews believe to be the tree of knowledge of good and evil, placed in the midst of the garden of Eden; the ficus indica, which throws out fresh trunks from every branch, and which, descending into the ground, take root, still enlarging their branches, until a vast extent is covered with the arched shade. Thus it forms of itself a forest of arched avenues, and a labyrinth of alleys, which afford shelter both to men and ani-

mals from the scorching rays of the vertical sun. But the glory of Ceylon is the laurus cinnamomum, or cinnamon tree, which grows to the height of about twenty feet. This valuable tree grows in greater quantity in the isle of Ceylon, than any other place. It grows wild in the woods, without any culture; every province does not possess it, there is none in that of Jaffanapatam, nor Manaar, but it abounds in most of the internal parts, and about Negumbo and Gale. The pompadour pigeon, is the bird, which, by carrying the fruit to different places, is a great disseminator of this valuable tree. It is not peculiar to this island; but here the bark is infinitely superior in quality to any other. Botanists enumerate numbers of kinds, all which, with the various trees above-mentioned, see particularly described under their respective heads in this work.

The northern extremity of Ceylon is broken into two isles, divided from the greater by a very narrow channel; the other side is faced by rocks and shoals, and affected by most variable currents. The city of Jaffanapatam stands on the western side of one of the isles; this retains its Cingalese name; but most of the other places in the neighbourhood have been changed by the Dutch. When the city was taken from the natives by the Portuguese, in 1560, they found in its treasury the tooth of an ape, so highly venerated by the people of Ceylon, that immense sums were offered for its redemption, but in vain. To destroy this piece of idolatry, the Portuguese viceroy ordered it to be reduced to powder, and then burnt. Apes are in many parts of India highly venerated, out of respect to their idols.

Most of the eastern side of Ceylon is guarded with sand banks or rocks. Trincomale harbour is in lat. 8° 30′, a fine and secure port, protected by a strong fort, which was taken by assault, on January 11, 1782, by our brave admiral, Sir Edward Hughes; but which, on August 26 of the same year, was wrested from us by his active rival Suffrein. On September 2d, the former came off Trincomale, and to his great surprise found the French colours flying on all the forts. Suffrein, with a superior squadron, sailed out of the harbour, secure, as he thought, of victory. Our brave admiral, and his officers, incensed at the loss of the place, eagerly accepted the offer of combat. The contending admirals displayed every proof of courage and skill. Suffrein's ship was reduced to a wreck; and he was obliged to remove his flag to another. Night alone terminated the battle. Suffrein, retired into Trincomale, crowding in without order. Thus secured, Hughes left him reluctantly, and sailed for Madras with his squadron. Between the bay of Trincomale and the fort Calirauw is the country called Bedas, a tract of forest, comprehending 120 miles; the habitation of the Bedas. The Ganges of Ptolemy runs into this harbour. Barticalo is the next port, lying in lat. 7° 40′. This also has a strong fortress. Here the Dutch first landed in 1638, and took it by capitulation from the Portuguese. The mountain called Monk's-hood, some leagues inland, is a remarkable sea mark. Barticalo may have been near the site of the town called by Ptolemy, Bocona; near it is a river which preserves the name, being called by the natives Ko-bokan-oye, or the river of Bokan. Dondrahead is the most southern point of any in the island. A little to the west is Tanawar, remarkable for having been the Diana of Ptolemy, sacred to the moon; the place still has its temple, or Pagoda, highly venerated by the natives. Punta de Galle is a little to the north-west of Dondrahead, in lat. 6°, turning almost due north. The town is strongly fortified, and is a place of great trade. In lat. 7° we find Colombo, built in a beautiful and magnificent manner by the Portuguese. Nigombo is a fortress some miles to the north of Colombo. The whole interval from Colombo is filled with beautiful villages, and open towns; characteristic of neatness and industry. The long isle of Calpentyn lies near the shore, about thirty-six miles farther north. That of Manaar, as the name implies, is a sandy tract, and had upon it at one time seven churches, built by the Portuguese. These fell to decay under their successors the Dutch, who were finally dispossessed of Trincomale by the English, on the 26th of August 1795. The expedition against this valuable settlement was conducted by general Stuart, and rear-admiral Rainier, to whom it was surrendered by capitulation, and placed under the government of the king of Great Britain.

CEY'RAS, a town of France, in the department of the Herault: seven miles east of Lodeve.

CEYSE'RIAT, a town of France, in the department of the Ain, and chief place of a canton, in the district of Bourg en Bresse: four miles east-south-east of Bourg en Bresse.

CEYSERIEU', a town of France, in the department of the Ain, and chief place of a canton, in the district of Belley: five miles north of Belley.

CEYS'SAC, a town of France, in the department of the Gironde, and chief place of a canton, in the district of Bourg: ten miles south-east of Blaye.

CEYX, in fabulous history, a king of Trachinia, son of Lucifer, and husband of Alcyone. He was drowned as he went to consult the oracle of Claros. His wife was apprised of his misfortune in a dream, and found his dead body washed on the sea shore. They were both changed into Alcyons, or king-fishers. According to Apollodorus, the husband of Alcyone and the king of Trachinia were two different persons.

CE'ZE, a river of France, which runs into the Rhone, two miles west of Caderousse.

CEZIM'BRA, a small seaport of Portugal, on the Atlantic: ten miles west of Setuval.

CE'ZY, a town of France, in the department of the Yonne, and chief place of a canton, in the district of Joigny: three miles north-west of Joigny.

C-FAUT, a note in the scale of music:

Gamut I am, the ground of all accord,
A re, to plead Hortensio's passion;
B mi Bianca, take him for thy lord,
C faut, that loves with all affection. *Shakespeare.*

CH has, in words purely English, or fully naturalized, the sound of *tsh*; a peculiar pronunciation, which it is hard to describe in words. In some words derived from the French, it has the sound of *sh*, as *chaise*; and, in some derived from the Greek, the sound of *k*, as *choleric*.

CHA, a town of China, of the third rank, in the province of Fo-kien: twenty-five miles south-south-west of Yen-ping.

CHA-TCHEOU', a town of Asia, in the country of Thibet: fifty-five leagues south-south-east of Hami. Lat. 40.22. N. lon. 113. 3. E. Ferro.

CHA'A, *s.* in botany. See THEA.

CHAALO'NS, or CHALONS SUR MARNE, a city of France, and capital of the department of the Marne; before the revolution, the see of a bishop, suffragan of Rheims, and chief place of the generality of Champagne; here are manufactures of coarse woollen cloth. It is situated on the river Marne, and contains thirteen parishes. The number of houses about 2800, and of inhabitants 18,000: twenty posts and a half north-north-west of Langres, and twenty and a quarter east of Paris. Lat. 48. 57. N. lon. 22. 2. E. Ferro.

CHABANOIS', a town of France, in the department of the Charente, and chief place of a canton, in the district of Confolent: three leagues south of Confolent.

CHABEIUL', a town of France, in the department of the Drome, and chief place of a canton, in the district of Valence: two leagues south-east of Valence.

CHA'BIS, a town of Persia, in the province of Kerman, at the edge of a desert, on the confines of Segestan: 115 miles north-east of Sirgian.

CHABLA'IS (duchy of), a province of Savoy, which stretches along the southern banks of the lake of Geneva, as

as far as the Valais, which bounds it on the east; on the south it is bounded by Faucigny, and on the west by the republic of Geneva: the country is mountainous and populous. Thonon is the capital.

CHABLIS', a town of France, in the department of the Yonne, and chief place of a canton, in the district of Auxerre, celebrated for its excellent white wine: three leagues east of Auxerre.

CHABNO', a town of Poland, in the palatinate of Volhynia; sixty-eight miles north-east of Zytomiers.

CHABON'S, a town of France, in the department of the Isere, and chief place of a canton, in the district of La Tour du Pin: thirty miles south-east of Lyons.

CHABOT'TES, a town of France, in the department of the Higher Alps, and chief place of a canton, in the district of Gap: seven miles north of Gap.

CHABRI'A, a town of Persia, sixty miles north-east of Asterabat.

CHA'BRIAS, an Athenian general and philosopher, who chiefly signalized himself when he assisted the Bœotians against Agesilaus. In this celebrated campaign, he ordered his soldiers to put one knee on the ground, and firmly to rest their spears upon the other, and cover themselves with their shields, by which means he daunted the enemy, and had a statue raised to his honour in that same posture. He assisted also Nectanebus, king of Egypt, and conquered the whole island of Cyprus; but he at last fell a sacrifice to his excessive courage, and disdained to fly from his ship, when he had it in his power to save his life like his companions.

CHABRILLA'ND, a town of France, in the department of the Drome, and chief place of a canton, in the district of Crest: three miles west of Crest.

CHA'BRIS, a town of France, in the department of the Indre, and chief place of a canton, in the district of Issoudun: seven leagues and a half north-north-west of Issoudun.

CHABRI'T (Peter), member of the supreme council of Bouillon, and advocate in the parliament of Paris, died in that capital in 1785. Born to no fortune, his days were shortened by difficulties and cares. In reading his works we admire his talents; and his manners are said to have attracted universal esteem. His book, intituled, Of the French Monarchy and its Laws, 2 vols. 12mo. 1785, displays a novelty in the design, and a variety of knowledge in the execution. He is thought to have taken Montesquieu for his model, whose energy and precision he copies with success.

CHA'CA-HA'MAR, a town of Chinese Tartary. Lat. 44. 50. N. lon. 110. 23. E. Ferro.

CHA'CA-TERGA'SH, a town of Asia, in the country of Thibet: forty-two miles north-north-east of Tchontori.

CHACAN'GA, see CHICANGA.

CHACA'O, a town of South America, in the island of Chiloe, where the governor usually resides.

CHACE, *s.* a station of game more extended than a park, and less than a forest: and is sometimes taken for the liberty of chasing or hunting within such a district. And according to Blount it hath another signification, i. e. the way through which cattle are drove to pasture, commonly called in some places a *drove-way*. See CHASE.

CHACE, a town of France, in the department of the Mayne and Loire, and chief place of a canton, in the district of Saumur: one league south of Saumur.

CHA'CEWATER, a small town in the county of Cornwall, near which are several rich copper mines, which, within the circle of two miles, are said to produce to the value of 15,000l. every month: five miles from Truro, and 262 west of London.

CHACHAPOY'AS, a district of South America, in Peru, lying to the east of the Andes, with a town of the same name, called also St. Juan de la Frontera, and two or three others. The Indians make a great variety of cottons and tapestry here, which for the liveliness of the colours and neatness of the work are much valued.

CHA'CO (Le), a province of South America, in the country of Buenos Ayres, reckoned 200 leagues long, and 125 broad, on the west side of the river Plata, and bounded on the west by a chain of mountains: it is inhabited by many Indian nations, and but little known.

CHA'CRELAS, *s.* a species of albinos, or white negroes, peculiar to the island of Java, having weak eyes, and dead-white skins, with features strictly corresponding to the negro race. See a figure of these extraordinary people, under the article ALBINOS, vol. i. p. 240.

CHACTAW'S, or FLAT HEADS, a powerful and intrepid race of Indians, who inhabit a fine and extensive tract of hilly country, with large and fertile plains intervening, between the Albania and Mississippi rivers, and on the western part of the state of Georgia. This nation had, not many years ago, forty-three towns and villages, in three divisions, containing 12,123 souls, of which 4,041 were fighting men. They are called Flat-heads by the traders, because all the males have the fore and hind part of their sculls artificially flattened when young. Different from most of the Indians bordering on the United States, they have large plantations or country farms, where they employ much of their time in agricultural improvements, after the manner of the white people. The Chactaws and Creek Indians are inveterate enemies to each other.

CHADA'GHI, a town of Persia, in the province of Farsistan: five miles west of Schiras.

CHAD'CHOD, *s.* a term in Jewish antiquity; Ezekiel mentions *chadchod* among the several merchandizes which were brought to Tyre. The old interpreters, not very well knowing the meaning of this term, continued it in their translation. St. Jerom acknowledges that he could not discover the interpretation of it. The Chaldee interprets it pearls; others think that the onyx, ruby, carbuncle, crystal, or diamond, is meant by it.

CHA'DER, an island of Asia, formed by a river which runs from the Euphrates to the Persian Gulph, which extends from Bassora nearly to El Catif, 240 miles long, and thirty wide.

CHÆREFO'LIUM, *s.* in botany. See SCANDIX.

CHÆRONE'A, anciently a city, now a small village, of Bœotia, towards Phocis; the birthplace of Plutarch; famous for the defeat of the confederate Greeks by Philip of Macedon, who commanded in person. The army of the confederate Greeks amounted to 30,000 men, commanded by Lysicles and Chares; the first but little, and the second unfavourably, known; and by Theagenes the Theban, a person strongly suspected of treachery. The Macedonian forces amounted to 32,000. Both armies formed in battle array before the rising of the sun. The right wing of the Macedonians was headed by Philip; his son Alexander, then only nineteen years of age, but surrounded by experienced officers, commanded the left wing, which faced the sacred band of the Thebans. The auxiliaries of either army were posted in the centre. In the beginning of the action, the Athenians charged with impetuosity, and repelled the opposing divisions of the enemy; but the youthful ardour of Alexander obliged the Thebans to retire, the sacred band being cut down to a man. The activity of the young prince completed their disorder, and he pursued the scattered multitude with his Thessalian cavalry. Meantime the Athenian generals, too much elated by their first advantage, lost the opportunity to improve it; for having repelled the centre and right wing of the Macedonians, except the phalanx, which was composed of chosen men, and immediately commanded by the king, they, instead of attempting to break this formidable body by attacking it in flank, pressed forward against the fugitives, Lysicles exclaiming in vain triumph, "Pursue, my brave countrymen! let us drive the cowards to Macedon." Philip observed this rash folly with contempt; and saying to those around him, "Our enemies know not how to conquer," commanded his phalanx, by a rapid evolution, to gain an adjacent eminence,

from which they poured down, firm and collected, on the advancing Athenians, whose confidence of success had rendered them insensible of their danger. But the irresistible force of the Macedonian spear converted their fury into despair. Above 1000 fell, 2000 were taken prisoners; the rest escaped by a precipitate and shameful flight. Of the Thebans more were killed than taken. Few of the confederates perished, as they had little share in the action; and as Philip, perceiving his victory to be complete, gave orders to spare the vanquished, with a clemency unusual in that age, and not less honourable to his understanding than his heart; since his humanity thus subdued the minds and gained the affections of his conquered enemies. See MACEDON.

CHÆROPHYL'LO SI'MILIS, *s.* in botany. See APHANES.

CHÆROPHYL'LUM, *s.* [χαιρω and φυλλον, Gr. rejoicing or being very luxuriant in leaves.] In botany, a genus of the class pentandria, order digynia, natural order of umbellatæ or umbelliferæ. The generic characters are—Calyx: umbel universal spreading; partial nearly equal as to the number of rays. Involucre universal none; partial subpentaphyllous; leaflets lanceolate, concave, reflected, nearly the length of the umbellule; perianthium proper obscure. Corolla: universal nearly uniform; florets of the disk abortive. Proper of five petals, heart-inflected; with the point bent in, flattish; exterior ones rather larger. Stamina: filaments five, simple, length of the umbellule. Anthers roundish. Pistillum: germ inferior. Styles two reflected. Stigmas obtuse. Pericarpium: none, fruit oblong, acuminate, smooth, bipartile. Seeds two, oblong, attenuated upwards, convex on one side, flat on the other.—*Essential Character.* Involucrum reflected concave; petal, heart-inflected; fruit, oblong, even.

Species. 1. Chærophyllum sylvestre, or wild cicely, cow-weed, or common cow-parsley: stem even, striated, joints somewhat swelling. Two feet high and upwards, hollow, grooved, generally villose and purplish, much branched: branches suberect, less hoary than the stem. Very common in pastures, orchards, and under hedges, flowering in May, and in warm situations in April. Hudson marks it as an annual plant; other authors affirm it to be perennial; we rather suppose it to be biennial. Linnæus remarks that this plant indicates a luxuriant soil; and says that the flowers communicate a green and yellow dye to wool. He also affirms that horses, sheep and goats are not fond of it, and that cows and swine refuse it. According to Villars, horses will not eat it, even in the stable. Miller says that there are few animals who care to eat it except the ass. On the contrary, Ray informs us that it has the name of *cow-weed*, because it is a grateful food to cows, in the spring, before it runs up to stalk; and in confirmation of this, Wainwright says that cows like it so well, that, when a pasture is over-run with it, as is often the case about Dudley, they always turn them in to eat it up. Rabbits are well known to be very fond of this herb; and Curtis relates, that, in time of scarcity, the young leaves have been used as a pot-herb. Haller (from Buckwald) says that the Dutch use it in gangrenes. John Bauhin mentions instances of two families having been poisoned by eating a small quantity of the root.

2. Chærophyllum bulbosum, or tuberous chervil: stem even, swelling at the joints, rough with hairs at the base. Root like the navew, and biennial; stem from two or three to six feet high, with reddish-brown spots, smooth and even at top, hispid, with long white hairs below, a little swelling at the joints. The roots taken up early in the spring are eaten boiled, with salt, oil, and vinegar. Gmelin affirms both these and the seeds to occasion vertigoes; but certainly this is not true, at least of the fresh root, many persons having eaten of that with impunity. Native of Germany, Austria, Swisserland, Norway; in hedges and by wood sides; flowering in June and July. Cultivated 1739, by Mr. Miller.

3. Chærophyllum aristatum: stem even swelling at the joints, seeds rough with hairs two-awned. Native of Japan.

4. Chærophyllum temulum, or wild chervil. Rough cow-parsley: stem rugged, joints swelling. Two feet or more in height. The roughness, deep purple colour, and swelled joints, of the stem, distinguish it from the first species; it also flowers a month or six weeks later, and is more confined to hedges, being rarely met with in open pastures. The stem being generally spotted with purple, it is frequently mistaken for hemlock. It has the name of *temulum* or *temulentum* from its supposed narcotic or inebriating quality, which it probably possesses, like the sylvestre, only in a very small degree, &c.

5. Chærophyllum hirsutum, or hairy chervil: stem equal; leaflets gashed, acute; fruits two-awned. This species is perennial, and resembles the first sort, but the leaves are hairy, and their segments broader. Stem four feet high. Corolla in some plants red, in others white. Native of Swisserland, Germany, Austria, Carniola, &c.

6. Chærophyllum aromaticum, or aromatic chærophyllum: stem equal; leaflets serrate, entire; fruits two-awned. Stem and petioles rough with hairs; from two to three feet high. Native of Lusatia, Misnia, Austria, Silesia; flowering in July and August. Cultivated 1758, by Mr. Miller.

7. Chærophyllum coloratum: stem equal; leaves superdecompound; involucels coloured. Native of Illyria.

8. Chærophyllum aureum, or golden chærophyllum: stem equal; leaflets gashed; seeds coloured, grooved, awnless. Stem angular, striated, spotted, rough with hairs at bottom, and not hollow: eighteen inches or more in height. Native of the country about Geneva, of Swisserland, Germany, and Austria. Cultivated 1570 by Mr. Penn.

9. Chærophyllum scabrum: stem equal, leaves gashed, acute, rough with hairs, peduncles rugged. Root fibrous; stem somewhat flexuose, erect, angular, striated, smooth below, hirsute above, a foot high and more; leaves bipinnate, rough with hairs. Found near Jeddo, &c. in Japan; flowering in April and May.

10. Chærophyllum arborescens: stem shrubby; leaves like those of the first species, large, superdecompound, with the pinnas much expanded. Native of Virginia.

Propagation and Culture. The first and fourth species are common weeds. The others are admitted only into botanic gardens; not being in use either for medicine, or in the kitchen. If the seeds be permitted to scatter, the plants will come up without farther care; or they may be sown in spring, where they are to remain. See ATHAMANTA and SCANDIX.

CHÆ'TODON, *s.* in ichthyology, a genus of fishes belonging to the order of *thoraci*. The generic character, by which these differ from all other thoracic fishes, is, the setaceous teeth. The body is broad, thin, laterally compressed, covered with hard scales, and most of the species are ornamented with transverse bands. The head and the aperture of the mouth are small; the lips can be protruded and drawn back: the teeth are loose, and of equal lengths; the eyes are small, round, covered with a membrane, and near the top of the head. The nostrils are double, small, and very near the eye. In most of the species, the dorsal, anal, and tail, fins, are stiff, and covered with scales; but all the species have spines in the dorsal and anal fins, the number of which varies in the different kinds, and often forms the specific character. This genus consists of a vast number of species; some authors reckon as many as seventy-seven; but it is not possible to say how many there may be. They are all entirely exotic, none of them being known in our seas. They are found in the warm countries of Asia, Africa, and America; most of the species are found in the East Indies: yet the genus was not even known to the ancient writers on fishes. Block, in his late celebrated work, enumerates forty-seven species, viz.

1. Chætodon

CHÆTODON

The Chætodon or Band-fish of Surat

1. Chætodon Suratensis, or Surat chetodon. Nineteen spines in the dorsal and thirteen in the anal fin, form the specific character. The membrane of the gills has five rays, the ventral fin sixteen, the anal twenty-three, the tail sixteen, the dorsal thirty-one. The aperture of the mouth is small; the lips fleshy; the nostrils, which are midway between the mouth and the eyes, are single and round; the rostrum declines; the iris is silvery. The aperture of the gills is wide, the membrane is loose, and sustained by five small jagged bones. The lateral line, which passes along the body near the back, is lost towards the end, and appears again about the middle of the tail. There is a black spot near the gill-covert, under the pectoral fin. The ground-colour of the fish is white, clouded with violet: and there are a vast number of beautiful round silvery spots, and six brown stripes or bands, the first of which reaches only to the pectoral fin. The anus is nearer to the head than to the tail. The ventral fins are black; the dorsal and anal, all along the spines, are violet, but the soft parts are grey; the spines of these fins are provided with soft broad filaments. It is a native of the seas about Surat, and is represented in the annexed Chætodon Plate I. They frequent the mouths of rivers in November, when they are taken pretty plentifully with the line. This grows fifteen inches long; the flesh is fat and well-tasted, either fried or boiled. At Tranquebar, the Portuguese eat them on fast-days, keeping them dried for that purpose. They spawn in February.

2. Chætodon Chinensis, or Chinese chetodon: with eighteen spines in the dorsal fin, which constitutes its specific character. The membrane of the gills has five rays; the pectoral fin ten, the ventral six, the anal twenty-eight, the tail sixteen, the dorsal twenty-four. This fish is broad in the middle, compressed at the ends. The head and mouth are small; the iris of the eye is bluish; on the gill-covert there is a black oval spot, with a white rim; there are two similar spots between the gill-covert and the eye. The branchiostege membrane is hid under the gill-covert. The lateral line runs parallel with the back; the anus is near the head. There are ten brown narrow bands on a white ground round the body of this fish, several of which are divided. The pectoral and ventral fins are grey; the rest violet-colour; the dorsal and pectoral fins are short; the anal long; there are fifteen spines in the dorsal fin. It is one of the fishes which the Chinese take by means of the tame guillemot or diver, which birds are trained for this sport.

3. Chætodon Kleinii, or Klein's band fish. A stripe across the eye and head, and seventeen spines in the dorsal fin, form the specific character. The membrane of the gills contains six rays, the pectoral fin fifteen, the ventral six, the anal twenty-three, the tail eighteen, the dorsal thirty-six. This fish is of a globular form; the aperture of the mouth is very small; the nostrils single; the pupil of the eye is black; the iris white; the gill-covert is composed of two thin leaves; the aperture is wide, and the membrane loose. The ground-colour of the body is white; the back is brown; the fins gold-yellow. This species is found in the East Indies. Klein was the first who described this fish, and gave a figure of it.

4. Chætodon bimaculatus, or the two-spotted chetodon. Two spots on the dorsal fin, and a stripe across the eyes, form its specific character. The membrane of the gills is provided with six rays, the pectoral fin with fourteen, the ventral with six, the anal with eighteen, the tail with seventeen, and the dorsal with thirty-four. The fins are oblong; the nostrils double, and placed near the eyes; the pupil of the eye is black, the iris yellow. The aperture of the gills is wide, and the membrane is concealed. The colour is white, inclining to grey; the pectoral and ventral fins are red, the others yellow at their origin and grey at the extremities. The band and the spots are edged with black and white; one of the spots is at the bottom, and the other at the edge, of the dorsal fin. Native of the East Indies.

5. Chætodon biaculeatus, or two-spined chetodon. The two spines under the eye furnish the specific character and the name. The membrane of the gills has four rays, the pectoral fin eighteen, the ventral six, the anal and tail seventeen each, the dorsal twenty-seven. The body is long; the back of a blue colour, the belly white. It is girt with three bands: the first encompasses the head, the second the body, the third the tail. The iris of the eye is of a brown hue. The hindermost of the two spines which are below the eye is much longer than the other. The two gill-coverts are jagged; the lateral line goes near the back; the anus is in the middle of the body. The fins are all grey, and vary only in shape; the pectoral and anal being round, the rest sharp; the dorsal fin has ten spines, and a furrow in the middle; the anal fin has two spines, the dorsal only one. This also is found in the East Indies.

6. Chætodon aureus, or the golden chetodon; the beautiful yellow colour of which, and the strong spine with which the jaw-bone is armed, form the specific character. There are twelve rays in the pectoral fin, six in the ventral, fifteen in the anal and tail, and twenty-four in the dorsal. The body down to the tail forms an oval figure; and except on the pectoral and ventral fins, it is covered with hard jagged scales. The mouth is small, with setaceous teeth; the lips are strong; the nostrils double, not far from the eyes; the pupil of the eye is black, the iris reddish. The gill-covert is a single plate, and goes off to a point near the pectoral fin: the aperture is large, and the membrane lies concealed under the covert. The origin of the fins is yellow, the extremities green. There are twelve sharp spines in the dorsal fin, and two in the anal; the rays of all the fins are branched; the tail and pectoral fins are round, the others are sickle-shaped. It inhabits the waters of the Antilles; and is carnivorous, being furnished with teeth proper for seizing its prey.

7. Chætodon imperator, or imperial chetodon; the body striped longitudinally, and the fourteen spines in the dorsal fin, form the specific character. The rays in the pectoral fin are eighteen in number, in the ventral six, in the anal twenty-three, in the tail sixteen, in the dorsal thirty-four. The head is large, and covered with small scales; the eyes have a black pupil, and orange-coloured iris; and round the iris is an arched blue stripe. The jaw-bone is edged with blue, and armed with a strong spine. The gill-covert is made up of two laminæ, with a blue stripe upon each. The ground-colour of the fish is white; the longitudinal stripes are blue. The dorsal and anal fins are thick, stiff, and round; the latter at its origin has three short strong spines; the ventral fin has one long one; all the fins have branched rays. It is a native of Japan, and the best of all the East-India fish: they are very scarce and dear, and only found on the tables of the great: whence the name.

8. Chætodon fasciatus, or striped chetodon. The specific character is, the fasciated, swathed, or listed, body, and seven spines in the anal fin. The pectoral fin has sixteen rays, the ventral six, the anal twenty-one, the tail fourteen, the dorsal twenty-three. The head, the scales, and the aperture of the mouth, are small; the jaws are of equal length, and furnished with teeth. The lips are hard; the nostrils double, and near the eyes; the pupil is black, the iris blue and white. There are blue stripes on the forehead, above, below, and behind, the eyes. The maxillary bone is jagged, and terminates behind in a strong spine. The gill-covert is one thin plate; the aperture is wide, the membrane hid. The colour is white, with blue stripes, edged with brown. The pectoral fin is short, transparent, and rounded; there is one spine in the ventral fin; and fourteen in the dorsal; the rest of the rays of the fins are soft and ramified. The blue bands round the anal fin have not the brown edge remarked in those on the trunk. This fish, which the Japanese call *the duke*, probably an account of its

its various-coloured bands, is a native of the East Indies. It appears to be of the voracious kind by its mouth and teeth.

9. Chætodon guttatus, or the spotted chetodon. Two spines (the first and last rays) in the ventral fin form the specific character. There are fifteen rays in the membrane of the gills, fifteen in the pectoral fin, five in the ventral, sixteen in the tail, and anal, and twenty-three in the dorsal. The body is narrow, compared with the other species, and covered with small scales; and the mouth is larger; the jaws are of an equal length, armed with sharp teeth; the lips are strong, the upper moveable and consisting of two bones. The eyes are large and round, the pupil black, the iris deep yellow. The gill-covert is one thin long plate, under which the membrane lies concealed. The sides are grey towards the back, white towards the belly, and marked with round spots of a reddish-brown colour, which look like drops of water. The fins are without scales, the pectoral yellowish brown, the ventral grey, the tail yellowish, the dorsal and anal dark grey. The rays of all the fins, except the specific spines, are branched; those of the tail have some reddish-brown dots; the dorsal has thirteen spines, the anal seven. It is a native of Japan, described only by Bloch, who calls it *bandouliere tachetée*. It is never caught but at the junction of fresh water and salt, i. e. at the mouths of rivers and streams; it is a scarce fish, and delicate eating; the prick of its spines is very painful.

10. Chætodon paru, or variegated angel-fish; the specific character of which is known by twelve spines in the dorsal fin, and five in the anal. There are fourteen rays in the pectoral fin, six in the ventral, and fifteen in the tail. The head is small; the aperture of the mouth somewhat wider than in many of the other species; the lower jaw is protruded beyond the upper; and both are armed with teeth; the upper lip consists of two long, narrow, thin, bones. The eyes are small, with a black pupil inclosed in a golden iris. The nostrils are just below the eyes, the gill-covert consists of two plates, and ends in a strong spine below; the head and breast are covered with small scales; those on the rest of the body are large; and they are all edged with yellow; there is also a yellow spot in front of the pectoral fin. The ground-colour of the fish is entirely black; and it is only on the sides, where the silvery scales hardly cover it, that the black appears through, and makes a grey colour. This fish is a native of America; it is found at Brasil and Jamaica, where its flesh is eaten.

11. Chætodon pavo, or peacock chetodon; in which its lengthened body, and fourteen spines in the dorsal fin, make up the specific character. There are four rays in the membrane of the gills, fifteen in the pectoral fin, six in the ventral, seventeen in the anal, fixteen in the tail, and twenty-seven in the dorsal. The head is large; mouth small; jaws armed with small teeth, and the lips hard; above these are the nostrils, double and round; between which and the eyes are some faint blue lines. The pupil of the eye is black; the iris of a greenish white. Behind the eyes, and near the beginning of the lateral line, is a round blue spot. The head and breast are of a yellowish brown colour, marked with bright blue spots. The gill-covert is one single plate, with a large aperture. The whole body is spread with various colour, which are intermixed so agreeably as to resemble a peacock's tail. It is a native of the East Indies, and is described only by Bloch, who, from it beautiful colours, calls it, *paon de l'Inde*, the Indian peacock.

12. Chætodon tricolor, or three-coloured chetodon. Its three distinct colours, and a long spine at the gill-covert, form its specific character. There are six rays in the membrane of the gills, twelve in the pectoral fin, six in the ventral, twenty-one in the anal, fifteen in the tail, and thirty-three in the dorsal. This very singular species is represented in the Chætodon Plate II. The head and mouth are small; the nostrils double; the gill-coverts and fins are edged with red, the mouth with black; the head, breast, belly, and fins, are yellow; from the shoulders to the tail it is entirely black; the pupil of the eye is black; with an iris of a beautiful gold-colour. The gill-covert is rounded before, and jagged behind; the aperture is wide, and the membrane covered; the back is sharp, and the belly rounded. The scales are hard, jagged, strongly attached to the skin, and like the fins, edged with red. The dorsal and anal fins are so covered with scales as to be quite stiff; the anal has three spines, the dorsal fourteen. This curious fish is found in the Brasilian sea, where prince Maurice made his drawing on the spot, from whence the annexed engraving is copied; it is also known in Cuba and at Guadaloupe; where it grows to two feet long.

13. Chætodon maculatus, or spangled chetodon. Eighteen prickles in the dorsal fin, and twelve in the anal, form its specific character. There are six rays in the membrane of the gills, sixteen in the pectoral fin, thirteen in the ventral, twenty in the anal and tail, and twenty-six in the dorsal. This species is also distinguished by being smaller, the body more flattened, the scales softer, and shining like gold spangles. These fishes abound on the coast of Coromandel, and in the fresh waters of Surinam; they are very full of bones, and therefore seldom eaten except by the negroes. The head is small and blunt; the bones of the lips narrow; the teeth like bristles; the nostrils single, and near the eyes. The pupil of the eye is black, with double irides, a narrow one which is yellow, and a broader one which is brown.

14. Chætodon macrolepidotus, or chetodon with enlarged scales. Two broad stripes on the body extending to the fins, the fin of the tail straight, and the fourth ray of the dorsal fin very long, like a hair or string, form its specific character. There are sixteen rays in the pectoral fin, six in the ventral, twenty-four in the anal, eighteen in the tail, and thirty-four in the dorsal. The head is small; the jaws of equal length; the eyes round, with a black pupil and bluish iris; below which there are two little apertures; above the eyes is a brown spot, and below them another of the same colour. The gill-covert is single; the aperture is wide, and the membrane lies hid under the covert. The scales on the head are small; but they advance in size from the head to the tail, where they are considerably enlarged. The brown stripes on a silver ground have a very pretty effect. The dorsal fin has eleven stiff rays, the anal three, the ventral one; the other rays are branched. This beautiful fish haunts the East-Indian seas; it grows to a large size, sometimes weighing twenty-five pounds. It is fat and well-flavoured, tasting like the sole.

15. Chætodon cornutus, the sea heron, or horned chetodon. Its specific character consists in the mouth being in the form of a cylinder, the tail crescent-shaped, and the third ray of the dorsal fin very long, like a horn. There are four rays in the membrane of the gills, eighteen in the pectoral fin, six in the ventral, thirty-two in the anal, and forty-five in the dorsal. The body is thin, and covered with very small scales. The jaws are of equal length, with two rows of teeth. The eyes are very near the top of the head; and below them are four little apertures. The gill-covert is single, and round; the aperture is wide, and the membrane lies concealed. The white ground of the body is relieved by black bands: the upper band, which passes over the eye, is divided, in some subjects, by a light stroke: this occasional variation has occasioned some to make two species of it. The dorsal fin has twelve stiff rays. It is an East Indian fish; and, according to Valentine, the flesh is good food.

16. Chætodon unimaculatus, or one-spotted chetodon: the single black spot on the lateral line, and thirteen spines in the dorsal fin, constitute its specific character. There are fourteen rays in the pectoral fin, six in the ventral, twenty-three in the anal, sixteen in the tail, thirty-five in the dorsal. The head is small, and a black band passes over the eye. The jaws are of equal length; and the nostrils are near the eyes. The pupil is black, surrounded by a white line, and a brown iris. The gill-covert

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The three-coloured Chætodon.

covert is composed of two small plates, and the membrane lies underneath, sustained by four little bones. The sides are white, covered with scales, and ornamented with transverse lines of a yellow colour. The back is grey, and there is a brown stripe across the tail. The fins are all yellow, with branched rays. Both the anal and dorsal fins are short, rounded, and edged with brown. This is also an East-Indian fish; Bloch received it from Japan, and he calls it *bandouliere à tache*.

17. Chætodon rostratus, or beaked chetodon; specifically distinguished by its long cylindrical beak, and by a black spot edged with white on the back. There are twelve rays in the pectoral fin, six in the ventral, twenty-three in the anal, fifteen in the tail, and thirty-nine in the dorsal. The trunk is broad and thin; the head narrow and long, and the mouth small; the jaws are of equal length, with small teeth. The nostrils are single, cylindrical, and very near the eyes; the pupil of the eye is black, the iris yellow, partly covered by a brown stripe or band passing over the eye. On the white ground there are brown longitudinal strokes, and four broad transverse bands: all the bands are black, edged with white. This fish haunts the Indian ocean, and at certain seasons approaches the mouths of rivers. It is remarkable for the method of obtaining its food. When it perceives an insect or fly perched on a sea-weed above the water, it advances within five or six feet, and thence spirts the water out of its long beak as through a syringe or squirt, with so much force as to beat it into the water, when he catches it up before it can recover itself. As this is a pleasing sight, the great men in the east keep these fish in large vases for amusement. They transfix an insect with a pin, and fasten it to the side of the vessel, when all the fishes, eager to get the fly, begin spirting drops of water at it with the greatest swiftness and without ever missing their aim. When they have furnished sufficient amusement, they are killed for the table, and are good food.

18. Chætodon orbis, the globular chetodon. Its orbicular form, with nineteen rays in the anal fin, determine its specific character. There are eighteen rays in the pectoral fin, six in the ventral, sixteen in the tail, and twenty-eight in the dorsal. The head is small, and very much declining; the nostrils single, and not far from the eyes; the pupil is black, iris gold-colour. The jaws are of equal length; the aperture of the gills is very large, and the membrane lies under the operculum or covert, which is narrow. The lateral line differs from the other species; instead of forming the usual arch, it is composed of a number of short strokes, at a small distance from each other, making a blunt angle with the back. The ground-colour of this fish is blue; it is a native of the East Indies; grows a foot long, and nearly as much broad. It is only caught in the sea, chiefly in the mouth of October, when it is most fat and succulent; but it is never found in abundance.

19. Chætodon nigricans, or Brasilian chetodon. Its notched teeth and the spine in the tail, form the specific character. There are four rays in the membrane of the gills, eighteen in the pectoral fin, six in the ventral, twenty-seven in the anal, twenty-one in the tail, and thirty-six in the dorsal. When the teeth are examined with a microscope, they look like a row of hands, being narrow and round below, and broader above, and they end in yellow points, one rising above another, somewhat like the fingers in a hand laid flat. There are sixteen teeth in the upper jaw, and ten in the lower. The body of this fish is harder than the other species, and is covered with scales. The head is small, the eyes large, with a black pupil and silvery iris: it has two apertures directly under the eyes. The gill-covert is long and narrow. The trunk is blackish on the back, brown at the sides, and white towards the belly. The pectoral fins are grey; the ventrals black; both furnished with branched rays: the dorsal and anal fins are white at their origin, brownish towards the extremities, with branched rays also, the tail fin is light grey with branched rays. This fish is found in different countries: at Brasil, in the Red Sea, and in the East Indies; where it grows to the length of two feet. The flesh is firm, juicy, and well tasted; its food is shell-fish and young crabs.

20. Chætodon Argusi, the Argus chetodon. Its specific character is taken from the four spotted spines, like eyes, in the anal fin. There are four rays in the membrane of the gills, eighteen in the pectoral fin, six in the ventral, eighteen in the anal, fourteen in the tail, twenty-eight in the dorsal. The body of this fish is almost square. The pupil of the eye is black; the iris gold-yellow. The aperture of the gills is wide, the membrane loose; the lateral line forms an arch. The sides are full of beautiful brown spots like eyes: whence the name. The colour is violet towards the back, white towards the belly: the fins are all short, and of a yellow colour. It is found in the fresh waters of the East Indies, commonly in marshy places abounding with insects, which are its food. Ruysch says that they follow the ships, and eat whatever is thrown into the sea, whence the name *stront-visch*, as if they fed on ordure. The flesh is wholesome, fat, and well-tasted. It is very remarkable that this fish is found petrified in the mountains of Bolca in Italy.

21. Chætodon vagabundus, or wandering chetodon. Its cylindrical mouth, a band across the eye, and thirteen spines in the dorsal fin, form its specific character. There are eighteen rays in the pectoral fin, six in the ventral, twenty in the anal, fourteen in the tail, and thirty-three in the dorsal. The head and body is covered with scales; over the head passes a black band, and round the body a brown stripe. The gill-covert is made up of two small plates, and the membrane is loose. The pupil of the eye is black, enclosed in a brown iris with a white line. The ground-colour of the fish is yellow; at the extremity of the trunk, and in the middle of the tail, fin, there is a black band. The dorsal, anal, and tail fins, are yellow bordered with brown. This beautiful fish abounds all over the East-Indian seas; and traverses the lakes and rivulets. It is fat, firm, and well-tasted.

22. Chætodon trivinculum, or three-banded chetodon. Specific character, three black bands round the body, with the dorsal and anal fins very long. There are seven rays in the membrane of the gills, eleven in the pectoral fin, six in the ventral, twenty-six in the anal, seventeen in the tail, and thirty-four in the dorsal. The body is very thin, as broad as it is long, with a declining rostrum. The head and mouth are small; the nostrils double, and near the eyes: the pupil is black, the iris white inclining to red. The gill-covert is one small plate; the aperture is wide, and the membrane partly concealed. The scales are very small, and jagged. The ground-colour is white; and the three black bands which intersect it have a very pretty effect: the first begins at the top of the head, goes round the eyes, and ends at the chin; the second reaches from the back to the anus; and the third which is near the tail, passes over part of the dorsal and anal fins. The rest of these fins, as well as those of the breast and tail, are white; but the ventral is black; the dorsal fin has five spines at its origin, the anal three. This singular fish is found in the Arabian and Indian seas; the subject represented in the Chætodon Plate III. fig. 1. is from the latter place. It lives on corals and shell-fish; and grows a foot and a half long, and broad in proportion; it lives only in the sea; and is caught from January to May; but never plentiful, and they are taken at no other part of the year. The flesh is nourishing, and is much recommended to sick people.

23. Chætodon perca, or perch-headed chetodon. The three bands on its body, with the dorsal and anal fins very short, form its specific character. The first band passes over the head; the second over the breast, the third from the extremity of the anus to the end of the dorsal

dorsal fin. This is a beautiful little fish; the ground-colour of which is silver. There are seventeen rays in the pectoral fin, five in the ventral, thirteen in the anal, sixteen in the tail, and twenty-four in the dorsal. The head is large; the mouth small; the jaws of equal length, armed with little sharp teeth. The top of the head and the iris are brown; the nostrils are near the upper lip; the bones of the cheeks are jagged, the gill-covert is one little plate, going to a point in the middle; the aperture is large, and the membrane is hid under the covert. The back and its fin are yellow, except where intersected by the bands; the central fin is long and black; the anal yellowish; the pectoral fin is transparent, that of the tail grey, and round. The scales are small, and extend over the dorsal, anal, and tail, fins. This fish is also found in the East Indies, and in Arabia; the one represented in the annexed plate, fig. 2. is from the former place. It lies among the coral, and lives on polype and other little animals. Its flesh is good food. This fish seems to form a connecting link between the chetodon (or band-fish,) and the perch. Its teeth and cheek-bone resemble the latter; but the body or trunk answers to the former, being broad, banded, and the fins covered with scales. But, as the teeth are not setaceous, or bristly, which is the generic character of the chetodon, it would more properly come among the perches. It is probable Linnæus did not examine the teeth. We have nevertheless followed that systematic author, in placing it in this genus.

24. Chætodon vespertilio, or sea-bat; the specific character of which arises from the broad dorsal and anal fins, extended like wings; and a black band across the tail. There are five rays in the membrane of the gills, eighteen in the pectoral fin; six in the ventral, thirty-three in the anal, seventeen in the tail, and forty-one in the dorsal. This fish is as broad as it is long. The head has no scales; the lips are strong; there are two round holes near the eyes; the pupil is black, encircled by a white line and a yellow iris. The gill-covert is made up of two small silvery plates; the aperture is wide, and the membrane partly concealed. The body is grey towards the back, white towards the belly, and covered with very small scales. The fins have branched rays; and are of a grey colour, except the dorsal and anal, of which the part covered with scales is yellowish. The first ray of the long ventral fin is a spine, of which there are three in the anal fin, and five in the dorsal; the dorsal and anal fins are very wide and thick, which occasioned Bloch to call it *bandouiliere à larges nageoires*; but Willughby, the *sea-bat*. This curious species is shewn at fig. 3. of the preceding plate.

25. Chætodon striatus, the striated chetodon. Its body swathed, the tail fin rounded, and thirteen spines in the dorsal fin, determine its specific character. There are sixteen rays in the pectoral fin, six in the ventral, twenty-two in the anal, eighteen in the tail, and thirty-two in the dorsal. The head is small, but furnished with large scales. The eyes are large, the pupil black, enclosed within a yellow line and a white iris. The gill-covert, under which the membrane is concealed, is double. The colour is yellow towards the back, white towards the belly, which colours are greatly set off by the brown bands. The fins are yellow at bottom, and brown towards the extremities. The pectoral fin is entirely brown, the ventral black. It is found both in the East Indies and in America; and is excellent food.

26. Chætodon capistratus, the striped angel-fish, or sea-butterfly. The specific character arises from a black spot encircled with white near the tail, and thirteen spines in the dorsal fin. There are five rays in the membrane of the gills, fourteen in the pectoral fin, six in the ventral, nineteen in the anal, sixteen in the tail, and thirty-three in the dorsal. This pretty fish has large eyes compared with the other species, the pupil is black, the iris reddish. The gill-covert is double, or made up of two small laminæ, under which the membrane lies concealed; the aperture is very broad. The body is covered with large scales, and a number of brown lines, forming a net-work, which has a pretty effect. There is a brown band at the origin of the tail-fin, and to the dorsal and anal fins there is an edging of the same colour. The gill-coverts and the spines of the dorsal and anal fins, are of a beautiful sea-green; but the fins themselves are all of a yellowish colour. This fish is found at Jamaica; it is small and thin, being seldom more than two or three inches long; and hence is devoured by the voracious kinds.

27. Chætodon bicolor, or two-coloured chætodon; specifically distinguished by the contrast of the two colours on its body. There are fourteen rays in the pectoral fin, six in the ventral, eighteen in the anal, sixteen in the tail, and thirty-five in the dorsal. The body is oblong; the gill-covert jagged, and armed with a spine. The head, with one half of the body, and the tail, are white; all the rest brown. The pectoral fins are semi-transparent; the anal and dorsal are covered with scales to the very ends. The eyes are large; pupil black, iris red. This beautiful fish is found in both the Indies.

28. Chætodon saxatilis, the mouchana chetodon. Its body long and fasciated, with thirteen rays in the anal fin, form the specific character. There are eighteen rays in the pectoral fin, six in the ventral, nineteen in the tail, twenty-six in the dorsal. The scales are very large in proportion to the body; those on the fins only are small. The eyes are large; pupil black, iris yellow. It has four little apertures just below the eyes. The membrane of the gills is loose, the aperture very wide. Five black bands on a white ground decorate the body. The fins are all black; the tail forked. Inhabits the seas of Brasil, the East Indies, and Arabia. It lies in deep places on beds of coral, and feeds on polypes. It rarely grows more than six or eight inches long. It keeps generally at the bottom of the waters, and thus escapes the hand of man.

29. Chætodon marginatus, the bordered chetodon: all the fins bordered or edged, and ending in a point, form its specific character. There are twelve rays in the pectoral fin, eight in the ventral, sixteen in the anal, twenty in the tail, and twenty-five in the dorsal. Besides these marks, it is distinguished by having no scales on the anal, tail, and dorsal, fins, which last only has prickly rays. The head and belly are whitish, the sides and back yellow. The scales are large; the ventral, pectoral, and anal, fins, and the back part of the dorsal, are grey; the rest of the dorsal fin and the tail are yellow; all the fins have branched rays except the twelve spiny ones of the dorsal. The eyes, instead of the usual round form, are oblong; and the branchial membrane is loose; the pupil of the eye is black, iris silvery; with two little round holes below. The eight light-brown bands on this fish give it an agreeable appearance. This species is found haunting the shores of the Antilles; and lives on small fish. Its flesh is well tasted.

30. Chætodon chirurgus, or the surgeon: one spine in the tail, and fourteen on the back, give its specific character. There are sixteen rays in the pectoral fin, six in the ventral, twenty in the anal, sixteen in the tail, twenty-six in the dorsal. It has no scales on the fins; the head is large; the upper jaw the longest; the aperture of the gills is wide, and the membrane loose. The eyes are round, having a black pupil with a white line and a yellow iris. The head is mingled with violet-colour and black, the sides and back yellow, the belly bluish; the pectoral and ventral fins violet; the anal of the same colour, with brown bands; the tail-fin is yellow at its origin, violet towards the extremity; and the dorsal fin is marbled with yellow and violet-colour. There are five narrow bands of a violet-colour on the trunk. This fish also inhabits the Antilles, and its flesh is well-tasted. The lancet-shaped spine in the tail gained it the name of *the surgeon*. This account is from Plumier's MS.

31. Chætodon rhomboides, or rhomboidal chetodon. Specific

1. The Teira. 2. The Aruanus. 3. The Vespertilio, Chætodons.

Specific character, three spines in the anus, and five in the back. There are eighteen rays in the pectoral fin, six in the ventral, twenty-four in the anal, twenty-six in the tail, twenty-two in the dorsal. The body is covered with scales, and is of a rhomboidal shape. The head is green at top, at the sides silvery. The back is dark green, which declines to a sea-green on the sides, which colour towards the belly is lost in three bands; the interval between these bands is white, and the belly yellow. The mouth is larger, and the teeth smaller, than in most of the species. The eyes are large, round, and have a black pupil in the middle of a red iris: below each eye are two little holes. The gill-covert consists of two small laminæ; the membrane is loose, and lies near the aperture, which is wide. The pectoral and ventral fins are yellow in the middle, violet towards the extremities; the anal, tail, and dorsal, fins, have a green border. This is an American fish; and grows to a considerable size.

32. Chætodon glaucus, or blue chetodon. The lateral line strait, and five spines on the back, form the specific character. There are twelve rays in the pectoral fin, six in the ventral, seventeen in the anal, twenty in the dorsal and tail. It is also peculiar to this species, that the anal fin is entirely composed of soft rays, and the ventral fins very small. The body is long, and covered with scales. The head small; the aperture of the mouth large. The eyes are small; the pupil, which is black, is surrounded with a white iris. Between the eyes and mouth are four little holes. The branchial membrane is loose; the aperture of the gills wide. The back and sides are blue as far as the lateral line, below which they are of a silvery whiteness. There are six short narrow black stripes on the body. The pectoral and ventral fins are yellowish at bottom, blue towards the ends; the others are blackish, and end in long points. Found in the American seas.

33. Chætodon Plumieri, or Plumier's chetodon. Its specific character is determined by two dorsal fins, and no scales on the head. There are four rays in the membrane of the gills, fourteen in the pectoral fin, six in the ventral, twenty-five in the anal, twelve in the tail, five in the first dorsal, thirty-four in the second. The body is shaped like a small shield; it is ornamented with six green bands, and covered above with small scales. The head is small, brown above, white at the sides. The eyes are white inclining to orange: above them is an elevation, below which are two round apertures. The gill-covert is two small laminæ; and the membrane, which has broad rays, is loose. The back is of a brownish colour; the sides yellowish, the belly white. The fins have no scales; they are green, and have branched rays. This was first found by Plumier, and retains his name. Native of the East Indies, and is good food.

34. Chætodon falcula, or sickle-banded chetodon. Specific character, two large black sickle-shaped bands, edged with white, running down the back. There are six rays in the membrane of the gills, fifteen in the pectoral fin; six in the ventral, twenty-four in the anal, twenty in the tail, and thirty-seven in the dorsal. The head is small; the snout almost like a trumpet; the orifice of the mouth is narrow, the teeth small; the nostrils single, and near the eyes; the pupil is black, full, and surrounded with a narrow blue iris. This fish has a broad black band going almost round the head, and in this the eyes are placed; this band is edged, on both sides, with a narrow stripe of white. The front gill-covert is like a fine saw; the hinder one is rounded off; and both are bounded by a black line. The scales on the head and fins are small; those on the body large; they adhere firmly to the skin, are toothed, and hard. The lateral line is near the back, and forms almost a semi-circle. The pectoral, ventral, and tail, fins, are all covered with scales, edged with black; their rays are branched. The regular brown bands which run down from the back, the edgings of the scales, &c. have a very beautiful effect on the silvery ground. Round the tail, close to the trunk, is a broad black band parallel with the edge of the fin; and bordered top and bottom with white. This curious species is found on the coast of Coromandel, and is correctly represented in the Chætodon Plate IV. fig. 1.

35. Chætodon setifer, or bristled chetodon: one long bristle, and a round black spot edged with white, in the dorsal fin, forms the specific character. There are six rays in the membrane of the gills, fifteen in the pectoral fin, six in the ventral, twenty-four in the anal, twenty in the tail, thirty-seven in the dorsal. The head is small; the snout thin and short: the aperture of the mouth is small; the lips broad; a black band, edged with white, goes round the head. The lateral line is arched; it is much nearer the back than the belly. It has thirteen prickly rays in the dorsal fin; three in the anal, and one in the ventral. The body is covered with large, hard, jagged, scales; somewhat resembling the quills of a porcupine. The red stripes which go in different directions across the body have a fine effect on the ground colour, which is yellow. The scales on the tail, anal, and dorsal, fins, make them very stiff; they are decorated with a black border. This very singular and elegant fish is shewn at fig. 2, of the above-mentioned engraving.

36. Chætodon ocellatus, the eye-banded chetodon. The specific character is, a black band over the eye; twelve spines in the dorsal fin; and a round black spot edged with white on the back. There are five rays in the membrane of the gills, sixteen in the pectoral fin, six in the ventral, twenty-two in the anal, eighteen in the tail, and thirty-four in the dorsal. The head and fins are covered with small scales; those on the body are large. The gill-covert is a single plate, which is short, and of a golden colour; the membrane is loose. The back is brown; the sides and belly white. The lateral line, contrary to the direction of the other species, goes strait from the upper end of the gill covert to the spot on the dorsal fin, where it is lost, but appears again on the opposite side of it, and then terminates in the middle of the tail. This fish is found in the East Indies.

37. Chætodon arcuatus, or bow-banded chetodon: five white arched bands on the body, and nine spines in the dorsal fin, determine the specific character. The first of the bands encircles the mouth; the last the dorsal fin; the rest pass over the body, very curiously bent in the shape of a bow, which occasioned Linnæus to give it the name, *arcuatus*. There are six rays in the membrane of the gills, sixteen in the pectoral fin, six in the ventral, twenty-five in the anal, fourteen in the tail, and forty-three in the dorsal. The head is large; the eyes placed at top, and small; the pupil black, iris gold yellow. The aperture of the gills is wide, and at the covert there is a spine. The lateral line is made up of white dots. The ground colour is brown, which towards the back inclines to black; and looks as if covered with velvet, inlaid with ivory. This species inhabits the seas of Brazil; and according to Marcgrave grows only three or four inches long; but from Seba's account it certainly attains a larger size.

38. Chætodon Curaçao, or the angel-fish of Curaçoa. Specific character, two spines in the anus, and thirteen in the back. There are twelve rays in the pectoral fin; six in the ventral, sixteen in the anal and tail, and twenty-five in the dorsal. The head is large, the jaws equal, and the lips strong; between which and the eyes are two little cylindrical holes on each side. The iris of the eye is white edged with yellow, and the pupil is black. The gill-covert is broad, and violet-coloured. The back is bluish; on the sides are three spots, with silvery scales edged with violet. The fins are yellow, with ramified rays; the tail-fin is bifurcated, the anal very strong. This fish inhabits the waters of South America, especially about the island of Curaçoa, whence the name. It is larger than most of the species; the flesh is fat and well-tasted.

39. Chætodon faber, or the smith. Specific character; body banded, the third spine of the dorsal fin long. There

There are eight rays in the membrane of the gills, sixteen in the pectoral fin, six in the ventral, twenty-four in the anal, and thirty-one in the dorsal. The body is thin; the ground-colour silver relieved by six bands of deep blue, the upper one but weak. The pupil of the eye is black, iris yellow. The branchial membrane is hid under the covert. The lateral line runs near the back, and forms a similar arch. The pectoral and ventral fins are black; the others dark blue. This is also found in the waters of South America, and is good food.

40. Chætodon Mauritii, or Prince Maurice's chætodon; three spines in the anal fin, and eleven in the dorsal, form the specific character. There are fourteen rays in the pectoral fin, six in the ventral, thirteen in the anal, eighteen in the tail, twenty-three in the dorsal. The body is covered with small scales; the mouth is large, the iris of the eye silvery white, inclining to yellow: the nostrils are below, and very narrow. The aperture of the gills is wide, and the membrane is hid under the covert. The back is arched, and of a deep blue colour; the belly is white; and over the sides, which are light blue, pass six black bands. The ventral fins are yellow; the pectorals dark blue; the others dark blue at the ends, and reddish at the bottom. Prince Maurice found this species at Brasil. It grows two feet long: the flesh is white, and well-tasted.

41. Chætodon Bengalensis, or Bengal chetodon. Specific character; banded body, two spines in the anal fin, and thirteen in the dorsal. There are four rays in the membrane of the gills, sixteen in the pectoral fin, six in the ventral, fourteen in the anal, eighteen in the tail, twenty-five in the dorsal. The body is broad; the ground colour blue, with five chesnut-coloured bands. The fins are brown at their origin, and blue at their extremities. The scales on the head and fins are small, those on the body large. The opening at the gills is wide, and the membrane is concealed under the operculum. The eyes have a black pupil, surrounded by a white iris inclining to yellow. This species is peculiar to Bengal, whence its name.

42. Chætodon ciliaris, the hairy angel-fish. The spine in the cheek, and the bristly edges of the scales, form the specific character. There are six rays in the membrane of the gills, twenty in the pectoral fin, six in the ventral, twenty-two in the anal, sixteen in the tail, and thirty-five in the dorsal. The head and fins are furnished with small scales; the body with large ones; the capillary risings, which begin at the middle of the scales and pass beyond their extremities, are very remarkable, and give the specific name. The aperture of the mouth is small; the jaws of equal length, the lips strong; between which and the eyes are four round apertures. The eyes have a black pupil; the iris is white inclining to red. On the back, which is dark grey, and just before the fin, is a black ring. The sides are grey; the fins the same, edged with brown; and the belly is white. The cheeks are jagged, and near the long spine are two shorter ones; the aperture of the gills is wide, and the membrane is in part concealed. This species is from the East Indies; they are caught about the island of St. Croix, and are much esteemed by the inhabitants. The stomach is large and wide, of a bent form; the food is little crabs, which are often found half-digested therein. The intestinal canal is very long, with a great many flexures, and is fastened to the mesentery, as in quadrupeds. The air-bladder is strong, and fastened to each side, as in the perch. Neither ovary nor seed-vessels have been discovered: indeed the fish is very imperfectly known in Europe.

43. Chætodon octo fasciatus, or eight-banded chetodon. Specific character, eight transverse bands on the body, eleven spines in the dorsal fin. There are sixteen rays in the pectoral fin, six in the ventral, sixteen in the anal, twelve in the tail, twenty-eight in the dorsal. The head is small; the jaws protrude, but are of equal length. The iris of the eye is white inclining to yellow; in front of which are two round apertures. The ground-colour is white inclining to violet; the bands are brown, lying two and two together. The anal and dorsal fins are edged with brown, the others with grey. This is an East-Indian fish, and Linnæus regards it as a *perch*; but it is evidently a chetodon, for which reason we have followed Bloch's classification.

44. Chætodon annularis, the ring-chetodon. Specific character; the body striped longitudinally, with a circle or ring on the lateral line near the head. There are sixteen rays in the pectoral fin, six in the ventral, twenty-eight in the anal, sixteen in the tail, forty-one in the dorsal. The stripes are six in number, not strait, and of a light-blue colour. The ground-colour of the fish is brown, the scales are small. The iris of the eye is silvery, and near the eyes there are four small apertures. The gill-covert is double; the upper lamina jagged and armed with a spine. The pectoral, ventral, and tail, fins, are white; the anal and dorsal black: the former is rounded, and has a blue band; the latter ends in a point. This is from the East Indies; and is good food.

45. Chætodon collare, the collared chetodon: five bands round the head (two white, the others black), and twelve spines in the dorsal fin, form the specific character. There are four rays in the membrane of the gills, fourteen in the pectoral fin, six in the ventral, twenty-four in the anal, twenty in the tail, and forty in the dorsal. The jaws are protruded; the eyes are large, with a black pupil, blue iris, and a membrane; just below there are two little holes. The forehead goes down with a steep declivity. The scales are small on the head and fins; but very large on the body. The sides and back are blue; the belly yellowish. The pectoral fin is yellow, the ventral grey, the rest yellowish edged with brown. There is a yellow band on the dorsal fin, and a brown one across the tail. This species is very small, and is a native of Japan.

46. Chætodon meloleucus, or mulatto chetodon: a black band over the eye, the gill-covert armed with a spine, and twelve spines in the dorsal fin, form the specific character. There are sixteen rays in the pectoral fin, six in the ventral, twenty one in the anal, sixteen in the tail, twenty-nine in the dorsal. The body forms an oblong rounded figure, and is covered with small scales. The fore-part is white inclining to blue: the back part black; the dorsal and anal fins are dark, the rest light. The eyes are large, and just in front of them are two oblong apertures; the gill-covert consists of two small laminæ; and beneath the large spine several small ones appear; the aperture is large, and the membrane partly loose. This is also a small species, and was received from Japan by Bloch, in whose work only a description of it is found.

47. Chætodon velifer, the sail-finned chetodon. The teeth serrated and cutting, and one spine in the tail, form its specific character. The body is compressed, party-coloured, and has seven fins. It inhabits the seas of both the Indies. The head is small, blunt, and ends in a blunt snout; the mouth is small, the lips large; the jaws are armed with only one row of hollowed jagged teeth. The nostrils are single, and near the eyes. The pupil is black, with two irides; one blue, the other yellow. The gill-coverts are united; the aperture is wide, the membrane concealed. The ground colour of the body is white, covered with brown bands, like most of the other chætodons. The belly goes off sharp; the back is rounded. The dorsal and anal fins form each a half-circle, somewhat like full-bent sails; whence its name: and are ornamented with round blue spots. The spine of the tail is enclosed in a sheath; it is moveable, and the point is directed upwards towards the head of the fish. The rays of the pectoral fins are soft and ramified; the anal fin has two prickly rays, the dorsal three, the tail four on each side; the rest of the rays of these fins are soft. Bloch makes a separate genus of this, under the name of *acanthurus*.

CHÆTODON. Plat. IV.

1

2

1. The sickle banded Chetodon 2. The bristled Chetodon.

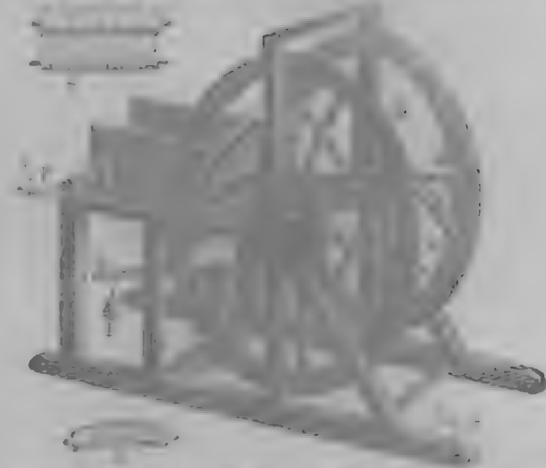
[illegible]

The former mass to form, and frame to use. *Dryden.*

[illegible]

[illegible] with violets mix'd [illegible]

[illegible]



[illegible]

CHAF'FERER, *f.* A buyer; bargainer; purchaser.

CHAF'FERN, *f.* [*efchauffer*, Fr. to heat.] A veffel for heating water.

CHAF'FERY, *f.* Traffic; the practice of buying and felling.—The third is, merchandize and *chaffery*; that is, buying and felling. *Spenfer.*

CHAF'FERY, in the iron works, the name of one of the two principal forges. The other is called the finery. When the iron has been brought at the finery into what is called an ancony, or fquare mafs, hammered into a bar in its middle, but with its two ends rough, the bufinefs to be done at the chaffery is the reducing the whole to the fame fhape, by hammering down the rough ends to the fhape of the middle part.

CHAF'FINCH, *f.* A bird fo called, becaufe it delights in chaff. See FRINGILLA.

CHAFF'LESS, *adj.* Without chaff:

The love I bear him,
Made me to fan you thus; but the gods made you,
Unlike all others, *chafflefs.* *Shakefpeare.*

CHAFF'WEED, *f.* [*gnaphalium*, Lat.] An herb the fame with *cudweed.*

CHAF'FY, *adj.* Like chaff; full of chaff; light.—If the ftraws be light and *chaffy*, and held at a reafonable diftance, they will not rife unto the middle. *Brown.*

CHA'FINGDISH, *f.* A veffel to make any thing hot in; a portable grate for coals.

CHAGNON, a town of France in the department of the Rhone and Loire: fix leagues fouth of Lyons.

CHAGNY', a town of France, in the department of the Saone and Loire, and chief place of a canton, in the diftrict of Chalons: ten miles north-north-weft Chalons fur Saone.

CHA'GRE, a river of South America, in the ifthmus of Darien, which runs into the fea, thirty miles weft-fouth-weft Porto Bello.

CHAGRI'N, *f.* [*chagrine*, Fr.] Ill humour; vexation; fretfulnefs; peevifhnefs. It is pronounced *fhagreen*:

Hear me, and touch Belinda with *chagrin*;
That fingle act gives half the world the fpleen. *Pope.*

To CHAGR'IN, *v. a.* [*chagriner*, Fr.] To vex; to put out of temper; to teaze; to make uneafy.

CHAHAI'GNE, a town of France, in the department of the Sarte, and chief place of a canton, in the diftrict of Chateau du Loir: five miles north-eaft Chateau du Loir.

CHA-HO, a town of China, in the province of Pe-tche-li: feven miles fouth of Chun-te.

CHA-HO-TCHAN, a town of Chinefe Tartary: thirty miles fouth-weft of Ning-yuen.

CHAIA, a river of Siberia, which runs into the Oby: twenty miles north-eaft of Obdorfkoi.

CHAI'BAR, or KAIBAR, a ftrong town of Arabia, taken from the Jews by Mahomet in the feventh year of the Hegira: 152 miles north-eaft of Medina.

CHAILA'RD (Le), a town of France, in the department of the Ardeche, and chief place of a canton, in the diftrict of Mezen: four leagues and a half north-weft of Privas.

CHALLA'C, a town of France, in the department of the Indre, and chief place of a canton in the diftrict of Argenton: four leagues fouth-fouth-weft of Argenton.

CHAILLA'ND, a town of France, in the department of the Mayenne, and chief place of a canton, in the diftrict of Ernee: ten miles north of Laval.

CHAIL'LE LES MARAIS, a town of France, in the department of the Vendee, and chief place of a canton, in the diftrict of Fontenay-le-Conte: three leagues weft-fouth-weft of Fontenay.

CHAIL'LE-SOUS-LES-ORMEAUX, a town of France, in the department of the Sarte: ten miles eaft of Sable.

CHAILLEVET'TE, a town of France, in the department of the Lower Charente: five miles fouth of Marennes.

CHAILLOU'E, a town of France, in the department of the Orne, containing about 1100 inhabitants: one league north of Sees.

CHAIN, an ifland of the Pacific Ocean, difcovered by captain Cook in 1769, about four leagues long, and two wide. Lat. 17. 23. S. lon. 145. 54. W. Greenwich.

CHAIN, *f.* [*chaine*, Fr.] A feries of links faftened one within another.—And Pharoah took off his ring, and put it upon Jofeph's hand, and put a gold *chain* about his neck. *Genefis*, xli. 42.—A bond; a manacle; a fetter with which prifoners are bound:

Still in conftraint your fuff'ring fex remains,
Or bound in formal or in real *chains.* *Pope.*

A feries linked together, as of caufes or thoughts; a fucceffion; a fubordination.—As there is pleafure in the right exercife of any faculty, fo efpecially in that of right reafoning; which is ftill the greater, by how much the confequences are more clear, and the *chains* of them more long. *Burnet.*—A gold chain is one of the ornaments or badges of the dignity of the chief magiftrates of a city, as the lord mayor and aldermen of London, the provoft and bailiffs of Edinburgh, &c. Something like this obtained among the ancient Gauls: the principal ornament of their perfons in power and authority was a gold chain, which they wore on all occafions; and even in battle, to diftinguifh them from the common foldiers.

To CHAIN, *v. a.* To faften or bind with a chain.—They repeal daily any wholefome act eftablifhed againft the rich, and provide more piercing ftatutes daily to *chain* up and reftrain the poor. *Shakefpeare.*—To enflave; to keep in flavery:

This world, 'tis true,
Was made for Cæfar, but for Titus too:
And which more bleft? who *chain'd* his country, fay,
Or he whofe virtue figh'd to lofe a day? *Pope.*

To keep by a chain.—The admiral feeing the mouth of the haven *chained*, and the caftles full of ordnance, and ftrongly manned, durft not attempt to enter. *Knolles.*—To unite:

O Warwick, I do bend my knee with thine,
And in this vow do *chain* my foul with thine. *Shakef.*

CHAIN, *f.* in furveying, a lineal meafure, confifting of a certain number of iron links, ufually a hundred, ferving to take the dimenfions of fields, &c. At every tenth link is ufually faftened a fmall brafs plate, with a figure engraven upon it, or elfe cut into different fhapes, to fhew how many links it is from one end of the chain. Thefe chains are of various kinds and lengths; as—1. A chain of a hundred feet long, each link one foot, for meafuring of large diftances only, when regard is not propofed to be had to acres, &c. in the fuperficial content. 2. A chain of one pole or fixteen feet and a half in length; ufeful in meafuring and laying out gardens and orchards, turnips, &c. by the pole or rod meafure. 3. A chain of four poles, or fixty-fix feet, or twenty-two yards, in length, called Gunter's chain, peculiarly adapted to furveying or land-meafuring; becaufe ten fquare chains juft make an Englifh acre of land; fo that the dimenfions being taken in thefe chains, and thence the contents computed in fquare chains, they are readily turned into acres by dividing by ten, or barely cutting off the laft figure from the fquare chains. But it is ftill better in practice to proceed thus, viz. Count the dimenfions, not in chains, but all in links; then the contents are in fquare links; and, five figures being cut off for decimals, the reft are acres; that is four figures to bring the fquare links to fquare chains, and one more to bring the fquare chains to acres. In this chain, the links are each feven inches and $\frac{92}{100}$, or 7·92 inches in length, which is very nearly $\frac{2}{3}$ of a foot. And hence any number of chains

or links are easily brought to feet or inches, or the contrary: the best way of doing which is this: multiply the number of links by sixty-six, then cut off two figures for decimals, and the rest are feet: or multiply links by twenty-two for yards, cutting off two figures.

CHAIN-PUMP. See PUMP.

CHAIN-SHOT, two bullets united by a chain. They are used at sea to bring down yards or masts, and to cut the shrouds or rigging of a ship.—In sea-fights, oftentimes, a buttock the brawn of the thigh, and the calf of the leg, are torn off by the *chain-shot*. *Wiseman*.

CHAIN-WALES, or CHANNELS, of a ship. See NAVAL ARCHITECTURE.

CHA'INWORK, *s.* Work with open spaces like the links of a chain.—Nets of chequerwork, and wreaths of *chainwork*, for the chapiters which were upon the tops of the pillars. *1 Kings*.

CHAINGY', a town of France, in the deparment of the Loiret: five miles west of Orleans.

CHAIR, *s.* [*chaire*, Fr.] A moveable seat.—If a *chair* be defined a seat for a single person, with a back belonging to it, then a stool is a seat for a single person, without a back. *Watts*.—A seat of justice, or of authority:

The honour'd gods
Keep Rome in safety, and the *chairs* of justice
Supply with worthy men. *Shakespeare*.

A vehicle borne by men; a sedan.

CHA'IRMAN, *s.* The president of an assembly.—In assemblies generally one person is chosen *chairman* or moderator, to keep the several speakers to the rules of order. *Watts*.—One whose trade it is to carry a chair:

Troy *chairmen* bore the wooden steed,
Pregnant with Greeks, impatient to be freed;
Those bully Greeks, who, as the moderns do,
Instead of paying *chairmen*, run them through. *Swift*.

CHAIS (Charles), born in 1701, at Geneva. The church was chosen for his profession; and in the ministry his reputation as a preacher and an orator soon became so popular and extensive, that in 1728 he was elected pastor at the Hague. His conduct in this establishment, while it contributed to his own reputation, redounded no less to the honour of those who had appointed him. Having adorned his ministry by the purity of his manners, the excellency of the discourses which he delivered from the pulpit, and his numerous writings in defence of revealed religion, he died in 1786, at the age of 85, after having punctually discharged his duty as a pastor during the period of fifty-eight years. The unfortunate supported by his consolation, the youth enlightened by his instructions, and the poor succoured by his charity, lamenting the loss which they had sustained by the death of a benefactor and a friend, proved more eloquent attestations of his merit, than any panegyric which might have been pronounced from the lips of the sublimest orator. His sermons were distinguished by a perspicuous style and a pure morality. They seemed to flow not only from a man who practised what he taught, but from one who, acquainted with the inmost recesses of the human heart, could exert his eloquence to affect his hearers, and lead them almost imperceptibly to the paths of virtue and religion. His literary excellence consisted in a judicious and happy arrangement of his subjects, delivered in a plain and unaffected style. He made no pretensions to originality, but he illustrated the works of other writers, by introducing them to his countryman in a language that was more familiar to them. He compiled La Sante Bible, with an extensive commentary, translated from the English bibles, printed at the Hague in 1742, and was continued till 1777, forming 6 vol. in 4to. The 7th vol. was left by the author in MS. and the 8th, which completes this valuable Commentary on the Bible, was finished, after the author's death, by the Rev. Dr. Maclaine, of the Hague; and the whole was republished, with a learned preface, introduction, and an account of the author's life, at Utrecht, in 1796. 2. Le sens literal de l'Ecriture Sainte, traduit de l'Anglois de Stackhouse in 8vo. 3 vol. 1751. A la Haye. 3. Lettres historiques et dogmatiques sur les Jubilés, 1750, 1751, 3 tom. 8vo. à la Haye. 4. Theologie de l'Ecriture S. ou la Science du Salut, comprise dans une ample collection de passages du V. & N. Testament; à la Haye 1752, 2 tom. 8vo. Besides these works he superintended the publication of the History of France by the president Hainault, which was published at the Hague in 1747, 8vo. He was besides engaged as a writer in the Bibliotheque historique, which was begun at the Hague in 1738, and also contributed some articles in the Bibliotheque des Sciences et Beaux Arts.

CHAISE (Father de la), a jesuit of uncommon abilities, confessor to Louis XIV. born at Forez in the province of Lyons about 1626. He gave early indications of an excellent wit when he was at school, and performed his philosophical exercises under father de Vaux. When he was arrived at a proper age, he was ordained priest; and became professor of divinity in the college of Lyons. He spent a good deal of time in Paris, where his great address, his wit, and love of letters, made him almost universally known: and in 1663, cardinal Mazarine introduced him to the king, as a person of whose great abilities and merit he was well convinced. In 1675, he was made confessor to the king; and about ten years after, was the principal adviser and director of his marriage with madame de Maintenon. Louis XIV. was then arrived at an age when confessors have more than an ordinary influence: and la Chaise found himself a minister of state, without expecting, and almost before he perceived it. He did business regularly with the king, and immediately saw all the lords and all the prelates at his feet. He died January 1709, and possessed to the very last so great a share of favour and esteem with the king, that his majesty consulted him upon his death-bed about the choice of his successor.

CHAISE, *s.* [*chaise*, Fr.] A carriage of pleasure.—Instead of the chariot he might have said the *chaise* of government; for a *chaise* is driven by the person that sits in it. *Addison*.—Aurelius Victor relates, that Trajan first introduced the use of post-chaises: but the invention is generally ascribed to Augustus; and was probably only improved by Trajan, and succeeding emperors. See COACH.

CHAISE (La) a town of France, in the department of the North Coast, and chief place of a canton, in the district of Loudeac: five miles south-east of Loudeac.

CHAISE DIEU (La), a town of France in the department of the Upper Loire, and chief place of a canton, in the district of Brioude: thirteen miles Brioude, and eighteen north-north-west le Puy.

CHAISE LE VICOMTE (La), a town of France, in the department of the Vendée, and chief place of a canton, in the district of La Roche-sur-Yon: five miles east of La Roche.

CHA'JUK, a town of Asia, in the country of Charasm, on the frontiers of Grand Bukharia.

CHA'KEN KAN, a town of Asiatic Turkey, in the province of Caramania: twenty miles north-north-east of Tarsus.

CHAKE'NI-KOUZEY, a town of Asia, in the kingdom of Candahar: 120 miles east-north-east of Candahar.

CHA'LA, a small seaport of South America, in the Pacific Ocean, near the river Arequipa.

CHALA'BRE, a town of France, in the department of the Aude, and chief place of a canton, in the district of Limoux: ten miles south-west of Limoux.

CHALAIN', or LA POTHERIE, a town of France, in the department of the Mayne and Loire, and chief place of a canton, in the district of Segre: seven leagues north-west of Angers.

CHALAI'S, a town of France, in the department of the Charente: five miles west of Aubeterre.

CHALAMO'NT, a town of France, in the department of the Ain, and chief place of a canton, in the district of Montluel; four leagues south of Bourg en Bresse, and four north-north-east of Montluel.

CHALAN', a town of Persia, in the province of Farsistan: forty miles north-west of Schiras.

CHALANÇO'N, a town of France, in the department of the Ardeche: three leagues north of Privas.

CHALARON'NE, a river of France, which runs into the Saone, near Toissey.

CHALAU', or KALAU, a town of Lusatia: forty-six miles south-west of Francfort on the Oder.

CHALAU'TRE, a town of France, in the department of the Seine and Marne: two leagues and a half east of Provins.

CHALA'ZA, [from χαλαζα, a hail-stone.] The tread of an egg, and a small tubercle on the eye-lid, are so named from their likeness to a hail-stone.

CHAL'CASPANICULA'TA, *s.* in botany. See MURRAYA EXOTICA.

CHALCE'DON, or CHALCEDO'NIA, now Kadi-Keni, an ancient city of Bithynia, opposite Byzantium, built by a colony from Megara. Its situation was so improperly chosen, that it was called the city of blind men, intimating the inconsiderate plan of the founders. Chalcedon, in the Christian times, became famous on account of the council which was held there against Eutyches. The emperor Valens caused its walls to be levelled with the ground for siding with Procopius, and the materials to be conveyed to Constantinople, where they were employed in building the famous Valentinian aqueduct. Chalcedon is at present a small place, known to the Greeks by its ancient name, and to the Turks by that of Cadiaci, or "the judges town."

CHAL'CEDONY, or WHITE AGATE, *s.* A flint of a white colour, resembling milk diluted with water, and more or less opake, with veins, circles, or spots. It is softer than the onyx, but much harder than the agates of the same colour as the onyx. Bergman observes that it varies greatly in specific gravity, from 2·5 to 4·6. He found the chalcedony of Ferro to contain eighty-four parts of silex, and sixteen of clay.

CHALCEI'AS, *s.* in botany. See ALCHINOPS.

CHALCI'DENE, or CHALCIDICE, in the ancient geography, an inland country of Syria, having Antioch or Seleucia to the west, Cyrrhestica to the north, to the south Apamene and Cœlosyria, and to the east Chalybonitis; so called from its principal city Chalcis. This province, one of the most fruitful in Syria, was seized by Ptolemy the son of Mennæus during the troubles of Syria, and by him made a separate kingdom.

CHALCI'DIC, CHALCIDIDUM, or CHALCEDONIUM, in ancient architecture, a magnificent hall belonging to a tribunal or court of justice. Festus says, it took its name from the city Chalcis; but he does not give the reason. Pilander describes it as the court or tribunal where affairs of money and coinage were regulated; so called from χαλκος, brass, and δικη, justice. Others say, the money was struck in it; and derive the word from χαλκος, and οικος, house. In Vitruvius, it is used for the auditory of a basilica; in more ancient writers, for a hall or apartment where the heathens imagined their gods to eat.

CHALCI'DIUS, a famous platonic philosopher in the third century, who wrote a commentary, which is esteemed, on the Timæus of Plato. This work has been translated from the Greek into Latin.

CHAL'CIS, now Egripo, the chief city of Eubœa, in that part which is nearest to Bœotia. It was founded by an Athenian colony. The island was said to have been anciently joined to the continent in the neighbourhood of Chalcis. There were three other towns of the same name, in Thrace, Acarnania, and Sicily, all belonging to the Corinthians. *Pliny.*

CHALCI'OPE, a daughter of Æetes king of Colchis, who married Phryxus son of Athamas, who had fled to her father's court for protection. She had some children by Phryxus, and she preserved her life from the avarice and cruelty of her father, who had murdered her husband to obtain the golden fleece. *Ovid.*

CHALCI'TIS, one of the divisions or districts of Mesopotamia, to the south of Anthemusia, the most northern district, next to Armenia, and situated between Edessa and Carræ. *Chalcitis* (Pliny), an island opposite to Chalcedon.

CHAL'CO, a town of America, in the province of Mexico, near a lake to which it gives name: eighteen miles south-east of Mexico.

CHAL'CONDYLES (Demetrius), a native of Athens, and scholar of Theodore Gaza, was one of those Greeks who about the time of the taking of Constantinople went into the west. At the invitation of Laurence de Medicis, he professed to teach the Greek language at Florence, in 1479; where he had for his rival Angelus Politianus, to whom Laurence had committed the tuition of one of his sons. After the death of Laurence, Chalcondyles was invited to Milan by Lewis Sforzia. Here he taught Greek with great reputation; and died in 1510, at eighty years of age. Among the learned whom pope Nicolas V. sent to Rome to translate the Greek authors into Latin, Chalcondyles was one; from which we may collect, that he probably travelled into the west before the taking of Constantinople in 1453, since Nicolas died in 1455. He published a grammar, and some other things; and under his inspection was first published at Florence, in 1499, the Greek lexicon of Suidas. Pierius Valerianus, in his book De infelicitate literatorum, says, that Chalcondyles, though a deserving man in his moral as well as literary character, led nevertheless a very unhappy life; and reckons perpetual banishment from his country among the chief of his misfortunes.

CHAL'CONDYLES (Laonicus), a native of Athens, who wrote in the 15th century a history of the Turks, in ten books, from 1298 to 1462. This history, translated into Latin by Clauser, is interesting to all such as would trace the Grecian empire in its decline and fall, and the Ottoman power in its origin and progress; but allowance must be made for several facts set down in too much haste. The history of Chalcondyles made its appearance in Greek and Latin, from the Louvre, in 1650, folio. There is a French translation of it by Vigenere, continued by Mezerai, 1662, 2 vols. folio.

CHALDE'A, in the ancient geography, taken in a larger sense, included Babylonia; as in the prophecies of Jeremiah and Ezekiel. In a restricted sense, it denoted a province of Babylon, towards Arabia Deserta; called in Scripture *The land of the Chaldeans.* Named from Chased the fourth son of Nahor. See BABYLONIA.

CHAL'DEE PARAPHRASE, a celebrated writing, called the *Targum.* There are three Chaldee paraphrases in Walton's Polyglot; viz. that of Onkelos, that of Jonathan son of Uziel, and that of Jerusalem.

CHAL'DER, CHALDRON, or CHAUDRON, *s.* A dry English measure of coals, consisting of thirty-six bushels heaped up, according to the sealed bushel kept at Guildhall, London. The chaldron of coals is accounted to weigh about 2000 pounds. On ship board, twenty-one chaldrons of coals are allowed to the score.

CHALDESAY'GUES, a town of France, in the department of the Cantal: four leagues south of St Flour.

CHA'LEUR BAY, a large bay of the Atlantic, in the Gulf of St. Lawrence, between the province of New Brunswick and the south part of Lower Canada. On the 8th of July, 1760, a French fleet was destroyed by the English, under the command of captain Byron, in this bay. Lat. 48. N. lon. 65. W.

CHALENCEY', a town of France, in the department of the Upper Marne, and chief place of a canton, in the district of Langres: thirteen miles south-south-west of Langres.

CHALET'TE, a town of France, in the department of the

the Aube, and chief place of a canton, in the district of Arcis: twelve miles south-east of Arcis.

CHA'LICE, *s.* [*calic*, Sax. *calice*, Fr. *calix*, Lat.] A cup; a bowl:

When in your motion you are hot,
And, that he calls for drink, I'll have prepared him
A *chalice* for the nonce. *Shakespeare.*

It is generally used for a cup used in acts of worship.—All the church at that time did not think emblematical figures unlawful ornaments of cups or *chalices*. *Stillingfleet.*

CHA'LICED, *adj.* [from *calix*, Lat. the cup of a flower.] Having a cell or a cup: applied by Shakespeare to a flower, but now obsolete:

Hark, hark! the lark at heav'n's gate sings,
And Phœbus 'gins arise,
His steeds to water at these springs,
On *chalic'd* flowers that lies. *Shakespeare.*

CHALIGNY', a town of France, in the department of the Meurte: five miles south-west of Nancy.

CHA'LIM, a town of Portugal, in the province of Tra los Montes: twenty miles south of Bragança.

CHA'LIM-POU, a town of Chinese Tartary. Lat. 41. 12. N. lon. 139. 40. E. Ferro.

CHA'LIN, a river of Russia, which runs into the Karskoi Sea. Lat. 73. 5. N. lon. 89. E. Ferro.

CHALINAR'QUES, a town of France, in the department of the Cantal: twelve miles north of St. Flour.

CHALINDREY', a town of France, in the department of the Upper Marne, and chief place of a canton, in the district of Langres: five miles south-east of Langres.

CHALK, *s.* [*cealc*, *cealcstan*, Sax. *calck*, Welsh.] A very common species of calcareous earth, of an opake white colour, very soft, and without the least appearance of a polish in its fracture. Its specific gravity is from 2·4 to 2·6 according to Kirwan, who likewise informs us that the substance contains more fixed air than any other variety of the calcareous class, generally about forty per cent. It contains a little siliceous earth, and about two per cent of clay. Some specimens, and perhaps most, contain a little iron; and Birgman affirms, that marine salt of lime, or magnesia, is often found in it; for which reason he directs the powder of chalk to be several times boiled in distilled water before it is dissolved for the purpose of obtaining pure calcareous earth. See LIME. RED chalk is a clay coloured by the calx of iron, of which it contains from sixteen to eighteen parts in the hundred, according to Rinman. SPANISH chalk, is the soap-rock, or lapis ollaris; which is usually distinguished by this name. See CHEMISTRY. BLACK chalk is a name given by painters to a species of earth with which they draw or design on paper, &c. The colour-shops are supplied with this earth from Italy or Germany; though some parts of England afford substances nearly, if not entirely, of the same quality, and which are found to be equally serviceable both for marking, and for black paints. Such particularly is the black earth called *killow*, said by Dr. Merrit in his Pinax Rerum Britannicarum, to be found in Lancashire; and by Da Costa, in his History of Fossils, to be plentiful near the top of Cay-Avon, an high hill in Merionethshire. Chalk is employed as a remedy against the heart-burn, and other disorders that have acidity in the primæ viæ for their cause. Dr. Slare asserts from experiments, that it absorbs acid sooner, and more powerfully, than crabs'-eyes, calcined hartshorn, or coral. Some use it when finely powdered, to sprinkle on erysipelatous inflammations. When chalk is saturated with an acid, it is said to become subastringent, otherwise it hath no such property; hence chalk, given when acidity prevails in the stomach, sometimes produces costiveness; though this is much doubted by Cullen and others. Two drachms for a dose, and repeated at proper intervals, have often effected at a speedy cure, both in a diarrhœa and a dysentery; but this effect was owing to its absorbing those acrid juices whose stimuli caused the morbid excretion. When milk turns sour on the stomach, a scruple of chalk may be given with each half pint.

To CHALK, *v. a.* To rub with chalk:

The beastly rabble then came down
From all the garrets in the town,
And stalls and shop-boards in vast swarms,
With new-*chalk'd* bills and rusty arms. *Hudibras.*

To manure with chalk.—Land that is *chalked*, if it is not well dunged, will receive but little benefit from a second *chalking*. *Mortimer.*—To mark or trace out as with chalk.—His own mind *chalked* out to him the just proportions and measures of behaviour to his fellow-creatures. *South.*

CHALK-CUTTER, *s.* A man that digs chalk.—Shells, by the seamen called chalk eggs, are dug up commonly in the chalk-pits, where the *chalk-cutters* drive a great trade with them. *Woodward.*

CHALK-PIT, *s.* A pit in which chalk is dug.

CHALK-STONES, *s.* The calculi or concretions in the hands and feet of people violently afflicted with the gout. Leeuwenhoek has been at the pains of examining these by the microscope. He divides them into three parts. The first is composed of small particles of matter looking like white grains of sand; this is harder and drier, and also whiter, than the rest. When examined with large magnifiers, they are found to be composed of oblong particles laid closely and evenly together: though the whole small stones are opaque, these component parts of them are pellucid, and resemble pieces of horse-hair cut short, only that they are somewhat pointed at both ends. These are so extremely thin, that Mr. Leeuwenhoek computes, that a thousand of them placed together would not amount to the size of one hair of our heads. The whole stones in this harder part of the chalk are not composed of these particles, but there are confusedly thrown in among them some broken parts of others substances, and in a few places some globules of blood and small remains of other juices. The second kind of chalky matter is less hard and less white than the former, and is composed of fragments or irregular parts of those oblong bodies which compose the first or hardest kind, and these are mixed among tough and clear matter, interspersed with the small broken globules of blood discoverable in the former, but in much greater quantity. The third kind appears red to the naked eye; and, when examined with glasses, is found to be a more tough and clammy white matter, in which a great number of globules of blood are interspersed; these give it its red appearance.

CHALK'Y, *adj.* Consisting of chalk; white with chalk.—That bellowing beats on Dover's *chalky* cliff. *Rowe.*—Impregnated with chalk.—*Chalky* water towards the top of earth is fretting. *Bacon.*

CHALLA'NS, a town of France, and principal place of a district, in the department of the Vendée: seven leagues north of Sables d'Olonne, and sixteen north-west of Fontenay le Comte.

CHALL'ANT, a town of Piedmont, in the duchy of Aosta: eleven miles east-south-east of Aosta.

To CHAL'LENGE, *v. a.* [*chalenger*, Fr.] To call another to answer for an offence by combat:

The prince of Wales stept forth before the king,
And, nephew, *challeng'd* you to single fight. *Shakes.*

To call to a contest.—I *challenge* any man to make pretence to power by right of fatherhood, either intelligible or possible. *Locke.*—To accuse:

Were the grac'd person of our Banquo present,
Whom I may rather *challenge* for unkindness. *Shakes.*

To claim as due.—That divine order, whereby the pre-eminence of chiefest acceptation is by the best things worthily *challenged*. *Hooker.*

So

So when a tyger sucks the bullock's blood,
A famish'd lion, issuing, from the wood,
Roars loudly fierce, and *challenges* the food. *Dryden.*

To call any one of the performance of conditions.—I will now *challenge* you of your promise, to give me certain rules as to the principles of blazonry. *Peacham.*

CHAL'LENGE, *s.* A summons to combat:

I never in my life
Did hear a *challenge* urg'd more modestly. *Shakespeare.*

A demand of something as due.—There must be no *challenge* of superiority, or discountenancing of freedom. *Collier.*

CHAL'LENGE, in law, an exception taken either against persons or things. Persons, as to jurors, or any one or more of them: or in case of felony, by the prisoner at the bar against things, as a declaration, &c. The former is the most frequent signification in which this term is now used. There are two kinds of challenge; either to the array, by which is meant the whole jury as it stands arrayed in the panel, or little square pane or parchment, on which the jurors' names are written; or to the polls; by which are meant the several particular persons or heads in the array. 1 *Inst.* 156. Challenge to jurors is also divided into challenge principal or peremptory; and challenge pur cause, i. e. upon cause or reason alledged: challenge principal or peremptory, is that which the law allows without cause alledged, or further examination; as a prisoner at the bar, arraigned for felony, may challenge peremptorily the number allowed him by law, one after another, alleging no cause, but his own dislike, and they shall be put off, and new taken in their places: but yet there is a difference between challenge principal, and challenge peremptory; the latter being used only in matters criminal, and barely without cause alleged; whereas the former is in civil actions for the most part, and by assigning some such cause of exception, as being found true the law allows. *Staundf. P. C.* 124. Challenge to the favour, which is a species of challenge for cause, is where the plaintiff or defendant is tenant to the sheriff, or if the sheriff's son hath married the daughter of the party, &c. and is also when either party cannot take any principal challenge, but sheweth cause of favour; and causes of favour are infinite. If one of the parties is of affinity to a juror, the juror hath married the plaintiff's daughter, &c. If a juror hath given a verdict before in the cause, matter, or title; if one labours a juror to give his verdict; if after he is returned, a juror eats and drinks at the charge of either party; if the plaintiff, &c. be his master, or the juror hath any interest in the thing demanded, &c. these are challenges to the favour 2 *Rol. Abr.* 636.

CHAL'LENGE TO FIGHT. It is a very high offence to challenge another, either by word or letter, to fight a duel, or to be the messenger of such a challenge, or even barely to endeavour to provoke another to send a challenge, or to fight; as by dispersing letters to that purpose, full of reflections, and insinuating a desire to fight, &c. By stat. 9 *An.* c. 14. "Whoever shall challenge, or provoke to fight, any other person or persons whatsoever, upon account of any money won by gaming, playing, or betting at any of the games mentioned in that act, shall on conviction by indictment or information, forfeit all their goods, chattels, and personal estate, and suffer imprisonment without bail, in the county prison for two years." It is now every day's practice for the court of king's-bench, to grant informations against persons sending challenges to justices of the peace, or to other persons.

CHAL'LENGER, *s.* One that defies or summons another to combat:

Young man, have you challenged Charles the wrestler?—No, fair princess; he is the general *challenger*. *Shakes.*

One that claims superiority:

Whose worth
Stood *challenger* on mount of all the age,
For her perfections. *Shakespeare.*

A claimant; one that requires something as of right—Earnest *challengers* there are of trial, by some public disputation. *Hooker.*

CHAL'LIN, a town of France, in the department of the Mayne and Loire: five leagues west of Anger.

CHA'LO, a river of Asia, which rises near Lassa, or Baratola, in Tartary, passes through the province of Yunnan, in China, the country of Laos and Tonquin, and empties itself into the gulf of Cochinchina, in the Eastern Sea, opposite the island of Hainan.

CHA'LONER (Sir Thomas), a celebrated statesman, soldier, and poet, descended from a good family at Denbigh in Wales, and born at London in 1515. Having been educated in both universities, but chiefly at Cambridge, he was introduced at the court of Henry VIII. who sent him abroad in the retinue of Sir Henry Knevet, ambassador to Charles V. and he had the honour to attend that monarch on his fatal expedition against Algiers in 1541. Soon after the fleet left that place, he was shipwrecked on the coast of Barbary in a very dark night: and having exhausted his strength by swimming, he chanced to strike his head against a cable, which he had the presence of mind to catch hold of with his teeth; and, with the loss of several of them, was drawn up by it into the ship to which he belonged. Mr. Chaloner returned soon after to England, and was appointed first clerk of the council, which office he held during the rest of that reign. On the accession of Edward VI. he became a favourite of the duke of Somerset, whom he attended to Scotland, and was knighted by that nobleman after the battle of Musselburgh, in 1547. The protector's fall put a stop to Sir Thomas Chaloner's expectations, and involved him in difficulties. During the reign of queen Mary, being a determined protestant, he was in some danger; but having many powerful friends, he had the good fortune to escape. On the accession of queen Elizabeth, he appeared again at court; and was so soon distinguished by her majesty, that she appointed him ambassador to the emperor Ferdinand I. The queen was so well satisfied with his conduct, that, soon after his return, she sent him in the same capacity to the court of Madrid. He embarked for Spain in 1561, and returned to London in 1564, in consequence of a request to his sovereign, in an elegy written in imitation of Ovid. After his return, he resided in Clerkenwell-close, where he died in 1565, and was buried in St. Paul's cathedral. So various were the talents of Sir Thomas Chaloner, that he excelled in almost every thing to which he applied himself. He made a considerable figure as a poet. His poetical works were published by William Malim, master of St. Paul's school, in 1579. His capital work was that "Of restoring the English republic, in ten books," which he wrote when he was ambassador in Spain.

CHALONER (Sir Thomas), though inconsiderable as an author, deserves to be recorded as a skilful naturalist, in an age when natural history was very little understood in this or any other country; and particularly as the founder of the alum works in Yorkshire, which have since proved so exceedingly advantageous to the commerce of this kingdom. He was the only son of Sir Thomas Chaloner mentioned in the preceding article, and was born in 1559. Being very young at the time of his father's death, lord treasurer Burleigh, taking charge of his education, sent him to St. Paul's school, and afterwards to Magdalen college in Oxford, where like his father, he discovered extraordinary talents for Latin and English poetry. About the year 1580, he made the tour of Europe, and returned to England in 1584, when he married the daughter of Sir William Fleetwood, recorder of London. In 1591 he was knighted; and some time

time after, visiting Scotland; he returned in the retinue of James I. and was appointed governor to prince Henry, whom he constantly attended, and, when his royal pupil visited Oxford, was honoured with the degree of master of arts. He died in 1615, and was buried at Chiswick in Middlesex. His eldest son William was created a baronet, the 18th of James, 1620. He wrote, 1. Dedication to Lord Burleigh of his father's poetical works, 1759. 2. The Virtue of Nitre, wherein is declared the sundry cures by the same effected. Lond. 1584, 4to.

CHALON'NE, a town of France, in the department of the Mayne and Loire, and chief place of a canton, in the district of Angers, situated near coal mines: four leagues south-west of Angers.

CHALON'NE, an island in the Loire, a little below the town of the same name, about three miles in length, with a village.

CHALONOIS', before the revolution, a small country of France, in the environs of Chalons sur Saône.

CHALO'NS-SUR-SAONE, a city of France, in the department of the Saône and Loire: before the revolution, the see of a bishop, suffragan of Lyons; situated on the Saône. It is surrounded with walls, and defended by a citadel. The principal commerce consists in corn, wine, and wood: fourteen posts north of Lyons, forty-six and a half south-south-east of Paris. Lat. 46. 48. N. lon. 22. 31. E. Ferro.

CHALO'NS-SUR-MARNE. See CHAALONS.

CHALOS'SE, before the revolution, a small district of France, in the environs of St. Sever.

CHALTARON', a town of Asia, in the country of Thibet: ten miles west-north-west of Coucha.

CHALVAN'CA, or CHUMBIVILCAS, a town of South America, and principal place of the jurisdiction of Chumbivilcas, in Peru.

CHA'LUS, a town of France in the department of the Upper Vienne, and chief place of a canton, in the district of St. Yrieux. Richard I. king of England, received a wound in his shoulder which proved mortal, by an arrow shot from the castle of this town, as he was taking observations on the best way of assaulting it, to recover a treasure found there, which he claimed as his right, and was withheld by the viscount of Limoges: fifteen miles south-south-west of Limoges.

CHALY'BEATE, *adj.* [from *chalybs*, Lat. steel.] Impregnated with iron or steel; having the qualities of steel.—The diet ought to strengthen the solids, allowing spices and wine, and the use of *chalybeate* waters. *Arbuthnot.*

CHA'LYBES, a people of Asia Minor, near Pontus, once very powerful, and possessed of a great extent of country, abounding in iron mines, where the inhabitants worked naked. The Chalybes attacked the ten thousand in their retreat, and behaved with much spirit and courage. They were partly conquered by Crœsus, king of Lydia. Some authors imagine that the Chalybes are a nation of Spain.

CHA'LYBON, now supposed to be Aleppo, a town of Syria, which gave the name of Chalybonitis to the neighbouring country.

CHA-MA-KI, a town of the island of Formosa. Lat. 22. 10. N. lon. 138. E. Ferro.

CHAM, a country of Asia, and one of the provinces of Cochinchina.

CHAM, a town of Swisserland, in the canton of Zug, on the south side of the lake of Zug.

CHAM, a town of Germany, in the circle of Bavaria, on the Regen, at its conflux with a river called Campl, or Kampl: sixty-four miles east of Nuremberg, and eighty-four north of Saltzburg.

CHAM, CHAN, or KHAN, *s.* the title given to the sovereign princes of Tartary. The word, in the Persian, signifies mighty lord; in the Sclavonic, emperor. Sperlingius, in his dissertation on the Danish term of Majesty, koning, king, thinks the Tartarian cham may be well derived from it; adding, that in the north they say, kan, konnen, konge, konning, &c. The term cham is also applied, among the Persians, to the great lords of the court, and the governors of provinces.

CHAM DE COUCE, a town of Portugal, in the province of Estramadura: six leagues north of Thomar.

CHA'MA, *s.* a genus of shell-fish belonging to the order of vermes testaceæ. The shell is thick, and has two valves; it is of the oyster kind. Linnæus enumerates fourteen species, principally distinguished by the figure of their shells. See CONCHOLOGY.

CHA'MA-CHRYSO'COME, *s.* in botany. See STÆHELINA.

CHAMADE, *s.* [Fr.] The beat of the drum which declares a surrender.—Several French battalions made a show of resistance; but, upon our preparing to fill up a little fosse, in order to attack them, they beat the *chamade*, and sent us charte blanche. *Addison.*

CHAMÆBALA'NUS, *s.* in botany. See ARACHIS.

CHAMÆBUX'US, *s.* in botany. See POLYGALA.

CHAMÆCE'RASUS, *s.* in botany. See PRUNUS and LONICERA.

CHAMÆCIS'SUS, *s.* in botany. See GLECOMA.

CHAMÆCIS'TUS, *s.* in botany. See ANDROMEDA, AZALEA, CISTUS, PORTULACA, RHODODENDRON, SAXIFRAGA, and TURNERA.

CHAMÆCLE'MA, *s.* in botany. See GLECHOMA.

CHAMÆCRIS'TA, *s.* in botany. See CASSIA.

CHAMÆCYPARIS'SUS, *s.* in botany. See SANTOLINA.

CHAMÆDAPH'NE, *s.* in botany. See ANDROMEDA, KALMIA, MITCHELLA, and RUSCUS.

CHAMÆDRIFO'LIA, *s.* in botany. See FORSKOEHLEA.

CHAMÆ'DRYS, *s.* in botany. See BARTSIA, DRYAS, PÆDEROTA, RHINANTHUS, TEUCRIUM, VERONICA.

CHAMÆFI'LIX, *s.* in botany. See ASPLENIUM.

CHA'MÆ-GENIS'TA, *s.* in botany. See GENISTA.

CHAMÆIAS'ME, *s.* in botany. See STELLERA.

CHAMÆI'RIS, *s.* in botany. See IRIS.

CHAMÆLA'RIX, *s.* in botany. See ASPALATHUS.

CHAMÆLE'A, *s.* in botany. See CNEORUM, CLUTIA, PHYLICA, and TRAGIA.

CHAMÆLEAG'NUS, *s.* in botany. See MYRICA.

CHAMÆ'LEON, [from χαμαι, and λεων, a lion, i. e. dwarf lion.] The trivial name of a species of lizard. See LACERTA.

CHAMÆ'LEON, *s.* in botany. See ATRACTYLIS, CARDUUS, CARLINA, CARTHAMUS, CENTAUREA, and CNICUS.

CHAMÆLI'NUM, *s.* in botany. See LINUM.

CHAMÆME'LUM, *s.* in botany. See ACHILLEA, ANTHEMIS, ARCTOTIS, CHRYSANTHEMUM, COTULA, and MATRICARIA.

CHAMÆMES'PILUS, *s.* in botany. See MESPILUS.

CHA'MÆ-MO'LY, *s.* in botany. See ALLIUM.

CHAMÆMO'RUS, *s.* in botany. See RUBUS.

CHAMÆNE'RION, *s.* in botany. See EPILOBIUM.

CHA'MÆ-OR'CHIS, *s.* in botany. See OPHRYS.

CHAMÆPERICLY'MENUM, *s.* in botany. See CORNUS.

CHAMÆPEU'CE, *s.* in botany. See STÆHELINA.

CHAMÆPI'TYS, *s.* in botany. See CRESSA, DRACOCEPHALUM, ERICA, and TEUCRIUM.

CHAMÆRHODODEN'DRON, *s.* in botany. See AZALEA and KALMIA.

CHAMÆRHODODEN'DROS, *s.* in botany. See AZALEA and RHODODENDRON.

CHAMÆRI'PHES, *s.* in botany. See CHAMÆROPS.

CHA'MÆROPS, *s.* [from χαμαι and ρωψ, a low shrub.] The DWARF PALM, or PALMETTO; in botany, one of the genera of palmæ in the Linnæan Appendix, and belonging to the class polygamia, order dioecia. The generic

neric characters are—I. Hermaphrodite flower. Calyx: ſpathe univerſal, compreſſed, bifid; ſpadix branching; perianthium proper tripartite, very ſmall. Corolla: tripartite. Petals ovate, coriaceous, erect, acute, inflected at the tip. Stamina: filaments ſix, ſubulate-compreſſed, ſcarce cohering at the baſe. Anthers linear, twin, growing to the interior ſide of the filaments. Piſtillum: germs three, roundiſh; ſtyles as many, diſtinct, permanent. Stigmas acute. Pericarpium: drupes three, globoſe, unilocular. Seeds ſolitary, globoſe. II. Male flower in a diſtinct plant, flowering in the ſame manner. Calyx and corolla as in the hermaphrodite. Stamina: a gibbous receptacle, ending in ſix filaments not marked by perforations. All the other particulars as in the hermaphrodites. *Eſſential Character.*—Hermaphrodite. Calyx: three-parted; corolla three-petalled. Stamina ſix; piſtillum three; drupes three, one-ſeeded. Males. Dioecous, as in the hermaphrodite. Thunberg removes this genus into the claſs hexandria, and the order monogynia, along with muſa.

Species. 1. Chamærops humilis, or dwarf fan-palm: fronds palmated, plaited; ſtipes thorny. This never riſes with an upright ſtem, but the foot-ſtalks of the leaves riſe immediately from the head of the root, and are armed on each ſide with ſtrong ſpines; they are flat on their upper ſurface, and convex on their under ſide. The centers of the leaves are faſtened to the foot-ſtalk, and ſpread open like a fan, having many foldings, and at the top are deeply divided like the fingers of a hand; when they firſt come out, they are cloſed together like a fan when ſhut, and are faſtened together by ſtrong fibres which run along the borders of the leaves; and, when the leaves ſpread open, theſe fibres or ſtrings hang from the ſides and ends; the borders of the leaves are finely ſawed, and have white narrow edgings; they are from nine to eighteen inches long, and near a foot broad in their wideſt part: as the lower leaves of the plants decay, their veſtiges remain, and form a ſhort ſtump above ground, in the ſame manner as our common male fern does; from between the leaves comes out the ſpadix or club, which ſuſtains the flowers; this is covered with a thin ſpathe or hood, which falls off when the bunches open and divide. It grows naturally in Italy, Sicily, and Spain, particularly in Andaluſia, where, in the ſandy land, the roots ſpread and propagate ſo faſt, as to cover the ground in the ſame manner as fern in England. The leaves of theſe plants are tied together to make beſoms for ſweeping. Miller has a variety called Chamærops glabra, native of the Weſt-Indies; where it never riſes with a ſtem; the ſtipes are rounder than thoſe of the European fan-palm, and have no ſpines on their ſides. When the plants are old, the leaves are three or four feet long, and upwards of two broad, and of a darker green; the folds alſo are broader: ſome of them have put out ſlender bunches of male flowers in England. He calls it in Engliſh *palmetto royal.* There is a dwarf palm from Carolina very like this, if not the ſame. They are alſo uſed for making baſkets, and in thatching. The pith next the root is tender and ſweetiſh, and is ſometimes eaten in deſerts.

2. Chamærops excelſa: fronds palmated, nervous, ſerrate; ſtipes unarmed. A lofty tree. Leaves ſmooth, green above, pale underneath. There is a variety of this, which is a much lower tree. Native of Japan.

3. Chamærops Cochinchinenſis: fronds palmate plaited, ſtipes thorny, ſpathes partial, corollas monopetalous. Trunk eight feet high, an inch in diameter, ſtraight, equal. Native of the woods of Cochin-China. The fronds are fit for covering houſes, and making of umbrellas.

Propagation and Culture. The dwarf fan-palm is commonly propagated here by heads, which ſometimes ſeparate from the main root; if theſe are carefully taken off with fibres and planted, they will grow; but the plants ſo raiſed are not ſo good as thoſe which are produced from ſeeds; ſo that, if good ſeeds can be procured, that is by much the better way to propagate it. The ſeeds ſhould be ſown in ſmall pots filled with light ſandy earth, and plunged into a moderate hot-bed of tanners bark; theſe muſt be refreſhed now and then with water. If the ſeeds are freſh, the plants will come up in two months; theſe riſe with a ſingle long-pointed leaf. When they appear, they muſt be now and then refreſhed with water, but they muſt not have it in too great plenty. If the plants are not too cloſe to each other in the pots, they will not require to be tranſplanted the firſt year; therefore they ſhould remain in the tan-bed all the ſummer, but in warm weather they muſt have plenty of air admitted to them. In autumn the pots ſhould be removed into the ſtove, and, if they are plunged into the bark-bed the firſt winter, it will greatly forward the growth of the plants. The following ſpring the plants ſhould be carefully turned out of the pots, ſo as to preſerve their roots entire; for all the ſorts of palms have tender roots, and, if theſe be cut off or broken, the plants are frequently killed: then they ſhould be each planted into a ſeparate ſmall pot filled with light, ſandy, undunged, earth, and plunged into a freſh hot-bed to encourage their taking root; the following ſummer they ſhould be gradually hardened, by raiſing the glaſſes pretty high, ſo as to admit a large ſhare of air to them, but they ſhould not yet be wholly expoſed to the open air. The autumn following, the plants may be placed in a dry ſtove; but, as they advance and get ſtrength, they may be treated more hardily, and in ſummer placed in the open air in a warm ſituation, and in winter may be preſerved in a warm green-houſe without artificial heat. As the plants advance in growth, they ſhould be put into larger pots; but, when this is done, there muſt be great care taken that their roots are not cut or broken, nor ſhould they have pots too large. In winter they muſt have but little water, and, if they are expoſed to the open air in ſummer, they will not require much, unleſs the ſeaſon proves very warm and dry, in which caſe they may be ſparingly watered two or three times a-week.

CHAMÆRU'BUS, *ſ.* in botany. See RUBUS.

CHAMÆSY'CE, *ſ.* in botany. See EUPHORBIA.

CHAMAILLE'RE, a town of France, in the department of the Puy de Dome, and chief place of a canton, in the diſtrict of Clermont Ferrand: one mile ſouth-weſt of Clermont.

CHAMANIM', or CHAMERIM, *ſ.* in the Jewiſh antiquities, the Hebrew name for that which the Greeks call *Pyreia*, or *Pyrateria*; and which, according to rabbi Solomon, were idols expoſed to the ſun upon the tops of houſes. Abenezoa ſays, they were portable chapels or temples made in the form of chariots, in honour of the ſun. What the Greeks call Pyreia, were temples conſecrated to the ſun and fire, wherein a perpetual fire was kept up. They were built upon eminences; and were large incloſures without a roof or covering, where the ſun was worſhipped. CHAMERIM occurs in ſeveral places of the Hebrew bible, and is generally tranſlated the *prieſts of the idols.* St. Jerom, in the ſecond book of Kings, renders it *aruſpices.* In Hoſea and Zephania, he tranſlates it *æditui*, or church-wardens. But according to Mr. Bryant, *Chamirim* were prieſts of Ham, *the ſun*; Chamma was the title of the hereditary prieſteſs of Diana; and the Puratheia, where the rites of fire and idolatrous worſhip were carried on, were called Chamina, and Chaminim, whence *Caminus* of the Latins.

CHAMARAN'DE, a town of France, in the department of the Seine and Oiſe, and chief place of a canton, in the diſtrict of Eſtampes: five miles north-north-eaſt of Eſtampes.

CHA'MA-TA'O, a ſmall iſland, near the coaſt of China, in the Eaſtern Sea. Lat. 37. 58. N. lon. 138. 36. E. Ferro.

CHAMA'ZE, a town of France, in the department of the

the Mayenne, and chief place of a canton, in the district of Chateaugontier: four miles south-west of Chateaugontier.

CHAM'BE, a town of Armenia: 120 miles south-east of Erivan.

CHAM'BER, *s.* [*chambre*, Fr. *camera*, Lat. *siambr*, Welsh.] An apartment in a house; generally used for those appropriated to lodging:

Bid them come forth, and hear me;
Or at their *chamber* door I'll beat the drum,
Till it cry, Sleep to death. *Shakespeare.*

Any retired room; as, The dark caves of death, and *chambers* of the grave. *Prior.*—Any cavity or hollow.—Petit has, from an examination of the figure of the eye, argued against the possibility of a film's existence in the posteriour *chamber*. *Sharp.*—A court of justice, or of commerce.—In the imperial *chamber* this vulgar error is not admitted. *Ayliffe.*—The lower part of a gun where the charge is lodged.—A species of great gun.—Names given them, as cannons, demi-cannons, *chambers*, arquebuse, musket, &c. *Camden.*—The cavity where the powder is lodged in a mine.

Privy-CHAMBER. Gentlemen of the privy-chamber are servants of the king, who are to wait and attend on him and the queen at court, in their diversions, &c. Their number is forty-eight, under the lord-chamberlain; twelve of whom are in quarterly waiting, and two of these lie in the privy-chamber. In the absence of the lord-chamberlain, or vice-chamberlain, they execute the king's orders: at coronations, two of them personate the dukes of Aquitain and Normandy; and six of them, appointed by the lord-chamberlain, attend the foreign ambassadors to their audiences, and in public entries. The gentlemen of the privy-chamber were instituted by Henry VII.

CHAM'BER OF A MORTAR, or cannon, is a cell or cavity at the bottom of the bore, to receive the charge of powder. It is not found by experience that chambers have any sensible effect on the velocity of the shot, unless in the largest ordnance, as mortars or very large cannon. Neither is it found that the form of them is very material; a small cylinder is as good as any; though mathematical speculations may shew a preference of one form over another. But in practice, the chief point to be observed, is to have the chamber of a size just to contain the charge of powder, and no more, that the ball may lie close to the charge; and that its entrance may point exactly to the centre of the ball.

To CHAM'BER, *v. n.* To be wanton; to intrigue.—Let us walk honestly as in the day, not in rioting and drunkenness, not in *chambering* and wantonness. *Romans.*—To reside as in the chamber.—The best blood *chamber'd* in his bosom. *Shakespeare.*

CHAM'BERER, *s.* A man of intrigue:

I have not those soft parts of conversation
That *chamberers* have. *Shakespeare.*

CHAMBERET', a town of France, in the department of the Correze: fifteen miles north of Tulle.

CHAM'BERFELLOW, *s.* One that lies in the same chamber.—It is my fortune to have a *chamberfellow*, with whom I agree very well in many sentiments. *Spectator.*

CHAM'BERI, or CHAMBERY, a large and populous town, the capital of Savoy, situated on two small brooks, with a castle, seated on an eminence: it is surrounded with mountains, but not fortified; so has never withstood a siege. It contains two parochial churches, and about 15,000 inhabitants: twelve posts and a half east of Lyons. The inhabitants of this town threw themselves into the power of France, in September, 1792. It is now the capital of the department of Mont Blanc. Lat. 45. 34. N. lon. 23. 36. E. Ferro.

CHAM'BERLAIN, *s.* a term or title variously used in our laws, statutes, and chronicles: as first there is the Lord Great Chamberlain of England, to whose office belongs the government of the palace at Westminster; and upon all solemn occasions the keys of Westminster-hall, and of the court of requests, are delivered to him; he disposes of the sword of state to be carried before the king when he comes to the parliament, and goes on the right hand of the sword next to the king's person: he has the care of providing all things in the house of lords in the time of parliament; to him belong livery and lodgings in the king's court, &c. And the gentleman usher of the black rod, yeoman usher, &c. are under his authority. The office of Lord Great Chamberlain of England is hereditary; and where a person dies seised in fee of this office, leaving two sisters, the office belongs to both sisters, and they may execute it by deputy; but such deputy must be approved of by the king, and must not be of a degree inferior to a knight. 2 *Bro. P. C.* 146.

The Lord Chamberlain of the Household has the oversight and government of all officers belonging to the king's chamber, (except the bed-chamber, which is under the groom of the stole,) and also of the wardrobe; of artificers retained in the king's service, messengers, comedians, revels, music, &c. The serjeants at arms are likewise under his inspection; and the king's chaplains, physicians, apothecaries, surgeons, barbers, &c. And he hath under him a vice-chamberlain, both being always privy counsellors. There were formerly chamberlains of the king's courts. 7 *Edw.* 6. c. 1. And there are chamberlains of the Exchequer, who keep a controlment of the pells, of receipts and exitus, and have in their custody the leagues and treaties with foreign princes, many ancient records, the two famous books of antiquity called Domesday, and the Black Book of the Exchequer; and the standards of money, and weights, and measures, are kept by them. There are also under-chamberlains of the exchequer, who make searches for all records in the treasury; and are concerned in making out the tallies, &c. The office of chamberlain of the exchequer is mentioned in the stat. 34 and 35 *H.* 8. c. 16. Besides these, we read of a chamberlain of North Wales. *Stowe*, p. 641. There is a chamberlain of Chester, to whom it belongs to receive the rents and revenues of that city; and, when there is no prince of Wales, and earl of Chester, he hath the receiving and returning of all writs coming thither out of any of the king's courts. The Chamberlain of London, is an officer who is commonly the receiver of the city rents payable into the chamber; and hath great authority in making and determining the rights of freemen; as also concerning apprentices, orphans, &c.

CHAM'BERLAIN, *s.* A servant who has the care of the chambers:

Think'st thou
That the bleak air, thy boisterous *chamberlain*,
Will put thy shirt on warm? *Shakespeare.*

When Duncan is asleep, his two *chamberlains*
We will with wine and wassel so convince. *Shakespeare.*

He serv'd at first Æmilia's *chamberlain*. *Dryden.*—A receiver of rents and revenues; as, *chamberlain* of the exchequer, of Chester, of the city of London. *Chambers.*

CHAM'BERLAINSHIP, *s.* The office of a chamberlain.

CHAM'BERLAYNE (Edward), descended from an ancient family at Odington in Gloucestershire, was born in 1616. He was a commoner of St. Edmund-hall in Oxford in 1634; and was afterwards appointed rhetoric reader. During the civil war in England, he made the tour of Europe. In 1658 he married the only daughter of Richard Clifford, esq. by whom he had nine children. After the restoration he was chosen F. R. S. and, in 1669, attended Charles earl of Carlisle to Stockholm, with the order of the garter to the king of Sweden. In 1670 the degree of LL.D. was conferred on him at Cambridge, and two years after he was incorporated in the same at Oxford.

Oxford. He was appointed to be tutor to Henry duke of Grafton, one of the natural sons of Charles II. and was afterwards pitched upon to instruct prince George of Denmark in the English tongue. He died at Chelsea in 1703, and was author of the following works: 1. A brief Relation of the five years civil wars of Henry III. king of England, 1647. 2. England's Wants; offered to the consideration of both houses of parliament, 1667. 3. The Converted Presbyterian: or the church of England justified, 1668. 4. Angliæ Notitia: or the Present State of England, 1668. The second part was published 1671, &c. This work has gone through many editions: that of 1741 is the 34th. 5. An Academy or College for Young Ladies, 1671. He also translated many books out of Italian, Spanish, and Portuguese, into English.

CHAM'BERLAYNE (John), son to the above-mentioned author of The Present State of England, and continuator of that useful work, was admitted into Trinity college, Oxford, in 1685. He translated, 1. From French and Spanish, The Manner of Making Tea, Coffee, and Chocolate, 1685, 8vo. 2. From Italian, A Treasure of Health, 1686, 8vo. 3. The Arguments of the Books and Chapters of the Old and New Testament, written originally in French by the reverend Mr. Ostervald, 3 vols. 8vo. 1716. 4. The Lives of the French Philosophers, republished since in 1721, under the title of Memoirs of the Royal Academy of Sciences in Paris, 8vo. 5. The Religious Philosopher, in 3 vols. 8vo. 1718; reprinted several times since in 8vo. and once in 4to. 6. The History of the Reformation in the Low Countries, from the Dutch of Gerrard Brandt, 4 vols. fol. 1721. 7. The Lord's Prayer in a hundred different languages, 8vo. 8. Dissertations Historical, Critical, Theological, and Moral, on the most Memorable Events of the Old and New Testaments, 1723, folio. He was F.R.S. and communicated three pieces, inserted in the Philosophical Transactions; one, concerning the Effects of Thunder and Lightning at Sampford Courtney in Devonshire, October 7, 1711. 2. An Account of the Sunk Islands in the Humber, recovered from the Sea. 3. Remarks on the Plague at Copenhagen in 1711. It was said of him, that he understood sixteen languages. He died in the year 1724.

CHAM'BERMAID, *s.* A maid whose business is to dress a lady, and wait in her chamber.

CHAM'BERS (Ephraim), author of the well-known dictionary of Arts and Science called the *Cyclopædia*. He was born at Milton in Westmoreland, where he received the common education for qualifying a youth for trade and commerce. When of a proper age, he was put apprentice to Mr. Senex the globe-maker, a business which is connected with literature, especially with geography and astronomy. It was during Mr. Chambers's residence with this skilful artist, that he acquired that taste for literature which accompanied him through life, and directed all his pursuits. It was even at this time that he formed the design of his grand work, the Cyclopædia; some of the first articles of which were written behind the counter. To have leisure to pursue this work, he quitted Mr. Senex, and took chambers in Gray's-Inn, where he chiefly resided during the rest of his life. The first edition of the Cyclopædia, which was the result of many years intense application, appeared in 1728, in 2 vols. folio. The reputation that Mr. Chambers acquired by the execution of this work, procured him the honour of being elected F.R.S. Nov. 6, 1729. In less than ten years time, a second edition became necessary; which accordingly was printed, with corrections and additions, in 1738; and this was followed by a third edition the very next year.

Although the Cyclopædia was the chief business of Mr. Chambers's life, and may be regarded as almost the sole foundation of his fame, his attention was not wholly confined to this undertaking. He was concerned in a periodical publication, called, The Literary Magazine, which was begun in 1735. In this work he wrote a variety of articles; particularly a review of Morgan's Moral Philosopher. He was also concerned with Mr. John Martyn, professor of botany at Cambridge, in preparing for the press a translation and abridgement of the Philosophical History and Memoirs of the R. Acad. of Sciences at Paris; which work was not published till 1742, some time after our author's decease, in 5 volumes 8vo. Mr. Chambers was also author of the translation of the Jesuit's Perspective, from the French, in 4to; which has gone through several editions. Mr. Chambers's close and unremitting attention to his studies at length impaired his health, and obliged him occasionally to take a country lodging, but without much benefit; he afterwards visited the south of France, but still with little effect; he therefore returned to England, where he soon after died, at Islington, May 15, 1740, and was buried at Westminster Abbey. After the author's death, two more editions of his Cyclopædia were published. The proprietors afterwards procured a supplement to be compiled, by Mr. Scott and Dr. Hill, but chiefly by the latter, which extended to two volumes more; and the whole has since been reduced into one alphabet in four volumes, by Dr. Rees, forming a very valuable body of the sciences.

CHAM'BERS (Sir William), the celebrated architect, was descended of the ancient family of Chalmers in Scotland, barons of Tartas, in France. His grandfather suffered considerably in his fortune by supplying Charles XII. of Sweden with money, &c. which that monarch repaid in base coin. Sir William's father resided several years in Sweden to recover his claims; and there Sir William was born, and, at eighteen years of age, was appointed supercargo to the Swedish East-India company. From a voyage which he made to China, he brought home the Asiatic style of ornament, in tents, temples, mosques, and pagodas. These ornaments, through the interest of lord Bute, he was enabled to apply in the gardens at Kew. Patronised by the princess dowager and the king, Mr. Chambers had much of the fashionable buildings of his day. Under Burke's reform, he was appointed surveyor general of the board of works. Somerset-house was worth to him at least 2000l. a-year. His *chef d'œuvres* are his staircases, particularly those at lord Besborough's, lord Gower's, and the Royal and Antiquarian Societies. The terrace behind Somerset-house is a bold effort of conception. His designs for interior arrangements were excellent. His Treatise on Civil Architecture alone will immortalize his name. In private life, Sir William was hospitable, kind, and amiable. His son married Miss Rodney; Mr. Cotton, Mr. Innis, and Mr. Harward, married his beautiful daughters. Having been abstemious in his youth, Sir William's constitution did not begin to break till he was seventy years of age. For the last three years, he was kept alive by wine and oxygenated air; and died on the 5th of March 1796. His celebrity will be lasting in the works which he has left; and, as he was equally skilled in the theory and practice of the arts which he professed, his precepts are as valuable as his works. At his death, he was fellow of the Royal and Antiquarian Societies, treasurer of the Royal Academy, surveyor-general of the board of works, and knight of the Swedish order of the Polar Star. As to the attack on his professional character by Mr. Revely, see under ARCHITECTURE, vol. ii. p. 97.

CHAM'BERSBURGH, a post-town of the American States, in Pennsylvania, and the chief of Franklin county. It is situated on the eastern branch of Conogocheague creek, on Potowmac river, in a rich and highly cultivated country. Here are about 200 houses, a stone goal, a handsome court house built of brick, a paper and corn mill. It is fifty-eight miles east by south of Bedford, eleven north-west of Shippensburg, and 157 west of Philadelphia. Lat. 39. 53. N. lon. 77. 30. W.

CHAMBLE'E FORT, strong and well built, on the margin of the river of the same name, about fifteen miles

miles south-west from Montreal, and north of St. John's fort. It was taken by the Americans, October 20, 1775; and retaken by the British, January 18, 1776.

CHAMBLE'E, or SORRELL RIVER, a water of the St. Laurence, issuing from lake Champlain, 300 yards wide when lowest. It is shoal in dry seasons; but of sufficient depth for rafting lumber, &c. spring and fall. It was called both Sorrel and Richlieu, when the French held Canada.

To CHAM'BLET, *v. a.* [from CAMELOT.] To vary; to variegate.—Some have the veins more varied and *chambleted*; as oak, whereof wainscot is made. *Bacon.*

CHAM'BLIS, or CHAMBLY, a town of France, in the department of the Oise, and chief place of a canton, in the district of Senlis: thirteen miles west-south-west of Senlis.

CHAMBOIS', a town of France, in the department of the Orne, and chief place of a canton, in the district of Argentan: two leagues north-east of Argentan.

CHAMBON' (Le), a town of France, in the department of the Rhone and Loire, in the district of St. Etienne: one league south-west of St. Etienne.

CHAMBON', a town of France, in the department of the Creuse, and seat of a tribunal, in the district of Evaux: one league west of Evaux, and eight east of Gueret.

CHAMBONLI'VE, a town of France, in the department of the Correze, and chief place of a canton, in the district of Uzerche: five miles east of Uzerche.

CHAMBO'SE, a town of France, in the department of the Rhone and Loire, seven miles west of Villefranche en Beaujolois.

CHAMBRAIS', a town of France, in the department of the Eure: five miles west of Bernay.

CHAMBRAN'LE, *s.* in architecture, the border, frame, or ornament of stone or wood, surrounding the three sides of doors, windows, and chimneys. This is different in the different orders: when it is plain and without mouldings, it is called simply and properly, band, case, or frame. In an ordinary door, it is mostly called door-case; in a window, the window-frame. The chambranle consists of three parts; the two sides, called ascendents; and the top, called the traverse or supercilium.

CHAM'BRE (La), a town of Savoy, on the Isere: the inhabitants are remarkably subject to the goître, or swelling of the neck: whence they are called *crawns*. Twenty-three miles north-east of Chambery.

CHAM'BRE (Martin Cureau de la), physician in ordinary to the French king, was distinguished by his knowledge in medicine, philosophy, and polite learning. He was born at Mons, and was received into the French academy in 1635, and afterwards into the academy of sciences. He wrote a great number of works; the principal of which are, 1. The Characters of the Passions. 2. The Art of knowing Men. 3. On the Knowledge of brute Animals, &c. He died at Paris in 1669.

CHAM'BREL OF A HORSE. The joint or bending of the upper part of the hinder leg.

CHAM'BRON, a town of the Netherlands, in the county of Hainaut, on the Dender: eight miles south-east of Ath.

CHAM'CHOU-POU, a town of Chinese Tartary: eight miles north-north-east of Ning-yuen.

CHAMCHOZ', a town of Armenia: 145 miles east of Erivan.

CHAMEJAS'ME, *s.* in botany. See HOUSTONIA.

CHAMEIRAT', a town of France, in the department of the Correze, and chief place of a canton, in the district of Tulle: three miles south-west of Tulle.

CHAMELÆ'A, *s.* in botany. See DAPHNE, PAULLINIA, and TRAGIA.

CHAMELET', a town of France, in the department of the Rhone and Loire, and chief place of a canton, in the district of Villefranche: three leagues west of Villefranche.

CHAMELION, *s.* A species of lizard. See LACERTA.

To CHAM'FER, *v. a.* [*chanfrer*, Fr.] To channel; to make furrows or gutters upon a column, called *fluting*.

CHAM'FER or CHAMFRET, *s.* A small furrow or gutter on a column; hence called a *fluted* column. *Chamfering* is also a term for cutting the edge or the end of any thing bevel or aslope.

CHAM'FORT (Nicolas), one of the forty members of the French academy, but who, by levelling all family distinctions, seems to have been born a republican. He was the fruit of illicit love, and, as it should seem, of promiscuous amours; for he never knew his father; a circumstance which in no degree diminished his affection for his mother, to supply whose wants he often denied himself the necessaries of life. He was taken at a very early age into the College des Grassins, at Paris, in quality of bursar, and was known there by his christian name of Nicolas. Nothing, during the two first years, announced extraordinary talents; but in the third, out of five prizes that were distributed annually, he bore away four, failing in Latin verses alone. The next year his success was complete; and he made a remark upon the occasion, which discovered good taste, a superior mind, and the opinion he entertained of the judges: "I lost the prize last year," said he, "because I imitated Virgil; this year I obtained it, because I took Buchanan, Sarbievius, and other moderns, for my guides." In Greek he made a rapid progress; but his petulance, his wit, and his waggish tricks, threw the class into so much disorder, that he was expelled from it by M. Lebeau, the professor of that language; and not long after left the college altogether. Thrown upon the wide world, without friends, or any means of support, he was soon reduced to the lowest state of poverty. He bore his misfortunes, however, with philosophic patience, and cheered himself with the most flattering hopes: "I am a poor devil now," said he to Selis, another man of letters: "but do you know what will happen? I shall obtain a prize from the academy, my play will succeed, I shall be courted by the world, and well received by the great, whom I despise: they will make my fortune for me, and I shall afterwards live like a philosopher." The first part of his prediction was soon verified. He obtained a prize, and sent a copy of his production to the very M. Lebeau who had expelled him from the Greek class, accompanied by the following note: "Chamfort sends the work that has obtained the suffrages of the academy to his old and respectable master; and, at the end of nine years, begs his pardon for Nicolas." M. Lebeau made answer, "I always loved Nicolas; I admire Chamfort." A few days after they met, and the master and the pupil embraced each other with tears. Nor was he deceived by his presentiment of his future fortune. By the cares and interest of his friends, it gradually swelled to eight or nine thousand livres a-year; but the greatest part of it consisted of pensions, and the whirlwind of the revolution swept them away. In this reverse of fortune Mirabeau was his friend, and often borrowed his pen. Chamfort was, indeed, his counsel upon many occasions; and, when Mirabeau went to pass an hour with him, as was his custom in the morning, he used to call it going to rub the most electrical head he had ever met with. The light emitted by this electrical head could not fail to shine in opposition to the blasting rays of the mock sun of liberty; of the felon Robespierre; to whom talents and virtue were alike obnoxious. It was difficult, however, to lay hold on Chamfort. Frank, upright, decided, and independent of all parties, he had steered a steady course through the revolutionary storm; openly professing an equal hatred of priests and nobles, and of Marat and the rest of the men of blood. At the same time that he was author of the saying, *Guerre aux châteaux, paix aux chaumières*, "War to the palace, peace to the cottage," he explained, by the appellation of the fraternity of Cain and Abel, the compulsive system of fraternization, devised by the jacobin club. At length, however, an

an obscure informer was found to denounce him, and Chamfort was carried to the Madelonnettes. Unable to obtain there the attentions he required, he conceived so profound a horror of imprisonment, that when he was suffered to return, a few days after, to his apartments, under the custody of a guard, he swore he would rather die than be immured anew. In little more than a month, the gendarme told him he had orders to carry him back to confinement. Chamfort retired to a closet, fired a pistol at his head, shattered the bones of his nose, and drove in his right eye. Astonished at finding himself alive, he took up a razor, tried to cut his throat, and mangled the flesh in the most dreadful manner. The weakness of his hand made no change in the resolution of his mind: he attempted several times, in vain, to reach his heart with the same instrument; and, finding himself begin to faint, made a last effort to open the veins at his knees. At length, overcome by pain, he uttered a loud cry, and fell almost lifeless into a chair. The door was broke open, and surgeons and civil officers soon repaired to the spot. While the former were preparing dressings for so many wounds, Chamfort dictated to the latter the following truly Roman declaration: "I, Sebastian Roch Nicolas Chamfort, declare it was my intention to die a freeman, rather than to be carried back, like a slave, to a house of confinement. I declare, moreover, that, if violence be used to carry me thither in the state I am in, I have still strength enough to finish what I have begun." An hour or two after he became perfectly calm, and resumed his usual ironical manner: "See what it is," said he, "to want dexterity; an awkward man cannot even kill himself." He then went on to relate how he had perforated his eye, and the lower part of his forehead, instead of blowing out his brains; scored his throat, instead of cutting it; and scarified his breast, without reaching his heart: "At last," added he, "I recollected Seneca; and, in honour of Seneca, I resolved to open my veins; but Seneca was a rich man; he had a warm bath, and every thing to his wish: I am a poor devil, and have none of the same advantages; yet here I am still." Not one of the multitude of wounds he had made was mortal. Strange as it may appear, they were even attended by beneficial consequences. By giving vent to an internal humour that had long preyed upon his constitution, they restored him to a state of health he had been a stranger to for years; and Chamfort might now have been alive, if, when his wounds were closed, the surgeons had given vent to that humour by other means. But they neglected the precaution, and this singularly courageous character was soon after seized with an inflammation of the lungs, and died. In his port-folio was found a collection of original anecdotes, thoughts, maxims, and characters, which were published in one volume, 8vo. Paris, 1796.

CHAMIER' (DANIEL), an eminent protestant divine, born in Dauphiny, was long minister at Montelimart, from whence he removed in 1612 to Montauban, to be professor of divinity; and was killed at the siege of that place by a cannon ball in 1621. He was no less distinguished as a statesman than as a divine. Varillas says, it was he who drew up the edict of Nantz. His treatise De œcumenico pontifice, and his Epistolæ jesuiticæ, are commended by Scaliger. His principal work is his Panstratie catholique, written at the desire of the synod of the reformed churches in France, to confute Bellarmine. Though this work makes four large folio volumes, it wants a fifth, which the author's death prevented him from finishing. His Corpus Theologicum, and his Epistolæ jesuiticæ, were printed in a small folio volume, 1693.

CHAMILLA'RD (Stephen), a jesuit, born at Bourges in 1656, taught grammar and philosophy, and was a popular preacher for about twenty years. He died at Paris in 1730, at the age of seventy. He was deeply versed in the knowledge of antiquity. He published, 1. A learned edition of Prudentius for the use of the dauphin, with an interpretation and notes, Paris, 1687. 4to. It is become scarce. 2. Dissertations on several medals, gems, and other monuments of antiquity, Paris, 4to. 1711.

CHAMIR', a town of Arabia, in the country of Yemen: fifty miles north-east of Loheia. Lat. 17. 15. N. lon. 43. 5. E. Greenwich.

CHAMI'RA, *s.* in botany. See HELIOPHILA.

CHAMIT'SCHE, a town of Russia, in the government of Mogilev, on the borders of Poland: forty miles south-south-west of Mogilev.

CHAM'KA or TCHAMKA, a town of Asia, in the country of Thibet: 229 miles south-east of Lassa.

CHA'MLET, *s.* [See CAMELOT.] Stuff made originally of camel's hair.—To make a *chamlet*, draw five lines, waved overthwart, if your diapering consist of a double line. *Peacham.*

CHAMNEI'SKOI, a fortress of Russia, on the confines of China: 168 miles south-west of Verch Udinskoi.

CHA'MOIS, *s.* [*chamois*, Fr.] An animal of the antelope kind, whose skin is made into soft leather, called among us *shammy*. See CAPRA, vol. iii. p. 772.—These are the beasts which ye shall eat; the ox, the sheep, and the wild ox, and the *chamois*. *Deuteronomy.*

CHA'MOMILE, *s.* See ANTHEMIS.

CHAMOMIL'LA, *s.* in botany. See MATRICARIA.

CHA'MOS, or CHEMOSH, the idol or god of the Moabites; a symbol of the sun, which that people worshipped.

CHAMOU'NI, or CHAMUNY, one of the elevated valleys of the Alps, situated at the foot of Mount Blanc. See ALPS, vol. i. p. 371.

CHAMOUSSET', (Charles Humbert Piarron de), born at Paris in 1717, and destined to supply his father's place in the parliament of that city as a judge. Medicine, however, became his favourite study; and his disposition to do good appeared so early, that, when he was a boy, he used to give to the poor the money allowed him weekly for battlings. When he came into practice, he was so forcibly struck with the wretched situation of the great hospital of Paris (the Hotel Dieu), where the dead, the dying, and the living, were very often crowded together in the same bed (five persons at a time occasionally occupying the same bed), that he wrote a plan of reform for that hospital, which no one can read without shuddering at the horrid pictures it represents. M. de Chamousset was now so well known as a man of true benevolence, that Choiseul made him, in 1761, intendant general of the military hospitals of France, the king, Louis XV. telling him, "that he had never, since he came to the throne, made out an appointment so agreeable to himself;" and added, "I am sure I can never make any one that will be of such service to my troops." The pains he took in this employment were incredible. His attention to his situation was so great, and conducted with such good sense and understanding, that the marshal de Soubise, on visiting one of the great military hospitals at Dusseldorf, under the care of M. de Chamousset, said, "This is the first time I have been so happy as to go round an hospital without hearing any complaints." Another marshal of France told his wife: "Were I sick," said he, "I would be taken to the hospital of which M. de Chamousset has the management." This good man died in 1773, at the age of 56 years, from a malignant disorder induced by an incessant application to the duties of his profession.

CHAMOU'X, a town of Savoy, in the county of Maurienne: four miles and a half north-west of Argentina.

To CHAMP. *v. a.* [*champayer*, Fr.] To bite with a frequent action of the teeth.—Coffee and opium are taken down, tobacco but in smoke, and betel is but *champed* in the mouth with a little lime. *Bacon.*

The fiend reply'd not, overcome with rage;
But, like a proud steed rein'd, went haughty on,
Champing his iron curb. *Milton.*

To devour, with violent action of the teeth.—A tobacco-pipe happened to break in my mouth, and the pieces left such a delicious roughness on my tongue, that I champed up the remaining part. *Spectator*.

To CHAMP, *v. n.* To perform frequently the action of biting.—They began to repent of that they had done, and irefully to *champ* upon the bit they had taken into their mouths. *Hooker*.

CHAMPACA' and CHAMPACAM', *s.* in botany. See MICHELIA.

CHAMPAGNAC', a town of France, in the department of the Dordogne, and chief place of a canton, in the district of Nontron: twelve miles north of Perigueux.

CHAMPA'GNE (Philip de), a celebrated painter, born at Brussels in 1602. He discovered an inclination to painting from his youth; and owed but little to masters for the perfection he attained in it, excepting that he learned landscape from Fouquiere. In all other branches of his art, nature was his master, and he is said to have followed her very faithfully. At nineteen years of age he set off for Italy, taking France in his way; but he proceeded no farther than Paris. He lodged there in the college of Laon, where Poussin also dwelt; and these two painters became very good friends. Du Chesne, painter to queen Mary of Medicis, was employed about the paintings in the palace of Luxembourg, and set Poussin and Champagne at work under him. Champagne acquitted himself so well, that he was presently made director of the queen's paintings, who settled on him a yearly pension of 1200 livres, and allowed him lodgings in the palace of Luxembourg. There are a vast number of his pieces much esteemed. He was made rector of the royal academy of painting, which office he exercised many years. He died at Paris in 1674.

CHAMPA'GNE, a town of France, in the department of the Dordogne, and chief place of a canton, in the district of Riberac: ten miles north of Riberac.

CHAMPA'GNE, a town of France, in the department of the Ain, and chief place of a canton, in the district of Belley, ten miles north of Belley.

CHAMPA'GNE, before the revolution, a district of France, bordered on the east by Lorraine and Franche Comté, on the south by Burgundy and Nivernois, on the west by the Isle of France and Picardy, and on the north by Flanders; about sixty-five leagues in length, and forty-five broad: the land is fertile, and produces that celebrated wine called after its name; and abounds in grain and pasturage: it contained two archbishoprics, Rheims and Sens; and four bishoprics, Langres, Châlons, Troyes, and Meaux. The principal rivers are the Seine, the Marne, the Aube, the Meuse, and the Aisne. Troyes was the capital.

CHAMPA'GNE MOUTON, a town of France, in the department of the Charente, and chief place of a canton, in the district of Confolent: ten miles west of Confolent.

CHAMPAGNO'LE, a town of France, in the department of Jura, and chief place of a canton, in the district of Poligny: three leagues south-east of Poligny.

CHAMPAI'GN, *s.* [*campagne*, Fr.] A flat open country:

Of all these bounds,
With shadowy forests and with *champaigns* rich'd,
We make thee lady. *Shakespeare*.

CHAMPAIN', or POINT CHAMPAIN, *s.* in heraldry, a mark of dishonour in the coat of arms of him who kills a prisoner of war after he has cried quarter.

CHAMPCON', a town of France, in the department of Mayenne: two leagues north-east of Mayenne.

CHAMPDENIE'RS, a town of France, in the department of the two Sevres, and chief place of a canton, in the district of St. Maixent: ten miles north of Niort.

CHAMPDIEU', a town of France in the department of the Rhone and Loire: one league north of Montbrison.

CHAMPEAU'X, a town of France, in the department of the Seine and Marne: seven miles north-east of Melun.

CHAMPEI'X, a town of France, in the department of the Puy de Dôme, and chief place of a canton, in the district of Issoire: two leagues and a half north-west of Issoire.

CHAM'PERTY, *s.* [from *campi partitio*, because the parties in champerty agree to divide the land, &c. in question.] In law, a bargain with the plaintiff or defendant in any suit, to have part of the land, debt, or other thing sued for, if the party that undertakes it prevails therein. Whereupon the champertor is to carry on the party's suit at his own expence. See 4 *Comm.* 135. 2 *Inst.* 368. It is a species of maintenance, and punished in the same manner. This seems to have been an ancient grievance in our nation; for, notwithstanding the several statutes of 3 Ed. I. c. 25. 13 Ed. I. c. 49. 28 Ed. I. stat. 3. c. 11. and 33 Ed. I. &c. and a form of a writ framed to them; yet 4 Ed. III. c. 11 and 32 Hen. VIII. c. 9. enacted, That, whereas former statutes provided redress for this evil in the king's-bench only, from henceforth it should be lawful for justices of the common pleas, justices of assise, and justices of peace in their quarter sessions, to inquire, hear, and determine, this and such like cases, as well at the suit of the king, as of the party: and this offence is punishable by common law and statute; the stat. 33 Ed. I. stat. 3. makes the offenders liable to three years imprisonment, and a fine at the king's pleasure. By the stat. 28 Ed. I. c. 11. it is ordained, That no officer, nor any other, shall take upon him any business in suit, to have part of the thing in plea; nor none upon any covenant shall give up his right to another; and if any do, and be convicted thereof, the taker shall forfeit to the king so much of his lands and goods as amounts to the value of the part purchased. In the construction of these statutes, it hath been adjudged, that under the word covenant all kinds of promises and contracts are included, whether by writing or parol: that rent granted out of land in variance, is within the statute of champerty: and grants of part of the thing in suit made merely in consideration of the maintenance or champerty, are within the meaning of this statute; but not such as are made in consideration of a precedent honest debt, which is agreed to be satisfied with the thing in demand when recovered. 2 *Inst.* 209. 2 *Rol. Abr.* 113.

It is said not to be material, whether he who brings a writ of champerty, did in truth suffer any damage by it; or whether the plea wherein it is alleged be determined or not. 1 *Hawk. P. C.* c. 84. A conveyance executed pending a plea, in pursuance of a bargain made before, is not within the statutes against champerty: and if a man purchase land of a party, pending the writ, if it be *bonâ fide*, and not to maintain, it is not champerty. *F. N. B.* 172. But it hath been held, that the purchase of land while a suit of equity concerning it is depending, is within the purview of the statute 28 *E.* 1. c. 11. A lease for life, or years, or a voluntary gift of land, is within the statutes of champerty; but not a surrender made by a lessee to his lessor; or a conveyance relating to lands in suit, made by a father to his son, &c. 1 *Hawk. P. C.* c. 84. The giving part of the lands in suit, after the end of it, to a counsellor for his reward, is not champerty, if there be no precedent bargain relating to such gift; but if it had been agreed between the counsellor and his client before the action brought, that he should have part for his reward, then it would be champerty. *Bro. Champert.* 3. And it is dangerous to meddle with any such gift, since it carries with it a strong presumption of champerty. 2 *Inst.* 564. If any attorney follow a cause to be paid in gross, when the thing in suit is recovered, it hath been adjudged, that this is champerty. *Hob.* 117. Every champerty implies maintenance; but every maintenance is not champerty. *Crom. Jur.* 39. To this may be referred the provision of the stat. 32 *H.* 8. c. 9. that no one shall sell or purchase any pretended right or title to

to land, unless the vendor hath received the profits thereof for one whole year before such grant; or hath been in actual possession of the land, or of the reversion or remainder, on pain that both purchaser and vendor shall each forfeit the value of such land to the king and the prosecutor. See MAINTENANCE.

CHAM'PERTORS, *s.* by statute, are those who move pleas or suits, or cause them to be moved, either by their own procurement, or by others, and sue them at their proper costs, to have part of the land in variance, or part of the gain.

CHAMPIGNEL'LE, a town of France in the department of the Yonne, and chief place of a canton, in the district of St. Fargeau: nine miles north of St. Fargeau.

CHAMPI'GNON, *s.* [*champignon*, Fr.] A kind of mushroom. See AGARICUS.

He viler friends with doubtful mushrooms treats,
Secure for you, himself *champignons* eats. *Dryden.*

CHAMPIGNY'SUR VEUDE, a town of France in the department of the Indre and Loire: two leagues and a half south of Chinon.

CHAM'PION, *s.* [*champion*, Fr. *campio*, low Lat.] A man who undertakes a cause in single combat.—In many armies, the matter should be tried by duel between two *champions*. *Bacon.*

For hot, cold, moist, and dry, four *champions* fierce,
Strive here for mast'ry, and to battle bring
Their embryon atoms. *Milton.*

A hero; a stout warrior; one bold in contest.—This makes you incapable of conviction; and they applaud themselves as zealous *champions* for truth, when indeed they are contending for error. *Locke.*—It appears that champions, in the ancient sense of the word, were persons who fought in stead of those that, by custom, were obliged to accept the duel, but had a just excuse for dispensing with it, as too old, infirm, being ecclesiastics, &c.

CHAM'PION, in law, is taken not only for him that fights a combat in his own cause, but also for him that doth it in the place or quarrel of another. *Bract. cap.* 21. And in Sir Edward Bishe's notes on *Upton, fol.* 36, it appears that Henry de Ferneberg, for thirty marks fee, did by charter covenant to be champion to Roger abbot of Glastenbury. *An.* 42. *Hen.* 3. These champions, so mentioned in our law books and histories, were usually hired; and any one might hire them, except parricides, and those who were accused of the highest offences: before they came into the field, they shaved their heads, and made oath that they believed the persons who hired them were in the right, and that they would defend their cause to the utmost of their power; which was always done on foot, and with no other weapon than a stick or club, and a shield: and before they engaged, they always made an offering to the church, that God might assist them in the battle. When the battle was over, the punishment of a champion overcome, and likewise of the person for whom he fought, was various: if it was the champion of a woman for a capital offence, she was burnt, and the champion hanged: if it was of a man, and not for a capital crime, he not only made satisfaction, but had his right hand cut off; and the man was to be close confined in prison till the battle was over. *Bract. lib.* 2. *c.* 35. Victory in the trial by battle is obtained, if either champion proves recreant; that is, yields and pronounces the horrible word of *craven*; a word of disgrace and obloquy, rather than of any determinate meaning. But a horrible word it indeed is to the vanquished champion: since as a punishment to him for forfeiting the land of his principal, by pronouncing that shameful word, he is condemned as a recreant to become infamous, and not to be accounted *liber & legalis homo*; being supposed by the event to be proved forsworn, and therefore never to be put upon a jury, or admitted as a witness in any cause. 3 *Comm.* 340.

CHAM'PION OF THE KING, an ancient officer, whose office it is at the coronation of our kings, when the king is at dinner, to ride armed cap-à-pié into Westminster-hall, and by the proclamation of a herald make a challenge, That, if any man shall deny the king's title to the crown, he is there ready to defend it in single combat, &c. which being done, the king drinks to him, and sends him a gilt cup with a cover full of wine, which the champion drinks, and hath the cup for his fee. This office, ever since the coronation of Richard II. when Baldwin Freville exhibited his petition for it, was adjudged from him to Sir John Dymocke his competitor, (both claiming from Marmion,) and hath continued ever since in the family of the Dymockes; who hold the manor of Scrivelsby in Lincolnshire, hereditary from the Marmions, by grand serjeanty, viz. That the lord thereof shall be the king's champion, as abovesaid. Accordingly Sir Edward Dymocke performed this office at the coronation of Charles II. And a person of the name of Dymocke performed it at the coronation of his present majesty George the Third.

To CHAM'PION, *v. a.* [from the noun.] To challenge to the combat:

The seed of Banquo kings!
Rather than so, come, Fate, into the list,
And *champion* me to th' utterance. *Shakespeare.*

CHAM'PION (Joseph), famous in the art of penmanship, was born at Chatham in 1709, and received his education under Snell, who kept Sir John Johnson's free writing-school, in Forster-lane, Cheapside. He afterwards kept the new academy in Bedford-street, where he had many pupils, whom he instructed with great success; and he has never been excelled in his art. His first performance was his Practical Arithmetic, 8vo, 1733. In 1747 he published his Tutor's Assistant in Arithmetic, in forty plates, 4to. But his most elaborate and curious performance, is his Comparative Penmanship, twenty-four folio plates, 1750. It is engraved by Thorowgood, and is an honour to British penmanship. His New and complete Alphabets, with the Hebrew, Greek, and German, Characters, in twenty-one plates folio, engraved by Bickham, came out in 1754; and in 1758 he began to publish his Living Hands, or the different hands in common use, upwards of forty plates, 4to. He contributed forty-seven folio pieces for George Bickham's Universal Penman, wherein he displays a delightful variety of writing, both for use and ornament. His other pieces are, Engrossing Hands for young Clerks, 1757. The Young Penman's Practice, 1760. The Penman's Employment, folio, 1759 and 1762. In 1754 he addressed and presented to the royal society a large body of penmanship, in folio, which remains in MS.

CHAMP'L, a river of Germany, in the circle of Bavaria, which runs into the Regen, at Cham.

CHAMPLAIN' (Samuel de), a celebrated French navigator, the original founder of the colony of New France or Canada. He built Quebec; was the first governor of the colony in 1603, and was accidentally drowned in 1649.

CHAMPLAIN', a lake of North America, next in size to lake Ontario, and situate east-north-east from it, forming a part of the dividing line between the states of New-York and Vermont. It took its name from the French governor above-mentioned, who was drowned in it. It was before called Corlaer's Lake. In length from Fairhaven to St. John's it is about 200 miles; its breadth is from one to eighteen miles, being very different in different places; the mean width is about five miles; and it occupies about 500,000 acres. Its depth is sufficient for the largest vessels. There are in it above sixty islands of different sizes; the most considerable are North and South Hero, and Motte Island. North Hero, or Grand Isle, is twenty-four miles long, and from two to four wide. It receives at Ticonderoga the waters of Lake George

George from the south-south-west, which is said to be 100 feet higher than the waters of this lake. Half the rivers and streams which rise in Vermont fall into it. There are several which come to it from New-York state, and from Canada; to which last it sends its own waters through Chamblee river into the St. Lawrence. This lake is well stored with fish, particularly salmon, salmon-trout, sturgeon, and pickerel; and the land on its borders, and on the banks of its rivers, is good. The rocks in several places appear to be marked, and stained, with the former surface of the lake, many feet higher than it has been since its discovery in 1608. The waters generally rise from about the 20th of April to the 20th of June, from four to six feet; the greatest variation is not more than eight feet. It is seldom entirely shut up with ice until the middle of January. Between the 6th and 15th of April the ice generally goes off; and it is not uncommon for many square miles of it to disappear in one day. The scenery along various parts of the lake is extremely grand and picturesque, particularly beyond Crown Point; the shores are there beautifully ornamented with hanging woods and rocks, and the mountains on the western side rise up in ranges one behind the other in the most magnificent manner.

CHAMPLAIN', a town, the most northerly in Clinton county, New-York, which takes its name from the lake above described. It was granted to some Canadian and and Nova-Scotia refugees, who were either in the service of the United States during the war, or fled to them for protection. The indigence or ill habits of these people occasioned the breaking up of the settlement; and a better set of inhabitants have now taken their place. The lands are fertile; and two rivers run through it well stored with fish.

CHAMPLEMY', a town of France, in the department of Nyèvre, and chief place of a canton, in the district of La Charité: four leagues south-south-west of Clamecy.

CHAMPLIT'TE, a town of France, and principal place of a district, in the department of the Upper Saône, it contains about 1000 inhabitants: twenty-seven miles west of Vesoul, and twelve north of Gray.

CHAMPRO'ND, a town of France in the department of the Eure and Loire, and chief place of a canton, in the district of Nogent le Rotrou: fifteen miles west of Chartres.

CHAMPROUE'NT, a town of Savoy: nine miles north of Chambery.

CHAMPTERCIER', a town of France, in the department of the Lower Alps, and chief place of a canton, in the district of Digne: three miles west of Digne.

CHAMPTO'CE, a town of France, in the department of the Mayne and Loire, and chief place of a canton, in the district of Angers: four leagues west-south-west of Angers.

CHAMPTOCEAU'X, a town of France, in the department of the Mayne and Loire, and chief place of a canton, in the district of St. Florent le Vieil, containing about 1000 inhabitants: four miles west-south-west of Ancenis.

CHAMPVA'NS, a town of France, in the department of Jura, and chief place of a canton, in the district of Dole: one league south-west of Dole.

CHAMPVA'NT, a town of France in the department of the Upper Saône, and chief place of a canton, in the district of Gray: one league south of Gray.

CHAM'TA, or TCHAMTA, a town of Asia, in the country of Thibet: 107 miles east of Lassa.

CHAMTOU', a town of Asia, in the country of Thibet: seventy-five miles north-north-west of Cont-Choud-fong.

CHAMU'NY, a town of Savoy, in the lordship of Faucigny: nine miles east of Salanche.

CHAMUS'CA, a town of Portugal, in the province of Estramadura: three leagues north-east of Santaren.

CHAMU'TI, a river of Italy, in the kingdom of Naples, which runs into the sea: six miles south-south east of Girace.

CHAMU'TI, a town of Italy, in the kingdom of Naples, and province of Calabria Ultra: five miles south-south-west of Girace.

CHAN-CHAN, a town of Asia, in the kingdom of Corea: twelve miles south-west of Long-Kouang.

CHANAC', a town of France, in the department of Lozere, and chief place of a canton, in the district of Mende: two leagues and a half south-west of Mende.

CHANAID', a small island of Scotland, near the south-west extremity of the island of Ila.

CHANANÆ'I, the name of the ancient inhabitants of Canaan, descendants of Canaan, but peculiarly appropriated to some one branch, though uncertain which branch or son of Canaan it was.

CHA'NAS, a town of France, in the department of the Isere, and chief place of a canton, in the district of Vienne: four miles south-south-west of Vienne.

CHANCAIL'LO, a seaport of South America, in the Pacific Ocean, on the coast of Peru, north-west of Lima. Lat. 12. 5. S.

CHANÇAY', a town of South America, in Peru, and principal place of a jurisdiction, in the archbishopric of Lima; it contains 300 families, chiefly Spaniards: ten leagues south of Lima.

CHANCE, *s.* [*chance*, Fr.] Fortune; the cause of fortuitous events.—*Chance* is but a mere name, and really nothing in itself; a conception of our minds, and only a compendious way of speaking, whereby we would express, that such effects as are commonly attributed to *chance*, were verily produced by their true and proper causes, but without their design to produce them. *Bentley.*—Fortune; the act of fortune; what fortune may bring: applied to persons.—These things are commonly not observed, but left to take their *chance*. *Bacon.*—Accident, casual occurrence; fortuitous event.—To say a thing is a *chance* or casualty, as it relates to second causes, is not profaneness, but a great truth; as signifying no more, than that there are some events besides the knowledge and power of second agents. *South.*

All nature is but art, unknown to thee;
All *chance* direction, which thou canst not see. *Pope.*

Event; success; luck: applied to things:

Now we'll together, and the *chance* of goodness
Be like our warranted quarrel! *Shakespeare.*

Misfortune; unlucky accident:

To say extremity is the trier of spirits,
That common *chances* common men could bear. *Shakesf.*

Possibility of any occurrence:

A *chance*, but *chance* may lead, where I may meet
Some wand'ring spirit of heav'n, by fountain side,
Or in thick shade retir'd. *Milton.*

CHANCE, *adj.* [It is seldom used but in composition.] Happening by chance:

Now should they part, malicious tongues would say,
They met like *chance* companions on the way. *Dryden.*

To CHANCE. *v. n.* [from the noun.] To happen; to fall out; to fortune.—How *chance* thou art not with the prince thy brother? *Shakespeare.*

I h[illegible]ose the safest sea, and *chanc'd* to find
A ri[illegible]ver's mouth impervious to the wind. *Pope.*

CHANCE, *s.* The doctrine and laws of, are the same as those of expectation or probability, &c. Chances, in play, consist of the number of ways by which events may happen. Thus, if a halfpenny, or other piece of money, be tossed up, there are two events, or chances, or sides that may turn up, namely, one chance for turn-ing

ing up a head, and one for the contrary; that is, it is an equal chance to throw a head or not. And in throwing a common die, which has six faces, there are in all six chances, that is, one chance for throwing an ace, or any other single point, and five chances against it; or it is five to one that such assigned point does not come up. Upon this subject, see Demoivre, Simpson, &c. also ALGEBRA, vol. i. p. 315; and the article GAMING.

The ancient *sortilege*, or *chance*, M. Placette observes, was instituted in the Old Testament, where we find several standing laws and express commands which prescribed its use on certain occasions. Hence the scripture says, "The lot, or chance, fell on Matthias," when it was in question who should fill Judas's place in the apostolate. Hence also arose the *sortes sanctorum*, or method of determining things, among the ancient Christians, by opening some of the sacred books, and pitching on the first verse they cast their eye on, as a sure prognostic of what was to befal them. The *sortes Homericæ*, *Virgilianæ*, *Prænestinæ*, *&c.* used by the heathens, were with the same view, and in the same manner. St. Augustin seems to approve of this method of determining things future, and owns that he had practised it himself; grounded on this supposition, that God presides over chance; and on *Prov.* xvi. 33.

CHANCE, in law, is where a man commits an unlawful act, by misfortune, or chance, and not by design, but by a deficiency of the will, because here it observes a total neutrality, and doth not co-operate with the deed; which therefore wants one main ingredient of a crime. Of this, as it affects the life of another, see MURDER. It is to be observed, however, generally, that if any accidental mischief happens to follow from the performance of a lawful act, the party stands excused from all guilt; but if a man be doing any thing unlawful, and a consequence ensues which he did not foresee or intend, as the death of a man, or the like, his want of foresight shall be no excuse; for being guilty of one offence, in doing antecedently what is in itself unlawful, he is criminally guilty of whatever consequence may follow the first misbehaviour. 1 *Hal. P. C.* 39.

CHANCE-MEDLEY, in law, such killing of a man as happens either in self-defence on a sudden quarrel, or in the commission of an unlawful act, without any deliberate intention of doing any mischief at all. 1 *Hawk. P. C.* c. 30. The self-defence here meant, is that whereby a man may protect himself from an assault in the course of a sudden quarrel, by killing him who assaults him. And this is what the law expresses by this word chance-medley, or, as some rather choose to write it, chaud-medley; the former of which, in its etymology, signifies a casual affray, the latter an affray in the heat of blood or passion; both of them of much the same import: but the former is in common speech too often erroneously applied to any manner of homicide, by misadventure; whereas it appears by stat. 24 Hen. VIII. c. 5. and, in ancient law-books, that it is properly applied to such killing as happens to self-defence, in a sudden rencounter. 4 *Comm.* 183. 3 *Inst.* 55. *Foster* 275. In chance-medley the offender forfeits his goods, but hath a pardon of course. 6 *Ed.* 1. c. 9.

CHAN'CEABLE. *adj.* Accidental.—The trial thereof was cut off by the *chanceable* coming thither of the king of Iberia. *Sidney.*

CHAN'CEFUL. *adj.* Hazadous. Out of use:

Myself would offer you t' accompany
In this adven'trous *chanceful* jeopardy. *Spenser.*

CHAN'CEL, *s.* That part of the choir of a church, between the altar or communion-table and the ballustrade or rail that incloses it, where the minister is placed at the celebration of the communion. The word comes from the Latin *cancellus*, which in the lower Latin is used in the same sense, from *cancelli*, "lattices or cross bars," wherewith the chancels were anciently encompassed, as they now are with rails. The right of a seat and a sepulchre in the chancels is one of the privileges of founders. The right of granting the same indulgence to individuals, is in the rector or vicar for the time being.

CHANCELA'DE, a town of France, in the department of the Dordogne: one league north-west of Perigueux.

CHAN'CELLOR, *s.* [*cancellarius*, Lat.] A great legal officer, who was at first only a chief notary or scribe under the emperor, and was called cancellarius, because he sate intra cancellos, to avoid the crowd of the people. This word is by some derived from *cancello*, and by others from *cancellis*, an inclosed or separated place, or chancel, encompassed with bars, to defend the judges, and other officers from the press of the public. And cancellarius originally, as Lupanus thinks, signified only the register in court; *Grapharios, scil. qui conscribendis & excipiendis judicum actis dant operam*: but this name and officer is of late times greatly advanced, not only in this, but in other kingdoms; for the lord high chancellor is the chief administrator of justice, next to the sovereign, who anciently heard equitable causes himself. All other justices in this kingdom are tied to the strict rules of the law, in their judgments; but the chancellor hath power to moderate the written law, governing his judgment by the law of nature and conscience, and ordering all things *juxtà æquum & bonum*. It has been suggested, that the chancellor originally presided over a political college of secretaries, for the writing of treaties, grants, and other public business; and that the court of equity under the old constitution was held before the king and his council in the palace, where one supreme court for business of every kind was kept: and at first the chancellor became a judge to hear and determine petitions to the king, which were referred to him; and in the end, as business increased, the people intitled their suits to the chancellor, and not the king: and thus the chancellor's equitable power had by degrees commencement by prescription. Staundford says, the chancellor hath two powers; one absolute, the other ordinary; meaning, that although by his ordinary power, in some cases, he must observe the form of proceeding as other inferior judges, in his absolute power he is not limited by the law, but by conscience and equity, according to the circumstances of things. And though Polydore Virgil, in his history of England, makes William the Conqueror the founder of our chancellors; yet Dugdale has shewn that there were many chancellors of England long before that time, which are mentioned in his Origines Juridicales, and catalogues of chancellors; and Sir Edward Coke in his fourth Institute saith, it is certain, That both the British and Saxon kings had their chancellors, whose great authority under their kings were in all probability drawn from the reasonable custom of neighbouring nations and the civil law.

He that bears this chief magistracy, is stiled the Lord High Chancellor of Great Britain, which is the highest honour of the long robe. A chancellor may be made so at will, by patent, but it is said not for life, for, being an ancient office, it ought to be granted as hath been accustomed. 2 *Inst.* 87. But Sir Edward Hyde, afterwards earl of Clarendon, had a patent to be lord chancellor for life, though he was dismissed from that office, and the patent declared void. 1 *Sid.* 338. By the stat. 5 Eliz. c. 18, The lord chancellor and keeper have one and the same power; and therefore, since that statute, there cannot be a lord chancellor and lord keeper at the same time; before, there might and had been. 4 *Inst.* 78. Henry V. had a great seal of gold, which he delivered to the bishop of Durham, and made him lord chancellor, and also another of silver, which he delivered to the bishop of London to keep. But the lord Bridgman was lord keeper, and lord chief justice of the common pleas, at the same time; which offices were held not to be inconsistent. By stat. 1 W. & M. c. 21. Commissioners appointed to execute the office of lord chancellor, may exercise all the authority,

rity, jurisdiction, and execution of laws, which the lord chancellor, or lord keeper, of right ought to use and execute, &c. since which statute this high office hath been several times in commission.

The office of lord chancellor or lord keeper, is now created by the mere delivery of the king's great seal into his custody: whereby he becomes, without writ or patent, an officer of the greatest weight and power of any now subsisting in the kingdom, and superior in point of precedency to every temporal lord. And the act of taking away this seal by the king, or of its being resigned or given up by the chancellor, determines his office. He is a privy counsellor by his office; and according to lord-chancellor Ellesmere, prolocutor of the house of lords by prescription. To him belongs the appointment of all justices of peace throughout the kingdom. Being formerly almost always an ecclesiastic, (for none else were then capable of an office so conversant in writings,) and presiding over the royal chapel, he became keeper of the king's conscience; visitor, in right of the king, of all hospitals and colleges of the king's foundation, and patron of all the king's livings under the value of twenty marks a-year in the king's books. (38 *Ed.* 3. 3. though *Hob.* 214, extends this value twenty pounds.) He is the general guardian of all infants, ideots, and lunatics; and has the superintendance of all charitable uses in the kingdom. And all this over and above the vast and extensive jurisdiction, which he exercises in his judicial capacity in the court of chancery. 3 *Comm.* 47. The stat. 25 Edw. III. c. 2. declares it to be treason to slay the chancellor (and certain other judges) being in their places doing their offices; and it seems that the lord keeper and commissioners of the great seal, are within this statute by virtue of statutes 5 Eliz. c. 18; and 1 W. & M. c. 21. The lord chancellor, now there is no lord high steward, is accounted the first officer of the kingdom; and he not only keeps the king's great seal, but all patents, commissions, warrants, &c. from the king, are perused and examined by him before signed; and lord Coke says the lord chancellor is so termed *à cancellando*, from cancelling the king's letters patent, when granted contrary to law; which is the highest point of his jurisdiction. 4 *Inst.* 88. He by his oath swears well and truly to serve the king, and to do right to all manner of people, &c. In his judicial capacity, he hath divers assistants and officers, viz. The master of the rolls, the masters in chancery, &c. And in matters of difficulty, he calls one or more of the chief justices and judges to assist him in making his decrees; though in such cases they only give their advice and opinion, and have no share whatever of the judicial authority. See CHANCERY.

CHAN'CELLOR OF A DIOCESE, or OF A BISHOP. A person appointed to hold the bishop's courts, and to assist him in matters of ecclesiastical law. This officer, as well as all other ecclesiastical ones, if lay or married, must be a doctor of the civil law so created in some university. *Stat.* 37 *H.* 8. c. 17.

CHAN'CELLOR OF THE DUCHY OF LANCASTER. An officer before whom, or his deputy, the court of the duchy chamber of Lancaster is held. This is a special jurisdiction concerning all matter of equity relating to lands holden of the king in right of the duchy of Lancaster. *Hob.* 77. 2 *Lev.* 24. This is a thing very distinct from the county palatine, which hath also its separate chancery for sealing of writs, and other special business. 1 *Ventr.* 257. This duchy comprises much territory which lies at a vast distance from the county, as particularly a very large district surrounded by the city of Westminster. The proceedings in this court are the same as on the equity side in the courts of exchequer and chancery. 4 *Inst.* 206. So that it seems not to be a court of record: and it has been holden that those courts have a concurrent jurisdiction with the duchy court, and may take cognizance of the same causes. 1 *C. R.* 55. 45. *Hard.* 171. This court is held in Westminster-hall, and was formerly much used. Under the chancellor of the duchy are an attorney of the court, one chief clerk or register, and several auditors, &c. See COUNTIES PALATINE.

CHAN'CELLOR OF THE EXCHEQUER. A great officer, who, it is thought by many, was originally appointed for the qualifying extremities in the Exchequer: he sometimes sits in court, and in the exchequer chamber; and, with the judges of the court, orders things to the king's best benefit. He hath, by the stat. 33 Hen. VIII. c. 39, power, with others, to compound for the forfeitures upon penal statutes, bonds and recognizances entered into to the king: he hath also great authority in the management of the royal revenue, &c. which seems of late to be his chief business, being commonly the first commissioner of the treasury; and hence it has become his province to invent, propose, and regulate, the taxes for the current year, and to provide completely for the national expenditure. And though the court of equity in the exchequer-chamber, was intended to be holden before the treasurer, chancellor, and barons, it is now usually before the barons only. When there is a lord-treasurer, the chancellor of the exchequer is the under treasurer.

CHAN'CELLOR OF A CATHEDRAL, an officer that hears lectures read in the church, either by himself or his vicar; to correct and set right the reader when he reads amiss; to inspect schools; to hear causes; apply the seal; write and dispatch the letters of the chapter; keep the books; take care that there be frequent preachings, both in the church and out of it; and assign the office of preaching to whom he pleases.

CHAN'CELLOR OF THE ORDER OF THE GARTER, is an officer who seals the commissions and mandates of the chapter and assembly of the knights, keeps the register of their proceedings, and delivers acts thereof under the seal of their order.

CHAN'CELLOR OF AN UNIVERSITY, the head or senior officer, who seals the diplomas or letters of degrees, provision, &c. given in the university. The chancellor of Oxford is usually one of the principal nobility, chosen by the students themselves in convocation. He is the chief magistrate of the place; his office is *durante vita*, to govern the university, preserve and defend its rights and privileges, convoke assemblies, and do justice among the members under his jurisdiction. Under the chancellor is the vice-chancellor, who is chosen annually, being nominated by the chancellor, and elected by the university in convocation. He is always the head of some college, and in holy orders. His proper office is to execute the chancellor's power, to govern the university according to her statutes, to see that officers and students do their duty, that courts be duly called, &c. When he enters upon his office, he chooses four pro-vice chancellors from the heads of the colleges, to execute his duty in his absence. The chancellor of Cambridge is also usually one of the first of our nobility, and in most respects the same as that in Oxford; only he does not hold his office *durante vita*, but may be elected every three years. Under the chancellor there is a commissary, who holds a court of record for all privileged persons and scholars under the degree of master of arts, where all causes are tried and determined by the civil and statute law, and by the custom of the university. The vice-chancellor of Cambridge is chosen annually by the senate, out of two persons nominated by the heads of the several colleges and halls. See COURTS of the UNIVERSITIES.

CHAN'CELLORSHIP, *s.* The office of chancellor.

CHAN'CERY, *s.* [*Cancellaria*, Lat.] The highest court of judicature in this kingdom next to the parliament, and of very ancient institution. The jurisdiction of this court is of two kinds; ordinary and extraordinary. The ordinary jurisdiction, is that wherein the lord-chancellor, lord-keeper, &c. in his proceedings and judgments,

ments, is bound to observe the order and method of the common law; and the extraordinary jurisdiction is that which this court exercises in cases of equity. The ordinary court holds plea of recognisances acknowledged in the chancery, writs of *scire facias* for repeal of letters patent, writs of partition, &c. and also of all personal actions, by or against any officer of the court; and by acts of parliament of several offences and causes. All original writs, commissions of bankrupt, of charitable uses, and other commissions, as ideots, lunacy, &c. issue out of this court, for which it is always open; and sometimes a supersedeas, or writ of privilege, hath been here granted to discharge a person out of prison. An habeas corpus, prohibition, &c. may be had from this in the vacation; and here a subpoena may be had to force witnesses to appear in other courts, when they have no power to call them. 4 *Inst.* 79. 1 *Danv. Abr.* 776.

The extraordinary court, or court of equity, proceeds by the rules of equity and conscience, and moderates the rigour of the common law, considering the intention rather than the words of the law. Equity being the correction of that wherein the law, by reason of its universality, is deficient. On this ground therefore, to maintain a suit in chancery, it is always alleged that the plaintiff is incapable of obtaining relief at common law; and this must be without any fault of his own, as by having lost his bond, &c. Chancery never acting against but in assistance of, the common law, supplying its deficiencies, not contradicting its rules. A judgment at law not being reversible by a decree in chancery. *Cro. Eliz.* 220. But a bill in chancery may be brought to compel the discovery of the contents of a letter which would discharge the plaintiff of an action at law, before verdict obtained. 3 *C. Rep.* 17.

Early in the history of our jurisprudence, the administration of justice by the ordinary courts appears to have been incomplete. To supply the defect, the courts of equity have gained an establishment; assuming the power of enforcing the principles, upon which the ordinary courts also decide when the powers of those courts or their modes of proceeding are insufficient for the purpose; of preventing those principles, when enforced by the ordinary courts, from becoming, contrary to the purpose of their original establishment, instruments of injustice; and of deciding on principles of universal justice, where the interference of a court of judicature is necessary to prevent a wrong, and the positive law is silent. The courts of equity also administer to the ends of justice, by removing impediments to the fair decision of a question in other courts; by providing for the safety of property in dispute, pending a litigation; by restraining the assertion of doubtful rights, in a manner productive of irreparable damage; by preventing injury to a third person from the doubtful title of others; and by putting a bound to vexatious and oppressive litigations, and preventing unnecessary multiplicity of suits; and, without pronouncing any judgment on the subject, by compelling a discovery which may enable other courts to give their judgment; and by preserving testimony, when in danger of being lost, before the matter to which it relates can be made the subject of judicial investigation. This establishment has obtained throughout the whole system of our judicial policy; most of the inferior branches of that system having their peculiar courts of equity: [*e. g.* the court of exchequer, courts of Wales, the counties palatine, cinque ports, &c.] and the court of chancery assuming a general jurisdiction in cases which are not within the bounds, or which are beyond the powers, of other jurisdictions. It is not therefore to be expected that all the cases within the jurisdiction of this court can be enumerated with any degree of accuracy in such a work as this. What follows may serve to shew the leading principles of its decisions. They who desire further and more precise information, will consult Viner's and the other Digests, which enter more fully into the subject.

This court gives relief for and against infants, notwithstanding their minority: and for and against married women, notwithstanding their coverture: in some cases a woman may sue her husband for maintenance; she may sue him when he is beyond sea, &c. and be compelled to answer without her husband. All frauds and deceits, for which there is no remedy at common law may here be redressed; as also unreasonable and deceitful engagements and agreements entered into, without consideration. 1 *Vern.* 205. All breaches of trust and confidence, and accidents; as to relieve obligors, mortgagors, &c. against penalties and forfeitures, where the intent was only to pay the debt; titles to lands, where the deeds are lost, or supprest, may by this court be confirmed, conveyances rendered defective by mistake may be made perfect, &c. In this court executors may be called upon to give security and pay interest for money that is to lie long in their hands. Here executors may sue one another, or one executor alone be sued by the legatees or others, without the rest; order may be made for performance of a will: it may be decreed who shall have the tuition of a child, and other matters are regulated as to the disposal of the goods of testators and intestates. 3 *Comm.* 437. And here it may be observed, that money articled to be laid out in land, shall be taken as land in equity, and descend to the heir. 1 *Salk.* 154. Personal estate in the hands of executors, shall be applied in discharge of the heir, where there are sufficient assets to pay the debts and legacies. 1 *Danv.* 770. There shall be no bill in equity against an executor, to discover assets before a suit commenced at law. *Hard.* 115. *Sed. qu.* Legal assets shall be applied in a course of administration; but equitable assets amongst all the creditors proportionably, on a bill brought, &c. 2 *Vern.* 62. Mortgages are not relievable in equity after twenty years, where no demand has been made, or interest paid, or where other particular circumstances do not interfere. Copyhold tenants may be relieved against the lords of manors; inclosures of common lands may be decreed; assignments of choses in action for a good consideration, though not valid in law, may be carried into effect; accounts are compelled to be rendered; the limitation of actions by statute may be relieved against.

A deed appearing to be cancelled, has been decreed to be a good deed, on special circumstances. 1 *Ch. Cas.* 249. Articles of agreement upon marriage reduced into writing, though not signed by either party, being proved to be agreed to, were decreed to be performed. 2 *Vern.* 200. Also an agreement in writing made since the statute of frauds, has been decreed to be discharged by parol. 1 *Vern.* 240. A release shall be avoided for fraud, where there is suppressio veri, or suggestio falsi; and a release may be set aside in chancery by reason of misapprehension of the party that gave it. 1 *Vern.* 20, 32. A will concerning lands, may be avoided in a court of equity when obtained by fraud, &c. 2 *Ch. Rep.* 97. Heirs may be relieved in equity against unconscionable contracts made during their fathers' lives to pay large sums of money on their out-living their fathers, and the securities are frequently decreed to be delivered up, on payment of the sum actually advanced. 2 *Chan. Rep.* 397. 1 *Vern.* 467. A purchaser of land, without notice of an incumbrance, shall not be hurt thereby in equity; and in pleading a purchase the defendant ought to deny notice of incumbrances, &c. Indentures of apprenticeship have been decreed to be delivered up, and the money given with the apprentice to be paid back by the master, on ill usage of the apprentice. *Finch Rep.* 125. Charity lands being let at a great under-value, as was found by inquisition, on a commission of charitable uses, the lease was avoided in equity, and the lessee decreed to pay the arrears in rent according to the first value, and to yield up the possession. 2 *Vern.* 415. Other cases of relief, with respect to public charities and charitable corporations, come also under the immediate direction of the court of chancery.

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It is common to give relief in chancery, notwithstanding there is an agreement between the parties that there shall be no relief in law or equity. 1 *Mod.* 141, 305. In cases which tend to restrain freedom, or introduce corruption into marriage contracts, the court are always most ready to afford relief. If a portion be given to a woman, provided she marries not without the consent of a certain person, although she marries without such consent, she shall be relieved in chancery, and have her portion; unless the portion, on such marriage, had been limited over to another, in which case it is otherwise. 1 *Danv.* 752. 1 *Mod.* 300. If a father, on the marriage of his son, take a bond of the son that he shall pay him so much, &c. this is void in equity, being adjudged by coercion while he is under the awe of his father. 1 *Salk.* 158. Also where a son, without privity of the father, treating the match, gives bond to return any part of the portion, in equity it is void. *Ibid.* 156. But a man is not bound to discover the consideration of a bond generally given, which in itself implies a consideration. *Hard.* 200. If a factor to a merchant hath money in his hands, it shall be accounted his own; for equity cannot follow money: but it may goods, to make them the merchant's, which may be known, though money cannot. 1 *Salk.* 260. Where trustees convert money raised out of land for payment of debts to their own use, the heir shall have the land discharged, which hath borne its burden, and the trustees are liable to the debts in equity. 1 *Salk.* 153. If a lessee for years, without impeachment of waste, about the end of his term cuts down timber-trees, the court of chancery may stop him by injunction. 1 *Rol. Abr.* 380. And tenant after possibility of issue extinct, or for life, dispunishable of waste, may be stopped in equity from pulling down houses, &c. 1 *Danv.* 761.

The following is a general and comprehensive view of the nature and reason of the pleadings in chancery, extracted from Mr. Mitford's treatise. Chancery will not retain a suit for any thing under ten pounds value, except in cases of charity, nor for lands under forty shillings per annum. A suit to the extraordinary jurisdiction of the court of chancery, on behalf of a subject merely, is commenced by preferring a bill (signed by counsel) in the nature of a petition to the lord chancellor, lord keeper, or lords commissioners of the great seal; or to the king himself, in his court of chancery, in case the person holding the seal is a party, or the seal is in the king's hand. But if the suit is instituted on behalf of the crown, or of those who partake of its prerogative, or whose rights are under its particular protection, as the objects of a public charity, the matter of complaint is offered by way of information, given by the proper officer; usually the attorney-general. Except in some few instances, bills and informations have been always in the English language; and a suit thus preferred is therefore commonly termed a suit by English bill, by way of distinction from the proceedings in suits within the ordinary jurisdiction of the court, which, till the stat. of 4 Geo. II. c. 26. were entered and enrolled more anciently in the French or Roman tongue, and afterwards in the Latin; in the same manner as the pleadings in the other courts of common law. Every bill must have for its object one or more of the grounds upon which the jurisdiction of the court is founded; and as that jurisdiction sometimes extends to decide on the subject, and in some cases is only ancillary to the decision of another court, or a future suit, the bill may, 1, either complain of some injury which the person exhibiting it suffers, and pray relief according to the injury; or, 2, without praying relief, may seek a discovery of matter necessary to support or defend another suit; or, 3, although no actual injury is suffered, it may complain of a threatened wrong; and, stating a probable ground of possible injury, may pray the assistance of the court to enable the plaintiff, or person exhibiting the bill, to defend himself against the injury whenever it shall be attempted to be committed.

As the court of chancery has general jurisdiction in matters of equity which are not within the bounds, or which are beyond the powers, of inferior jurisdictions, it assumes a controul over those jurisdictions, by removing from them suits which they are incompetent to determine. To effect this it requires the party injured to institute a suit in the court of chancery, the sole object of which is the removal of the former suit, by means of the writ of certiorari; and the prayer of the bill used for this purpose, is confined to that object. The bill, except it merely prays the writ of certiorari, in which case is does not require any defence, nor can there be any pleading beyond the bill, requires the answer of the defendant or party complained of, upon oath, unless the party is entitled to privilege of peerage, or as a lord of parliament, or unless a corporation aggregate is made a party. In the first case the answer is required upon the honour of the defendant, and in the latter upon the corporation seal. In the case of exhibiting a bill against a peer, the lord chancellor writes a letter to him, called a letter missive; and if he does not put in his answer, a subpœna issues, and then an order to shew cause why a sequestration should not issue; and if he still stands out, then a sequestration is granted; for there can be no process of contempt against the person of a peer. The process is the same against a member of the house of commons, except the letter missive.

An answer is thus required in the case of a bill, seeking the decree of the court on the subject of the complaint, with a view, 1. To obtain an admission of the case made by the bill either in aid of proof; or, 2. to supply the want of it. 3. To obtain a discovery of the points in the plaintiff's case, controverted by the defendant; and, 4. of the grounds on which they are controverted. 5. To gain a discovery of the case on which the defendant relies; and, 6. of the manner in which he means to support it. If the bill seeks only the assistance of the court to protect the plaintiff against a future injury, the answer of the defendant, upon oath, may be required to obtain an admission of the plaintiff's title, and a discovery of the claims of the defendant, and the grounds on which those claims are intended to be supported. When the sole object of the bill is a discovery of matter necessary to support or defend another suit, the oath of the defendant is required to compel that discovery; which oath, however, the plaintiff may, if he thinks proper, dispense with, by consenting to or obtaining an order of court for the purpose; and this is frequently done for the convenience of parties.

To the bill thus preferred, unless it is merely for a certiorari, it is necessary for the person or persons complained of to make defence, or to disclaim all rights to the matters in question. As the bill calls upon the defendant to answer the several charges it contains, he must do so, unless he can dispute the right of the plaintiff to compel such answer; either, 1, From some impropriety in requiring the discovery sought; or, 2, From some objection to the proceeding to which the discovery is proposed to be assistant; or, 3, Unless by disclaiming all right to the matters in question, he shews a further answer from him to be unnecessary. The grounds on which defence may be made to a bill either by answer, or by disputing the right of the plaintiff to compel such answer, are various. 1. The subject of the suit may not be within the jurisdiction of a court of equity. 2. Some other court of equity may have the proper jurisdiction. 3. The plaintiff may not be entitled to sue, by reason of some personal disability. 4. The plaintiff may not be the person he pretends to be. 5. He may have no interest in the subject; or, 6. Though he has such interest, he may have no right to call upon the defendant concerning it. 7. The defendant may not be the person he is alleged to be by the

the bill; or, 8. He may not have that interest in the subject to make him liable to the claims of the plaintiff. And notwithstanding all these requisites concur, 9. Still the plaintiff may not be entitled in the whole, or in part, to the relief or assistance he prays; or, 10. Even if he is so entitled, the defendant may also have rights in the subject which may require the attention of the court, and call for its interference to adjust the rights of all parties. The effecting complete justice, and finally determining, as far as possible, all questions concerning the subject, being the constant aim of courts of equity. Some of these grounds may extend only to entitle the defendant to dispute the plaintiff's claim to the relief prayed by the bill, and may not be sufficient to protect him from making the discovery sought by it; and where there is no ground for disputing the plaintiff's right to relief, or if no relief is prayed, the impropriety or immateriality of the discovery may protect the defendant from making it.

The form of making defence varies according to the foundation on which it is made, and the extent in which it submits to the judgment of the court. If it rests on the bill, and, on the foundation of the matter there apparent, demand the judgment of the court, whether the suit shall proceed at all, it is termed a demurrer. If on the foundation of new matter offered, it demands judgment whether the defendant shall be compelled to answer further, it assumes a different form, and is termed a plea. If it submits to answer generally the charges in the bill, demanding the judgment of the court on the whole case made on both sides, it is offered in a shape still different, and is simply called an answer. If the defendant disclaims all interest in the matters in question, his answer to the complaint made is different from all the others, and is termed a disclaimer. And these several forms, or any of them, may be used together, if applied to separate and distinct parts of the bill.

A demurrer, being founded on the bill itself, necessarily admits the truth of the facts contained in the bill, or in that part of it to which the demurrer extends; and therefore, as no fact can be in question between the parties, the court may immediately proceed to pronounce its definitive judgment on the demurrer; which, if favourable to the defendant, puts an end to so much of the suit as the demurrer extends to. A demurrer thus allowed consequently prevents any further proceeding. A plea is also intended to prevent further proceeding at large, by resting on some point founded on matter stated in the plea; and it therefore admits, for the purposes of the plea, the truth of the facts contained in the bill, so far as they are not controverted by facts stated in the plea. Upon the sufficiency of this defence the court will also give immediate judgment, supposing the facts stated in it to be true: but the judgment, if favourable to the defendant, is not definitive; for the truth of the plea may be denied by a replication, and the parties may then proceed to examine witnesses, the one to prove, and the other to disprove, the facts stated in the plea. The replication in this case concludes the pleadings, though, if the truth of the plea is not supported, further proceedings may be had. An answer generally controverts the facts stated in the bill, or some of them; and states other facts to shew the rights of the defendant, in the subject of the suit; but sometimes it admits the truth of the case made by the bill, and either with or without stating additional facts, submits the questions arising upon the case, thus made, to the judgment of the court. If an answer admits the facts stated in the bill, or such of them as are material to the plaintiff's case, and states no new facts, or such only as the plaintiff is willing to admit, no further pleading is necessary; the court will decide on the answer, considering it as true. So if the sole object of the suit is to obtain a discovery, there can be no proceeding beyond an answer by which the discovery is obtained. But, if necessary to maintain the plaintiff's case, the truth of the answer, or of any part of it, may be denied, and the sufficiency of the bill may be asserted by a replication, which in this case also concludes the pleadings, according to the present practice of the court. If a demurrer or plea is over-ruled upon argument, the defendant must make a new defence. This he cannot do by a second demurrer of the same extent with that over-ruled; for although, by a standing order of the court, a cause of demurrer must be set forth in the pleading, yet if that is over-ruled, any other cause appearing on the bill may be offered on argument of the demurrer; and if valid, will be allowed, the rule of court affecting only the costs. But after a demurrer has been over-ruled, new defence may be made by a demurrer less extended, or by plea or answer. And after a plea has been over-ruled, defence may be made by demurrer, by a new plea, or by an answer, and the proceedings upon the new defence will be the same as if it had been originally made. A disclaimer, neither asserting any fact, nor denying any right sought by the bill, admits of no further pleading.

Suits thus instituted are sometimes imperfect in their frame, or become so by accident before their end has been obtained; and the interests in the property in litigation may be changed, pending the suit, in various ways. To supply the defects arising from any such circumstances, new suits may become necessary, to add to, or continue, or obtain the benefit of, the original suit. A litigation commenced by one party, sometimes renders necessary a litigation by another party, to operate as a defence, or to obtain a full decision on the rights of all parties: and bills filed for this purpose are termed cross-bills. Where the court has given judgment on a suit, it will in some cases permit that judgment to be controverted, suspended, or avoided, by a second suit; and sometimes a second suit becomes necessary to carry into execution a judgment of the court. Suits instituted for any of these purposes are also commenced by bill; and hence arises a variety of distinctions of the kinds of bills necessary to answer the several purposes; as bills of review, (which among other cases may be brought, where new matter is discovered, in time, after the decree made,) bills of revivor, &c. 3 *Com.* 448, &c. and on all the different kinds of bills there may be the same pleadings as on a bill used for instituting an original suit.

It frequently happens that, pending a suit, the parties discover some error or defect in some of the pleadings; and, if this can be rectified by amendment of the pleadings, the court will in many cases permit it. This indulgence is most extensive in the case of bills; which being often framed upon an inaccurate state of the case, it was formerly the practice to supply their deficiencies, and avoid the consequences of errors by special replications; but this tending to long and intricate pleading, the special replication, requiring a rejoinder, in which the defendant might in like manner supply defects in his answer, and to which the plaintiff might sur-rejoin, the special replication is now disused for this purpose; and the court will in general permit a plaintiff to rectify any error, or supply any defect in his bill, either by amendment or by a supplemental bill, and will also permit, in some cases, a defendant in like manner to complete his answer, either by amendment, or by a further answer. If the plaintiff conceives the defendant's answer to be insufficient to the charges contained in the bill, he may take exceptions against it, on which it is referred to a master to report, whether it be sufficient or not; to which report exceptions may be also made. The answer, replication, and rejoinder, &c. being settled, and the parties come to issue, witnesses are examined upon interrogatories, either in court, or by commission in the country, wherein the parties usually join; and when the plaintiff and defendant have examined their witnesses, publica-

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tion is made of the depositions, and the cause is set down for hearing, after which follows the decree. If, however, in the process of the cause the parties come to an issue of fact, which by the common law is triable by a jury, the lord chancellor, in this case, delivers the record into the king's-bench to be tried there; and after trial had, the record is remanded into chancery, and judgment given there. Trials and issues at law are frequently directed by the court, which in that case makes an interlocutory decree or order, that after trial the parties shall resort to the court on the equity reserved. Interlocutory orders and decrees are also made on other occasions; as for injunctions till a hearing, where the injury sustained by the plaintiff requires such immediate interference.

If the plaintiff dismisses his own bill, or the defendant obtains the dismissal of it for want of prosecution, or if the decree is in behalf of the defendant, the bill is dismissed with costs to be taxed by a master. *Stat.* 4 & 5 *An.* c. 16. If the defendant does not appear, on being served with the process of subpœna, in order to answer, upon affidavit of the service of the writ, an attachment issues out against him; and if a non est inventus is returned, an attachment with proclamation goes forth against him; and if he stands further out in contempt, then a commission of rebellion may be issued for apprehending him, and bringing him to the Fleet-prison; in the execution whereof the persons to whom directed may justify breaking open doors. If the defendant stands further in contempt, a serjeant at arms is to be sent out to take him; and, if he cannot be taken, a sequestration of his land may be obtained till he appears. And if a decree, when made, is not obeyed, being served upon the party under the seal of the court, all the afore-mentioned processes of contempt may issue out against him for his imprisonment till he yields obedience to it. The court of chancery, notwithstanding its very extensive power, binding the person only, and not the estate or effects of the defendant. And in this sense, we presume, it is said that it is no court of record. 1 *Danv. Ab.* 749. and *Chan. Rep.* 193. *Howard* v. *Suffolk*.

Where there is any error in a decree in matter of law, there may be a bill of review, which is in nature of a writ of error; or else an appeal to the house of lords. Old authorities have been quoted, that a writ of error lies returnable in the court of king's-bench; and that a judgment of chancery may be referred to the twelve judges. 4 *Inst.* 80. 3 *Bulst.* 116. But it is now usual to appeal to the house of lords; which appeals are to be signed by two counsel of eminence, and exhibited by way of petition; the petition or appeal is lodged with the clerk of the house of lords, and read in the house, whereon the appellee is ordered to put in his answer, and a day fixed for hearing the cause; and after counsel heard, and evidence given on both sides, the lords affirm or reverse the decree of the chancery, and finally determine the cause by a majority of votes, &c. Though it is to be observed on an appeal to the lords from a decree in chancery, no proofs will be permitted to be read as evidence, which were not made use of in the chancery. *Preced. Canc.* 212.

No subpœna, or other process of appearance, shall issue out of chancery, till after a bill is filed, (except bills for injunctions to stay waste, or to stay suits at law commenced,) and a certificate thereof brought to the subpœna office. *Stat.* 4 & 5 *An.* c. 16. Persons in remainder, or reversion of any estate, after the death of another, on making affidavit in the court of chancery, that they have cause to believe such other person dead, and his death concealed by the guardian, trustees, or others, may move the lord chancellor to order such guardian, trustees, &c. to produce the person suspected to be concealed; and if he be not produced, he shall be taken to be dead, and those in reversion may enter upon the estate; and if such person be abroad, a commission may be issued for his being viewed by commissioners. *Stat.* 6 *An.* c. 18. Infants under the age of twenty-one years, seised of estates in trust, or by way of mortgage, are enabled, by statute, to make conveyances thereof; or they may be compelled thereto, by order of the court of chancery, upon petition and hearing of the parties concerned. 7 *An.* c. 9. And, by statute 4 Geo. II. c. 10. ideots and lunatics seised of estates in trust, may make conveyances by order of the court of chancery. By 12 Geo. I. c. 32. and 33. the power of the masters was abridged, with respect to the suitor's money, which is now to be paid into the Bank of England; and an additional stamp-duty, on writs, processes, &c. is granted for relief of the suitors, and as a common stock of the court of chancery.

All orders and decrees made and signed by the master of the rolls, shall be deemed and taken to be good and valid orders and decrees of the court of chancery; but not to be inrolled till signed by the lord chancellor, and subject to reversal, &c. by him. *Stat.* 3 *Geo.* II. c. 30. Where a defendant does not appear after subpœna issued, but keeps out of the way to avoid being served with the process, on affidavit that he is not to be found, and suspected to be gone beyond sea, or to abscond, the court of chancery will make an order for his appearance at a certain day; a copy of which order is to be published in the London Gazette; and then, if he do not appear, the plaintiff's bill shall be taken *pro confesso*, and the defendant's estate sequestered. But persons out of the kingdom, returning in seven years, may have a rehearing in six months, and be admitted to answer, otherwise to be barred by final decree. 5 *Geo.* II. c. 25. The following officers have their appointments in the court of chancery, as assistants to the lord chancellor:

The Master of the Rolls, having judicial power, is an assistant to the lord chancellor when present, and his deputy when absent; but he has certain causes assigned him to hear and decree, which he usually doth on certain days appointed at the chapel of the rolls, being assisted by one or more masters in chancery; he is, by virtue of his office, chief of the masters of chancery and chief clerk of the petty-bag office. The twelve masters in chancery sit some of them in court, and take notice of such references as are made to them, to be reported to the court, relating to matters of practice, the state of the proceedings, accounts, &c. and they also take affidavits, acknowledge deeds and recognizances, &c. The six clerks in chancery transact and file all proceedings by bill and answer, and also issue out some patents that pass the great seal; which business is done by their under-clerks, each of whom has a seat there, and whereof every six-clerk has a certain number in his office, usually about ten; the whole body being called the sixty clerks. The cursitors of the court, four-and-twenty in number, make out all original writs in chancery, which are returnable in C. B. &c. and among these the business of the several counties is severally distributed. The register is a place of great importance in this court, and he hath several deputies under him, to take cognizance of all orders and decrees, and enter and draw them up. The master of the subpœna office issues out all writs of subpœna. The examiners are officers in this court, who take the depositions of witnesses, and are to examine them, and make out copies of the depositions. The clerk of the affidavits, files all affidavits used in court, without which they will not be admitted. The clerk of the rolls, sits constantly in the rolls to make searches for deeds, offices, &c. and to make out copies. The clerks of the petty-bag office, in number three, have great variety of business that goes through their hands, in making out writs of summons to parliament; *congé d'elires* for bishops; patents for customers; liberates upon extent of statute-staple, and recovery of recognizances forfeited; and also relating to suits for and against privileged persons. The usher of the chancery, had formerly the receiving and custody of all money ordered to be deposited in court, and paid it back again by order; but this business was afterwards assumed by the

the masters in chancery; till by stat. 12 Geo. I. c. 32, a new officer was appointed, called accountant general, to receive the money lodged in court, and convey the same to the bank, to be there kept for the suitors of the court. There is also a sergeant at arms, to whom persons standing in contempt are brought up by his substitute as prisoners. A warden of the Fleet, who receives such prisoners as stand committed by the court, &c. Besides these officers, there is a clerk of the crown in chancery; clerk and comptroller of the hanaper; clerk for inrolling letters patent, &c. not employed in proceedings of equity, but concerned in making out commissions, patents, pardons, &c. under the great seal, and collecting the fees thereof. A clerk of the faculties, for dispensations, licences, &c. clerk of the presentations, for benefices of the crown in the chancellor's gift; clerk of appeals, on appeals from the courts of the archbishop to the court of chancery; and divers other officers, who are constituted by the chancellor's commission.

CHAN'CRE, *s.* [*chancre*, Fr.] An ulcer usually arising from venereal maladies. See MEDICINE.

CHAN'CROUS, *adj.* Having the qualities of a chancre; ulcerous.—You may think I am too strict in giving so many internals in the cure of so small an ulcer as a chancre, or rather a *chancrous* callus. *Wiseman.*

CHAN'CHA, a town of Egypt: two leagues east of Cairo, at the entrance of a desert which leads to Mount Sinai.

CHAN'DA, a town of Hindoostan, in the country of Berar: sixty-seven miles south of Nagpour, and 218 east of Aurungabad. Lat. 20. 2. N. lon. 79. 54. E. Greenwich.

CHANDAIL', a circar or district of Hindoostan, in the country of Alla-Habad, south-west of the country of Benares.

CHANDELEU'R ISLANDS, a cluster of islands in the Gulf of Mexico, near the coast of West Florida. Lat. 29. 30. to 29. 45. N. lon. 88. 48. to 88. 58. W. Greenwich.

CHANDELIE'R, *s.* [*chandelier*, Fr.] A branch for candles. This elegant contrivance for light and ornament has of late years been considerably improved; particularly by M. Lafount, who has introduced a new method of constructing chandeliers, girandoles, lustres, &c. so that the upper and lower branches are made to appear all of one piece. This invention was sanctioned by letters patent, on the 13th of December, 1796. The method he adopts is to unite the upper and lower branches in a plate concealed by an ornamented hoop. The upper branches are affixed in sockets which are attached to the inside of the hoop; and the lower branches have turns in the upper end like the top of an S; the turns pass through the plate, and their extremity is affixed into sockets on the upper side of it. As the sockets on the hoop and on the plate are both in the same vertical plane, the upper and lower branches of the chandelier, which are affixed into those sockets, will of course appear to the eye as of one entire piece, whereby the luminous and brilliant effect is very much increased and improved.

CHANDELIE'R, in fortification, a kind of wooden parapet, consisting of upright timbers supporting others laid across the tops of them, six feet high, and fortified with fascines, &c. They are used to cover the workmen in approaches, galleries, and mines. And they differ from blinds only in this, that the former serve to cover the men before, and the latter over head.

CHANDERE'E, a town of Hindoostan, and capital of a circar or district in the Malwa country, near the river Betwha. It once contained 14,000 houses; and is now the residence of a rajah: 148 miles south of Agra, and 192 north of Ougein. Lat. 24. 48. N. lon. 78. 43. E. Greenwich.

CHANDERNAGO'RE, a town of Hindoostan, in the country of Bengal, situated on the Ganges. It was taken by the English, under the conduct of colonel Clive and admiral Watson, after a most bloody conflict, in March, 1757. It formerly contained 80,000 inhabitants; at this time, not half that number: eighty-two miles south of Moorshedabad, and thirteen north of Calcutta.

CHANDIEU', a town of France, in the department of the Rhone and Loire: one league north of Montbrison.

CHANDI'GA, a river of Siberia, which runs into the Adlan. Lat. 62. 10. N. lon. 153. E. Ferro.

CHANDIRO'BA, *s.* in botany. See FEUILLEA.

CHAND'LER, *s.* [*chandelier*, Fr.] An artisan whose trade is to make candles, or a person who sells them.

CHAND'LER (Mary), distinguished by her poetical genius, was the daughter of a dissenting minister at Bath, and was born at Malmesbury in Wiltshire, in 1687. She was bred a milliner; but from her childhood had a turn for versification, and in her riper years applied herself to the study of the poets. Her poems, for which she was complimented by Mr. Pope, breathe the spirit of piety and philosophy. She had the misfortune to be deformed, which determined her to live single; though she had peculiar sweetness of countenance, and was solicited to marry. She died in 1745, aged 58.

CHAND'LER (Samuel), an eminent dissenting minister, born at Hungerford in Berks, where his father was pastor of a congregation of protestant dissenters. Being by his literary turn destined to the ministry, he was first placed at an academy at Bridgewater, and from thence removed to Gloucester, under Mr. Samuel Jones. Among the pupils of Mr. Jones were Mr. Joseph Butler, afterwards bishop of Durham, and Mr. Thomas Secker, afterwards archbishop of Canterbury. With these eminent persons he contracted a friendship that continued to the end of their lives, notwithstanding the different views by which their conduct was afterwards directed, and the different situations in which they were placed. Having finished his academical studies, Mr. Chandler began to preach about July 1714; and being soon distinguished by his talents in the pulpit, he was chosen in 1716 minister of the Presbyterian congregation at Peckham near London. Here he entered into the matrimonial state, and began to have an increasing family, when, by the fatal South-sea scheme of 1720, he unfortunately lost the whole fortune which he had received with his wife. His circumstances being thereby embarrassed, and his income inadequate to his expences, he engaged in the trade of a bookseller, and kept a shop in the Poultry, London, for two or three years, still continuing to discharge the duties of the pastoral office. He also officiated as joint preacher with the learned Dr. Lardner of a winter weekly evening lecture at the meeting-house in the Old Jewry, in which meeting he was established assistant preacher in 1725, and then as the pastor. Here he ministered to the religious improvement of a very respectable congregation for forty years with the greatest applause; and with what diligence he improved the vacancies of time from his pastoral duties, for improving himself and benefiting the world, will appear from his many writings on a variety of important subjects. While he was thus laudably employed, not only the universities of Edinburgh and Aberdeen gave him, without any application, testimonies of their esteem in diplomas, conferring on him the degree of D. D. but he also received offers of preferment from some of the governors of the established church, which he declined. He had likewise the honour of being afterwards elected F. R. and A. SS. On the death of George II. in 1760, Dr. Chandler published a sermon on that event, in which he compared that prince to king David. This gave rise to a pamphlet, intituled "The History of the Man after God's own Heart;" wherein the author ventured to exhibit king David as an example of perfidy, lust, and cruelty, fit only to be ranked with a Nero or a Caligula; and complained of the insult that had been offered to the memory of the late British monarch, by Dr. Chandler's parallel between him and the king of Israel. This attack occasioned Dr. Chandler to publish "A Review of the History of the Man after God's own Heart; in which the False-

Falsehoods and Misrepresentations of the Historian are exposed and corrected." He also prepared for the press a more elaborate work, in two volumes 8vo. intituled, "A Critical History of the Life of David; in which the chief Objections of Mr. Bayle and others against the Character of this Prince are examined and refuted; and the Psalms which refer to him explained." The greatest part of this work was printed off at the time of our author's death, which happened May 8th, 1766, aged 73. Dr. Chandler was a man of very extensive learning and eminent abilities; his apprehension was quick and his judgment penetrating; he had a warm and vigorous imagination; he was a very instructive and animated preacher; and his talents in the pulpit and as a writer procured him very great and general esteem, not only among the dissenters, but among large numbers of the established church. He was principally instrumental in the establishment of the fund for relieving the widows and orphans of poor Protestant dissenting ministers: the plan of it was first formed by him; and it was by his interest and application to his friends that many of the subscriptions for its support were procured. In 1768, four volumes of his sermons were published by Dr. Amory, according to his own directions in his last will; and in 1777 his Paraphrase and Notes on the Epistles of St. Paul to the Galatians and Ephesians; together with a critical and practical Commentary on the two Epistles of St. Paul to the Thessalonians.

CHANDOR', a town of Hindoostan, in the Baglana country: fifty-two miles north-east of Nassuck, and eighty north-west of Aurungabad.

CHANDOU'L, a town of Persia, in the province of Adirbeitzan: 150 miles north-east of Tauris.

CHAN'FRIN, *s.* [old French.] The fore part of the head of a horse, which extends from under the ears, along the interval between the eyebrows, down to his nose.

CHANG, a town of China, of the second rank, in the province of Chen-si: 495 miles south-west of Peking. Lat. 33. 50. N. lon. 127. 17. E. Ferro.

CHANG-CHE, a city of China, of the second rank, in the province of Quang-si: 403 leagues south-south-west of Peking. Lat. 22. 6. N. lon. 124. 3. E. Ferro.

CHANG-CHOU'I, a town of China, of the third rank, in the province of Honan: fifteen leagues south-east of Hiu.

CHANG-HA'I, a town of China, of the third rank, in the province of Kiang-nan: six leagues south-east of Song-kiang.

CHANG HANG, a town of China, of the third rank, in the province of Fo-kien: fifty miles south of Ting-tcheou.

CHANG-HA'I-TONG, a town of China, of the second rank, in the province of Quang-si; 400 leagues south-south-west of Peking. Lat. 22. 27. N. lon. 123. 50. E. Ferro.

CHANG-HO, a town of China, of the third rank, in the province of Chang-tong: six leagues south-west of Vou-ting.

CHANG-IN, a town of China, of the second rank, in the province of Quang-si: 385 leagues south-south-west of Peking. Lat. 23. 3. N. lon. 124. 10. E. Ferro.

CHANG-KA'O, a town of China, of the third rank, in the province of Kiang-si: ten leagues west-south-west of Choui-tcheou.

CHANG-LIN, a town of China, of the third rank, in the province of Quang-si: six leagues north-west of Ping.

CHANG-LING, a town of Asia, in the kingdom of Corea: five miles south-south-west of Hoang.

CHANG-NAN, a town of China, of the third rank, in the province of Chen-si: fourteen leagues south-east of Chang.

CHANG-SE, a town of China, of the second rank, in the province of Quang si: 1180 miles south-south-west of Peking. Lat. 22. 18. N. lon. 125. E. Ferro.

CHANG-SI, a province of China, one of the smallest of the empire, bounded on the east by that of Pe-tche-li, on the south by Ho-non, on the west by Chen-si, and on the north by the great wall. The Chinese say, that the first inhabitants of China fixed their residence in this province. Its climate is healthy and agreeable, and the soil is fruitful. It abounds in musk, porphyry, marble, lapis-lazuli, and jasper of various colours: iron-mines, salt-pits, and crystal, are also common here. This province is full of mountains; some of which are uninhabited, and have a wild and frightful appearance; but the rest are cultivated with care, and cut into terraces from top to bottom, which present a very agreeable prospect; on the tops of some there are found vast plains, which are no less fertile than the richest low lands. Vines grow here, which produce the best grapes in this part of Asia: good wine might be made from them; but the Chinese prefer drying them, and selling them in the other provinces. The mountains abound in coal, which the inhabitants pound, and having mixed with water, form into small cakes; it is not very inflammable, but, when once kindled, affords a strong and lasting fire. Chan-si comprehends in its district five cities of the first class, and eighty-five of the second and third. The capital of the province is called Tai-yuen-fou.

CHANG-TCHE'OU, a town of Asia, in the kingdom of Corea: twenty miles west of Long-kouang.

CHANG-TCHING, a town of China, of the third rank, in the province of Honan: eight leagues south-south-east of Kouang.

CHANG-TONG, a province of China, bounded on the east by the province of Pe-tche-li and by part of Ho-nan, on the south by Liang-nan, on the east by the Eastern Sea, and on the north by the same and part of Pe-tche-li. It is divided into six districts, which contain six cities of the first class, and one hundred and fourteen of the second and third. Besides these, there are found along the coast fifteen or sixteen forts, several villages of considerable note on account of their commerce, and a number of small islands, the greater part of which have harbours very convenient for the Chinese junks, which easily pass from thence to Corea or Leao-tong. Besides the grand imperial canal, which traverses this province, it contains a great many lakes, streams, and rivers, which contribute no less to the ornament than fecundity of its plains; however, it has much to fear from drought, as it seldom rains here. Locusts, also, make sometimes great devastation. There is no country, perhaps, where game is more plentiful, or where pheasants, partridges, and quails, are sold cheaper. Besides common silk-worms, there is found in this province a species of insect much resembling our caterpillars, which produce indeed, a coarser kind of silk, but of which much stronger stuffs are made; as these stuffs are very durable, they have an extensive sale throughout China. Tsi-nan-fou is the capital.

CHANG-TSA'I, a town of China, of the third rank: six leagues north of Yun-hing.

CHANG-YE'ON, a town of China, of the third rank, in the province of Kiang-si: ten leagues north-north-east of Nan-ngan.

CHANG-YU, a town of China, of the third rank, in the province of Tche-kiang: six leagues east-south-east of Chao-king.

CHAN'GA, or XANGA, a small island in the Indian Sea, near the coast of Africa, at the mouth of the river of the same name. Lat. 10. 45. N. lon. 39. 50. E. Greenwich.

CHANGAPRA'NG, a town of Asia, in the country of Thibet: 242 miles west of Lassa, and 195 north-north-east of Catmandu. Lat. 31. 6. N. lon. 86. 52 E. Greenwich.

CHANGASA'RI, a town of Russia, in the government Viborg: eighty miles west-north-west of Viborg.

To CHANGE, *v. a.* [*changer*, Fr. *cambia*, Lat.] To put one thing in the place of another.—He that cannot look into his own estate, had need choose well whom he employeth, and *change* them often; for new are more timorous,

timorous, and less subtile. *Bacon.*—To quit any thing for the sake of another: with *for* before the thing taken or received:

The French and we still *change*; but here's the curse,
They *change for* better, and we *change for* worse. *Dryden.*

To give and take reciprocally: with the particle *with* before the person to whom we give, and from whom we take.—To secure thy content, look upon those thousands, *with* whom thou wouldst not, for any interest, *change* thy fortune and condition. *Taylor.*—To alter; to make other than it was.—Whatsoever is brought upon thee, take chearfully, and be patient when thou art *changed* to a low estate. *Ecclus.*—To mend the disposition or mind:

I would she were in heaven, so she could
Intreat some pow'r to *change* this currish Jew. *Shakes.*

To discount a larger piece of money into several smaller.—A shopkeeper might be able to *change* a guinea, or a moidore, when a customer comes for a crown's worth of goods. *Swift.* *To change a horse*, or *to change hand*, is to turn or bear the horse's head from one hand to the other, from the left to the right, or from the right to the left.

To CHANGE, *v. n.* To undergo change; to suffer alteration: as, his fortune may soon *change*, though he is now so secure:

One Julia, that his *changing* thought forgot,
Would better fit his chamber. *Shakespeare.*

To change, as the moon; to begin a new monthly revolution.—I am weary of this moon; would he would *change*. *Shakespeare.*

CHANGE, *s.* An alteration of the state of any thing:

Since I saw you last,
There is a *change* upon you. *Shakespeare.*

A succession of one thing in the place of another:

Hear how Timotheus' various lays surprise,
And bid alternate passions fall and rise!
While, at each *change*, the son of Libyan Jove
Now burns with glory, and then melts with love. *Pope.*

The time of the moon in which it begins a new monthly revolution.—Take seeds or roots, and set some of them immediately after the *change*, and others of the same kind immediately after the full. *Bacon.*—Novelty; a state different from the former:

Our fathers did for *change* to France repair;
And they for *change* will try our English air. *Dryden.*

That which makes a variety; that which may be used for another of the same kind.—I will now put forth a riddle unto you; if you can find it out, then I will give you thirty sheets, and thirty *change* of garments. *Judges.*—Small money, which may be given for larger pieces.—Wood buys up our old halfpence, and from thence the present want of *change* arises; but, supposing not one farthing of *change* in the nation, five-and-twenty thousand pounds would be sufficient. *Swift.*—Change for exchange; a place where persons meet to traffic and transact mercantile affairs.—The bar, the bench, the *change*, the schools and pulpits, are full of quacks, jugglers, and plagiaries. *L'Estrange.*

CHAN'GE, a town of France, in the department of the Mayenne: one league north of Laval.

CHAN'GE, a town of France, in the department of the Sarte: one league south of Le Mans.

CHAN'GEABLE, *adj.* Subject to change; fickle; inconstant.—A steady mind will admit steady methods and counsels; there is no measure to be taken of a *changeable* humour. *L'Estrange.*—Possible to be changed.—The fibrous or vascular parts of vegetables seem scarce *changeable* in the alimentary duct. *Arbuthnot.*—Having the quality of exhibiting different appearances.—Now the taylor make thy doublet of *changeable* taffeta; for thy mind is a very opal. *Shakespeare.*

CHANGE'ABLE ROSE, *s.* in botany. See HIBISCUS MUTABILIS.

CHANGE'ABLENESS, *s.* Inconstancy; fickleness.—There is no temper of mind more unmanly than that *changeableness*, with which we are too justly branded by all our neighbours. *Addison.*—Susceptibility of change.—If how long they are to continue in force, be no where expressed, then have we no light to direct our judgment concerning the *changeableness* or immutability of such laws. *Hooker.*

CHAN'GEABLY, *adv.* Inconstantly.

CHAN'GEFUL, *adj.* Full of change; inconstant; uncertain; mutable; subject to variation; fickle:

Britain, *changeful* as a child at play,
Now calls in princes, and now turns away. *Pope.*

CHAN'GELING, *s.* [from *change*: the word arises from an odd superstitious opinion, that the fairies steal away children, and put others that are ugly and stupid in their places.] A child left or taken in the place of another:

And her base elfin breed there for thee left:
Such men do *changelings* call, so chang'd by fairies theft. *Spencer.*

An idiot; a fool; a natural:

Changelings and fools of heav'n, and thence shut out,
Wildly we roam in discontent about. *Dryden.*

One apt to change; a waverer:

As they had turn'd from side to side,
And as they *changelings* liv'd, they died. *Hudibras.*

Any thing changed and put in the place of another: in ludicrous speech:

I folded the writ up in form of the other,
Subscrib'd it, gave the impression, plac'd it safely,
The *changeling* never known. *Shakespeare.*

CHAN'GER, *s.* One that is employed in changing or discounting money; a money changer.—Also an officer belonging to the king's mint, whose office consists in exchanging coin for bullion; brought in by merchants or others.

CHAN'GES, *s.* The permutations or variations of any number of things, with regard to their position, order, arrangement, &c. as how many changes may be rung on a number of bells, or how many different ways any number of persons may be placed, or how many several variations may be made of any number of letters, or any other things proposed to be varied. To find out such number of changes, multiply continually together all the terms in a series of arithmetical progression, whose first term and common difference are each unity or 1, and the last term the number of things proposed to be varied, thus $1 \times 2 \times 3 \times 4 \times 5$, &c. till the last number be the proposed number of things. For, if there be only two things, as *a* and *b*, they admit of a double order of position only; for they may be placed either thus *ab* or thus *ba*, viz. $1 \times 2 = 2$ ways. If there be three things, *a*, *b*, and *c*, they will admit of six variations $= 1 \times 2 \times 3$, as in the margin, and no more; since each of the three may be combined three different ways with each of the other two. And if there be four things, each of them may be combined four ways with each order of the other three, that is four times six ways, or $1 \times 2 \times 3 \times 4 = 24$ ways. In like manner, the combinations of five things are $1 \times 2 \times 3 \times 4 \times 5 = 120$; of six things are $1 \times 2 \times 3 \times 4 \times 5 \times 6 = 720$, &c. So that if it be proposed to assign how many different ways a company of six persons may be placed, at table for instance, the answer will be 720 ways. Also the number of changes that can be rung on seven bells, are $1 \times 2 \times 3 \times 4 \times 5 \times 6 \times 7$, or $720 \times 7 = 5040$ changes.

a b c
a c b
b a c
b c a
c a b
c b a

CHAN'GE-

CHAN'GEWATER, a town of United America, in the State of New Jersey: twenty-five miles west-south-west of Morristown.

CHANGLOS'SE, a town of Asia, in the country of Thibet, near the river Sanpoo: 204 miles west of Lassa, and 190 north-north-east of Catmunda.

CHANGY', a town of France, in the department of the Rhone and Loire: three leagues and a half north-west of Roanne.

CHANIE'RES, a town of France in the department of the Gironde: twelve miles east of Blaye.

CHANIEWIE'ZE, a town of Lithuania in the palatinate of Novogrodek: fifty-six miles south-west of Novogrodek.

CHANMAN'NING, a town of Asia, in Thibet, where the grand Lama sometimes resides: 116 miles west of Lassa, and 266 north-east of Catmandu.

CHAN'NA, *s.* in ichthyology, the name of a fish of the perch genus, caught in the Mediterranean; called likewise *cannadella*, or *channadella*, and at Marseilles by the name of *charina*.

CHAN'NEL, *s.* [*canal*, Fr. *canalis*, Lat.] The hollow bed of running waters.—It is not so easy, now that things are grown into an habit, and have their certain course, to change the *channel*, and turn their streams another way. *Spenser.*—Any cavity drawn longways:

Complaint and hot desires, the lover's hell,
And scalding tears, that wore a *channel* where they fell.
Dryden.

A strait or narrow sea, between two countries: as the British *Channel*, between Britain and France; St. George's *Channel*, between Britain and Ireland.—A gutter or furrow of a pillar.

To CHAN'NEL, *v. a.* To cut any thing in channels:

No more shall trenching war *channel* her fields,
Nor bruise her flowrets with the armed hoofs
Of hostile paces. *Shakespeare.*

CHAN'NEL, the English name of the department of France called La Manche. See LA MANCHE.

CHAN'NI OUDOU'C, a town of Chinese Tartary, in the country of Moguls. Lat. 42. 51. N. lon. 132. E. Ferro.

CHANONA'T, a town of France, in the department of the Puy de Dome, celebrated for its mineral waters.

CHANSCHE'NA-POU, *s.* in botany. See BAUHINIA.

To CHANT, *v. a.* [*chanter*, Fr.] To sing:

Wherein the chearful birds of sundry kind
Do *chant* sweet music. *Fairy Queen.*

To celebrate by song.—The poets *chant* it in the theatres, the shepherds in the mountains. *Bramhall.*—To sing in cathedral service.

To CHANT, *v. n.* To sing: to make melody with the voice.—They *chant* to the sound of the viol, and invent to themselves instruments of music. *Amos*, vi. 7.

Heav'n heard his song, and hasten'd his relief;
And chang'd to snowy plumes his hoary hair,
And wing'd his flight, to *chant* aloft in air. *Dryden.*

CHANT, *s.* Song; melody:

A pleasant grove,
With *chant* of tuneful birds resounding loud. *Milton.*

In church-history we meet with divers kinds of *chant* or *song*. The first is the *Ambrosian*, established by St. Ambrose. The second, the *Gregorian chant*, introduced by pope Gregory the Great, who established schools of chanters, and corrected the church-song. This is still retained in the church under the name of *plain song*: at first it was called the *Roman song*. The *plain* or *Gregorian chant*, is where the choir and people sing in unison, or all together in the same manner.

CHANTABOU'N, a seaport town of the kingdom of Siam, on the frontiers of Camboja.

CHANTA'DA, a town of Spain, in the province of Galicia: twenty miles north of Orense.

CHANTAGIR', a river of Siberia, which runs into the Enisei. Lat. 51. 50. N. lon. 109. 20. E. Ferro.

CHANTAREL'LE, *s.* in botany. See AGARICUS.

CHANTAUNAY', a town of France, in the department of the Vendée: fifteen miles north of Fontenay-le-Comte.

CHANTEL'LE LE CHATEAU, a town of France, in the department of the Allier, and chief place of a canton, in the district of Gannat: three leagues north of Gannat.

CHANTENA'Y, a town of France, in the department of the Lower Loire, and chief place of a canton, in the district of Nantes: two miles west of Nantes.

CHANTENA'Y, a town of France in the department of the Sarte, and chief place of a canton, in the district of Sablé: fifteen miles west-south-west Le Mans.

CHAN'TER, *s.* a singer in the choir of a cathedral. The word is almost obsolete, *chorister* being commonly used instead of it. All great chapters have chanters and chaplains to assist the canons, and officiate in their absence. Chanter is used by way of excellence for the precenter or master of the choir. At St. David's cathedral in Wales, where there is no dean, he is next in dignity to the bishop. The ancients called the chanter *primicerius cantorum*. To him belonged the direction of the deacons and other inferior officers. Chanters in the temple of Jerusalem, were a number of Levites employed in singing and playing upon instruments before the altar. They had no habits distinct from the rest of the people; yet in the ceremony of removing the ark to Solomon's temple, the chanters appeared dressed in tunics of byssus or fine linen. 2 Chron. v. 12.

CHANTICLEER', *s.* [from *chanter* and *clair*, Fr.] The name given to the cock, from the clearness and loudness of his crow:

And chearful *chanticleer*, with his note shrill,
Had warned once, that Phœbus' fiery car
In haste was climbing up the eastern hill. *Spenser.*

Hark, hark, I hear
The strain of strutting *chanticleer*. *Shakespeare.*

CHANTIL'LY, a town of France, in the department of the Oise, and chief place of a canton, in the district of Senlis. The prince of Condé had a magnificent palace here, with beautiful gardens, a menagery, extensive park, and curious water-works. The stable was thought to exceed any thing of the kind in France; and the forest, for the purpose of keeping game, for the chase, and the gun, extended many miles in circumference: one league and a half west of Senlis, and four south-south-east of Clermont.

CHANTONA'Y, a town of France, in the department of the Vendée, and chief place of a canton, in the district of La Chataigneraye: four leagues and a quarter west of La Chataigneraye. In September, 1793, the French republicans were totally defeated by the royalists, near this town, with great loss.

CHAN'TRESS, *s.* A woman singer:

Sweet bird, that shunn'st the noise of folly,
Most musical, most melancholy!
Thee, *chantress* of the woods among,
I woo to hear thy even-song. *Milton.*

CHANTRI'GNE, a town of France, in the department of the Mayenne, and chief place of a canton in the district of Mayenne: two leagues and a half north of Mayenne.

CHAN'TRY, *s.* [*cantaria*, Lat.] A little church, chapel, or particular altar in some cathedral, endowed with lands, or other revenues, for the maintenance of one or more priests, daily to sing mass, and officiate divine service for the souls of the donors, and such others as they appointed. The stat. 1 Edw. VI. c. 14, put an end to these chantries, by declaring it not to be lawful for any person

person to enter for non-performance of the conditions on which they were founded. Of these chantries, mention is made of forty-seven belonging to St. Paul's church in London, by Dugdale in his history of that church. Hence *chantry-rents* are rents paid to the crown by the tenants or purchasers of chantry lands.

CHA'O-HING, a city of China, of the first rank, in the province of Tche-kiang: 673 miles south-south-east of Peking. Lat. 30. 10. N. lon. 138. E. Ferro.

CHA'O-IM, a town of Chinese Tartary: eight miles south of Geho.

CHA O-KE'OUING, a town of China, in the province of Chang-tong: fifty-five miles south-east of Tci-ngin.

CHA'O-MA-ING, a town of Asia, in Thibet: ten miles north of Chao-ma-ing-Hotun.

CHA'O-MA-ING-HO'TUN, a town of Thibet: 285 miles east of Hami.

CHA'O-OU-FOU, a town of China, of the first rank, in the province of Fo-kien: 775 miles south of Peking. Lat. 22. N. lon. 135. 5. E. Ferro.

CHA'O-PA'I, a town of Chinese Tartary. Lat. 42. 13. N. lon. 142. 28. E. Ferro.

CHA'O-PING, a town of China, of the third rank, in the province of Quang-si: five leagues south-east of Yong-ngan.

CHAO'NIA, a mountainous part of Epirus, which receives its name from Chaon, a son of Priam, inadvertently killed by his brother Helenus. There was a wood near, where doves were said to deliver oracles. The words *Chaonius victus* are, by ancient authors, applied to acorns, the food of the first inhabitants. *Lucan.*

CHAO'RA, one of the smaller Cape Verd islands.

CHA'OS, *s.* [*chaos*, Lat. χάος, Gr. confused.] The mass of matter, out of which this world was formed, supposed to be in confusion before it was divided by the creation into its proper classes and elements.—The whole universe would have been a confused *chaos*, without beauty or order. *Bentley.*—Confusion; irregular mixture:

Their reason sleeps, but mimic fancy wakes,
Supplies her parts, and wild ideas takes
From words and things, ill sorted and misjoin'd;
The anarchy of thought, and *chaos* of the mind. *Dryd.*

Any thing where the parts are undistinguished.—We shall have nothing but darkness and a *chaos* within, whatever order and light there be in things without us. *Locke.*

Pleas'd with a work, where nothing's just or fit,
One glaring *chaos* and wild heap of wit. *Pope.*

Chaos is represented by the ancients as the first principle, ovum, or seed, of nature and the world. All the sophists, sages, naturalists, philosophers, and poets, held that chaos was the eldest and first principle, το αρχαιον χαος. The Barbarians, Phœnicians, Egyptians, Persians, &c. all refer the origin of the world to a rude, mixed, confused, mass of matter. The Greeks, Orpheus, Hesiod, Menander, Aristophanes, Euripides, and the writers of the Cyclic Poems, all speak of the original chaos; the Ionic and Platonic philosophers build the world out of it. The Stoics hold, that, as the world was first formed of a chaos, it shall again return to a chaos; and that its periods and revolutions in the mean time are only transitions from one chaos to another. Ennius, Varro, Ovid, Lucretius, Statius, &c. all write to the same effect. Nor is there any sect or nation whatever that does not derive their κοσμοποιια, structure of the world, from a chaos. It does not appear who first introduced the notion of a chaos. Moses, the eldest of all writers, derives the origin of this world from a confusion of matter, dark, void, deep, without form, which is precisely the chaos of the Greek and Barbarian philosophers. Moses goes no farther back than the chaos, nor tells us whence it took its origin, or whence its confused state; and where Moses stops, there precisely do all the rest stop. Dr. Burnet endeavours to shew, that as the ancient philosophers, who wrote of the cosmogony, acknowledged a chaos for the principle of their world; so the divines, or writers of the theogony, derive the origin or generation of their fabled gods from the same principle. Mr. Whiston supposes the ancient chaos, the origin of our earth, to have been the atmosphere of a comet. He endeavours to make it out by many arguments, drawn from the agreement which appears to be between them. So that, according to him, every planet is a comet, formed into a regular and lasting constitution, and placed at a proper distance from the sun, revolving in a nearly circular orbit: and a comet is a planet either beginning to be destroyed or re-made; that is, a chaos or planet unformed or in its primæval state, and placed as yet in an orbit very eccentric. But on this see ASTRONOMY and EARTH.

CHAO'TIC, *adj.* Resembling chaos; confused.—When the terraqueous globe was in a *chaotic* state, and the earthy particles subsided, then those several beds were, in all probability, reposited in the earth. *Derham.*

CHAOUR'CE, a town of France, in the department of the Aude, and chief place of a canton, in the district of Ervy: five leagues south of Troyes.

To CHAP, *v. a.* [*kappen*, Dutch, to cut. This word seems originally the same with *chop*; nor were they probably distinguished at first, otherwise than by accident; but they have now a meaning something different, though referable to the same original sense.] To break into hiatus, or gapings.—It weakened more and more the arch of the earth, drying it immoderately, and *chapping* it in sundry places. *Burnet.*

Then would unbalanc'd heat licentious reign,
Crack the dry hill, and *chap* the russet plain. *Blackmore.*

CHAP, *s.* A cleft; an aperture; an opening; a gaping; a chink.—What moisture the heat of the summer sucks out of the earth, it is repaid in the rains of the next winter; and what *chaps* are made in it, are filled up again. *Burnet.*

CHAP, *s.* [This is not often used, except by anatomists, in the singular.] The upper or under part of a beast's mouth.—The nether *chap* in the male skeleton is half an inch broader than in the female. *Grew.*

Froth fills his *chaps*, he sends a grunting sound,
And part he churns, and part befoams the ground. *Dryd.*

CHAPA'LA, a lake of North America, in Mexico, and the province of Guadalaxara: eighteen leagues in length, and five in breadth, fifteen miles south of Guadalaxara.

CHAPARA'NG, or DISAPRONG, a town of Asia, in the country of Thibet, situated near the head of the Ganges: 140 miles north north-east of Sirinagur. Lat. 33. 10. N. lon. 79. 22. E. Greenwich.

CHAPARRAL', a town of Spain, in the province of Grenada: five leagues from Antequera.

CHAPE, *s.* [*chappe*, Fr.] The catch of any thing by which it is held in its place; as the hook of a scabbard by which it sticks in the belt; the point by which a buckle is held to the back strap.—This is monsieur Parolles, that had the whole theory of the war in the knot of his scarf, and the practice in the *chape* of his dagger. *Shakespeare.*—A brass or silver tip or case, that strengthens the end of the scabbard of a sword. *Phillips.*

CHAPEAU', *s.* in heraldry, an ancient cape of dignity worn by dukes, being scarlet-coloured velvet on the outside, and lined with fur. It is frequently borne above an helmet, instead of a wreath, under the crest.

CHA'PEL, *s.* [*capella*, Lat. *chapelle*, Fr.] Is either adjoining to a church, for performing divine service, or separate from the mother-church, where the parish is wide, which is commonly called a chapel of ease. And chapels of ease are built for the ease of those parishioners who dwell far from the parochial church, in prayer and preaching only; for the sacraments, marriages, and burials, ought to be performed in the parochial church.

2 *Rol. Abr.* 340. These chapels are served by curates, provided at the charge of the rector, &c. and the curates are therefore removeable at the pleasure of the rector or vicar: but chapels of ease may be parochial, and have a right to sacraments and burials, and to a distinct minister, by custom; (though subject in some respects to the mother-church:) and parochial chapels differ only in name from parish churches, but they are small, and the inhabitants within the district are few. In some places chapels of ease are endowed with lands or tithes, and in other places by voluntary contributions; and in some few districts there are chapels which baptize and administer the sacraments, and have chapel-wardens; but these chapels are not exempted from the visitation of the ordinary, nor the parishioners who resort thither from contributing to the repairs of the mother-church; especially if they bury there; for the chapel generally belongs to, and is, as it were, a part of the mother-church; and the parishioners are obliged to go to the mother-church, but not to the chapel. 2 *Rol. Abr.* 289. And hence it is said, that the offerings made to any chapel are to be rendered to the mother-church; unless there be a custom that the chaplain shall have them.

Public chapels, annexed to parish churches, shall be repaired by the parishioners, as the church is, if any other persons be not bound to do it. 2 *Inst.* 489. Besides the afore-mentioned chapels, there are free chapels, perpetually maintained and provided with a minister, without charge to the rector or parish, or that are free and exempt from all ordinary jurisdiction; and these are where some lands or rents are charitably bestowed on them. *Stat.* 37 *Hen.* 8. c. 4. 1 *Ed.* 6. c. 14. There are also private chapels, built by noblemen and others, for private worship, in or near their own houses, maintained at the charge of those persons to whom they belong, and provided with chaplains and stipends by them; which may be erected without leave of the bishop, and need not be consecrated, though they anciently were so, nor are they subject to the jurisdiction of the ordinary. There are likewise chapels in the universities belonging to particular colleges, which, though they are consecrated, and sacraments are administered there, yet they are not liable to the visitation of the bishop, but of the founder. 2 *Inst.* 363.

Knights of the CHA'PEL, called also poor knights of Windsor, were instituted by Henry VIII. Their number was first thirteen, but has been since augmented to twenty-six. They assist in the funeral services of the kings of England, are subject to the office of the canons of Windsor, and live on pensions assigned them by the order of the garter. They bear a blue or red cloak, with the arms of St. George on the left shoulder.

CHA'PEL-IN-THE-FRITH, a small market-town in Derbyshire, distant from London 163 miles, twenty from Manchester, and eleven and a half from Macclesfield. It is situated on the utmost confines of the peak, near the borders of Cheshire. A small cotton-manufacture is carried on here. The church has a square tower with six bells. Here is a free-school for six boys. A new canal is cut from Manchester to this place. The market is on Thursdays; and here are no less than twelve fairs, viz. on Thursday before Old Candlemas, February 13, March 29, Thursday before Easter, April 30, and Holy Thursday, for cattle; July 7, for wool; Thursday before St. Bartholomew's-day, August 24, and September 4, for cheese and sheep; Thursday after September 29, and Thursday before November 11.

CHAPELAIN' (John), an eminent French poet, born at Paris in 1595, and often mentioned in the works of Balzac, Menage, and other learned authors. He wrote several works, and at length distinguished himself by an heroic poem called *La Pucelle, ou France Deli-vrée*, which employed him several years; and which, raising the expectation of the public, was as much decried by some as extolled by others. He was one of the king's counsellors; and died in 1674, very rich, but very covetous and sordid. He had 50,000 crowns in ready cash by him; and his supreme delight was to have his strong box opened, and the bags taken out, that he might contemplate his treasure. In this manner were his bags about him when he died; which gave occasion to a certain academician to say, "there is our friend Chapelain just dead, like a miller among his bags."

CHA'PELESS, *adj.* Wanting a chape.—An old rusty sword, with a broken hilt, and *chapeless*, with two broken points. *Shakespeare.*

CHAPELIE'R (Isaac le), one of the leaders of the French revolution, was born at Rennes in Brittany, where his father was counsellor of the states of Brittany; his family was respectable; and his reputation for probity procured him letters of nobility, which were granted by Louis XV. in consequence of the demand of the states. The son, however, of a favourite of the court, and of the privileged orders, became one of the greatest enemies to the throne, and to nobility. Young Chapelier was brought up in a college at Rennes, and distinguished himself early by his extraordinary attainments. He became an advocate, and maintained the reputation of an accomplished orator. His manner abounded in dignity, elegance, and grace; and his style united the force of Demosthenes with the persuasive eloquence of Cicero: it was equally remarkable for the keenness of its point and satire. In 1789, he was elected deputy to the constituent assembly, and displayed in it all his powers of oratory from its first commencement. He was soon ranked among its most distinguished leaders, and was chosen president: his presidency was distinguished by the remarkable circumstance, that he was the first in that office who assumed a pre-eminence over the king. In the beginning of the revolution, many of the country-seats of the nobility were reduced to ashes; and Le Chapelier was strongly suspected of having been instrumental in the destruction of them. It appeared that he employed a man of the name of Valés de Loyac, who was afterwards imprisoned, and would have been punished with death, if he had not been protected by the influence of Le Chapelier. This fact was so notorious, that the viscount de Mirabeau, brother to the great Mirabeau, having a beautiful country-house in Brittany, and alarmed for its fate, threatened Le Chapelier openly in the assembly, and told him, that, if his seat were destroyed, he would make him answerable for the loss. Le Chapelier experienced the fate of a large portion of the founders of the republic. An energetic republican observes, that "it is a lamentable fact, that the historian of the revolution scarcely mentions any person of importance, whose sufferings he has not subsequently to relate." It was peculiar in the fate of Le Chapelier; that he, who, during the constituent assembly, had constantly sat on the left side, and never suffered an opportunity to escape him of humbling the nobles and privileged orders, should be afterwards accused of having conspired against the republic with the very men whose country-seats he was accused of having burnt, and to whom he had always been a declared enemy. Under the domination of Robespierre, he was accused of a conspiracy with Déprémenil, Malsherbes de Lamoignon, lady Lepeltier Rosambo daughter to Malsherbes, ladies De Château Brilliant, De Rochochoir, the celebrated Thouret, and many others, all of them of the first distinction. They were conducted to the unsparing guillotine, on the 22d of April, 1794, three months before the fall of the detestable tyrant who spilled such torrents of the best blood of his fellow-citizens. Le Chapelier was of a middle stature, his face was oval and flat, and his complexion yellow. Being short-sighted, he always wore spectacles.

CHAPEL'LANY, *s.* A *chapellany* is said to be that which does not subsist of itself, but is built and founded within some other church, and is dependent thereon. *Ayliffe.*

CHAPEL'LE (Claude Emanuel Lullier,) a celebrated French poet, born in 1621. He was the natural son of Francis Lullier, a man of considerable rank and fortune, who gave him a liberal education. He had the great Gassendus for his master in philosophy; but he distinguished himself chiefly by his fine turn for poetry. There was an uncommon ease in all he wrote; and he was excellent in composing with double rhymes. We are obliged to him for that ingenious work in verse and prose, called Voyage de Bachaumont. Many of the shining parts in Moliere's comedies it is but reasonable to ascribe to him; for Moliere consulted him upon all occasions, and paid the highest deference to his taste and judgment. He died in 1686, and his works were reprinted with additions at Amsterdam, in 1708.

CHAPEL'LE AGNON (La), a town of France, in the department of the Puy de Dôme: five miles north of Ambert.

CHAPEL'LE D'ANGILLON (La), a town of France, in the department of the Cher, and chief place of a canton, in the district of Aubigny: sixteen miles north of Bourges.

CHAPEL'LE AUBRY (La), a town of France, in the department of the Mayne and Loire, and chief place of a canton, in the district of St. Florent-le-Vieil: eight miles south of St. Florent.

CHAPEL'LE BASSE (La), a town of France, in the department of the Lower Loire, and chief place of a canton, in the district of Cliffon: nine miles north-east of Nantes.

CHAPEL'LE LA ERBRE'E, a town of France, in the department of the Ille and Vilaine, and chief place of a canton, in the district of Vitré: one league and a half east of Vitré.

CHAPEL'LE SUR ERDRE (La), a town of France, in the department of the Lower Loire, and chief place of a canton, in the district of Nantes: five miles north of Nantes.

CHAPEL'LE LA MOCHE (La), a town of France, in the department of the Mayenne, and chief place of a canton, in the district of Vilaine: four leagues and a half north-west of Vilaine.

CHAPEL'LE SUR OREUSE (La), a town of France, in the department of the Yonne: two leagues south of Sens.

CHAPEL'LE DE QUINCHAY (La), a town of France, in the department of the Saône and Loire, and chief place of a canton, in the district of Mâcon: two leagues south of Mâcon.

CHAPEL'LE LA REINE (La), a town of France, in the department of the Seine and Marne, and chief place of a canton, in the district of Nemours: five miles north-west of Nemours.

CHAPEL'LE ST. LAURENT (La), a town of France, in the department of the Two Sevres, and chief place of a canton, in the district of Chatillon: eleven miles north-west of Partenay.

CHAPEL'LE ST. MESMIN (La), a town of France, in the department of the Loiret, and chief place of a canton, in the district of Orleans: three miles west of Orleans.

CHAPEL'LE TAILLIFERET, a town of France, in the department of the Creuse: one league and a half south of Gueret.

CHAPEL'LE LA THIREUIL, a town of France, in the department of the Two Sevres, and chief place of a canton, in the district of Partenay: four leagues and a half west-south-west of Partenay.

CHAPEL'LE EN VERCORS (La), a town of France, in the department of the Drome, and chief place of a canton, in the district of Die: thirteen miles north of Die.

CHA'PELRY, *s.* [*capellania*, Lat.] Is the same thing to a chapel, as a parish to a church; being the precinct and limits of the jurisdiction thereof.

CHA'PERON, *s.* [Fr.] A hood or bonnet, anciently worn by the knights of the garter, as part of the habit of that noble order: but in heraldry it is a little escutcheon fixed on the forehead of the horses that draw a hearse at a funeral.

CHAP'FALN, *adj.* Having the mouth shrunk:

A *chapfaln* beaver loosely hanging by
The cloven helm. *Dryden.*

CHA'PITER, *s.* [*chapiteau*, Fr.] The upper part or capital of a pillar.—He overlaid their *chapiters* and their fillets with gold. *Exodus.*

CHA'PITERS, *s.* [*capitula*, Lat. *chapitres*, Fr. i. e. chapters of a book.] In our common law, import a summary of such matters as are to be enquired of, or presented before, justices in eyre, justices of assise, or of the peace, in their sessions. Britton, c. 3. uses the word in this signification: and chapiters are now commonly called articles, and delivered by the mouth of the justice in his charge to the inquest; whereas, in ancient times, (as appears by Bracton and Britton,) they were, after an exhortation given by the justices for the good observation of the laws and the king's peace, first read in open court, and then delivered in writing to the grand inquest for their better observance; and the grand jury were to answer upon their oaths to all the chapiters thus delivered them, and not put the judges to long and learned charges to little purpose, for want of remembering the same, as they do now, when they think their duty well enough performed if they only present those few of many misdemeanors which are brought before them by way of indictment. It were to be wished that this order of delivering written articles to grand juries were still observed, whereby crimes would be more effectually punished. In some inferior courts, as the court leet, &c. it is usual at this day for stewards of those courts to deliver their charges in writing to the juries sworn to enquire of offences. Horne, in his Mirror of Justices, expresses what those chapiters were wont to contain. *Lib.* 3. c *des Articles in Eyre*. And an example of them may be found in the book of assises. *F.* 138.

CHAP'LAIN, *s.* [*capellanus*, Lat.] One who performs divine service in a chapel; but it is commonly understood of clergymen who have appointments under the king, or other noble person, to instruct him and his family, and say divine service in his house, where there is usually a private chapel for that purpose. The king, queen, prince, princess, &c. may retain as many chaplains as they please; and the king's chaplains may hold any such number of benefices of the king's gift, as the king shall think fit to bestow upon them. An archbishop may retain eight chaplains; a duke or a bishop, six; marquis or earl, five; viscount, four; baron, knight of the garter, or lord chancellor, three; a duchess, marchioness, countess, baroness, (being widows,) the treasurer and comptroller of the king's house, the king's secretary, dean of the chapel, almoner, and master of the rolls, each of them two; the chief justice of the king's-bench, and warden of the cinque ports, one; all which chaplains may purchase a licence or dispensation, and take two benefices with cure of souls. *Stat.* 21 *Hen.* VIII. c. 13. But both the livings must have cure of souls; and the statute expressly excepts deaneries, archdeaconries, chancellorships, treasurerships, chantership, prebends, and sinecure rectories. A dispensation in this case can only be granted to hold one benefice more, except to clerks who are of the privy council, who may hold three by dispensation. By the canon law, no person can hold a second incompatible benefice, without a dispensation: and in that case, if the first is under eight pounds per annum in the king's book, it is so far void, that the patron may present another clerk, or the bishop may deprive; but, till deprivation, no advantage can be taken by lapse. But, independent of the statute, a clergyman, by dispensations, may hold any number of benefices, if they

they are all reputed under eight pounds per annum, except the last, and then by a dispensation under the statute he may hold one more. 1 *Comm.* 392. By the forty-first canon of 1603, the two benefices must not be further distant from each other than thirty miles; and the person obtaining the dispensation, must at least be a master of arts in one of the universities. But the provisions of this canon are not enforced or regarded in the temporal courts. 2 *Bl. Rep.* 968. Also every judge of the king's-bench and common pleas, and chancellor and chief baron of the exchequer, and the king's attorney and solicitor-general, may each of them have one chaplain, attendant on his person, having one benefice with cure, who may be non-resident on the same, by stat. 25 *Hen. VIII.* c. 16. And the groom of the stole, treasurer of the king's chamber, and chancellor of the duchy of Lancaster, may retain each one chaplain. *Stat.* 33 *Hen. VIII.* c. 28. But the chaplains under these two last statutes, are not entitled to dispensations under stat. 21 Hen. VIII. If a nobleman hath his full number of chaplains allowed by law, and retains one more, who has dispensation to hold plurality of livings, it is not good. *Cro. Eliz.* 723.

If one person has two or more of the titles or characters mentioned in stat. 21 Hen. VIII. c. 13, united in himself, he can only retain the number of chaplains limited to his highest degree. 4 *Co.* 90. The king may present his own chaplains, i. e. waiting chaplains in ordinary, to any number of livings in the gift of the crown, and even in addition to what they hold upon the presentation of a subject without dispensation; but a king's chaplain, being beneficed by the king, cannot afterwards take a living from a subject, but by a dispensation according to the stat. 29. 1 *Salk.* 161. A person retaining a chaplain, must not only be capable thereof at the time of granting the instrument of retainer, but he must continue capable of qualifying till his chaplain is advanced: and therefore if a duke, earl, &c. retain a chaplain, and die; or if such a noble person be attainted of treason; or if an officer, qualified to retain a chaplain, is removed from his office, the retainer is determined: but where a chaplain hath taken a second benefice before his lord dieth, or is attainted, &c. the retainer is in force to qualify him to enjoy the benefices. And if a woman that is noble by marriage, afterwards marries one under the degree of nobility, her power to retain chaplains will be determined; though it is otherwise where a woman is noble by descent, if she marry under degree of nobility, for in such case her retainer before or after marriage is good. A baroness, &c. during the coverture, may not retain chaplains; if she doth, the lord, her husband, may discharge them, as likewise her former chaplains, before their advancement. 4 *Rep.* 118. A chaplain must be retained by letters testimonial under hand and seal, or he is not a chaplain within the statute; so that it is not enough for a spiritual person to be retained by word only to be a chaplain, by such person as may qualify by the statutes to hold livings, &c. although he abide and serve as chaplain in the family. And where a nobleman hath retained and thus qualified his number of chaplains, if he dismisses them from their attendance upon any displeasure, after they are preferred, yet they are his chaplains at large, and may hold their livings during their lives; and such nobleman, though he may retain other chaplains in his family, merely as chaplains, he cannot qualify any others to hold pluralities while the first are living: for if a nobleman could discharge his chaplain when advanced, to qualify another in his place, and qualify other chaplains during the lives of chaplains discharged, by these means he might advance as many chaplains as he would, whereby the statutes would be evaded. 4 *Rep.* 90.

CHAP'LAINSHIP, *f.* The office or business of a chaplain. The possession or revenue of a chapel.

CHAP'LESS, *adj.* Without any flesh about the mouth:

Shut me nightly in a charnel-house,
With reeky shanks and yellow *chapless* bones. *Shakes.*

CHAP'LET, *f.* [*chapelet*, Fr.] A garland or wreath to be worn about the head:

All the quire was grac'd
With *chaplets* green, upon their foreheads plac'd. *Dryden.*

[In architecture.] A little moulding carved into round beads, pearls, or olives. [In horsemanship.] A couple of stirrup leathers, mounted each of them with a stirrup, and joining at top in a sort of leather buckle, which is called the head of the *chaplet*, by which they are fastened to the pummel of a saddle, after they have been adjusted to the length and bearing of the rider.—A tuft of feathers on the peacock's head.—A string of beads used in the Romish church for keeping an account of the number rehearsed of paternosters and ave-marias. A different sort is also used by the Mahometans. The invention of religious chaplets is ascribed to Peter the hermit, who probably learnt it of the Turks, who owed it to the East-Indians. Chaplets are sometimes called *pater-nosters*; and are made of coral, of diamonds, of wood, &c. according to the rank and fortune of the owner. The common chaplet contains fifty ave-marias, and five pater-nosters. There is also a chaplet of our Saviour, consisting of thirty-three beads, in honour of his thirty-three years residence on earth, instituted by father Michael the Camaldusian. The Oriental chaplets are a kind of chains, which they use in their prayers, rehearsing one of the perfections of God on each link or bead. The Great Mogul is said to have eighteen of these chains, all in precious stones; some diamonds, others rubies, pearls, &c. The Turks have chaplets, which they bear in the hand, or hang at the girdle: but father Dandini observes, they differ from those used by the Romanists, in that they are all of the same bigness, and have not that distinction into decads, though they consist of sixty heads. He adds that the Mussulmans run over the chaplet almost in an instant, the prayers being extremely short, containing only these words, "praise to God," or "glory to God," for each bead. Besides the common chaplet they have a larger one, consisting of a hundred beads, divided by little threads into three parts; on one of which they repeat thirty times *soubhan Allah*, i. e. "God is worthy to be praised;" on another, *ellamb Allah*, "glory be to God;" and on the third, *Allah ecber*, "God is great." These thrice thirty times making only ninety; to complete the hundredth, they add other prayers for the beginning of the chaplet. He adds that the Mahometan chaplet appears to have had its rise from the *mea beracoth*, or "hundred benedictions;" which the Jews are obliged to repeat daily, and which we find in their prayer-books; the Jews and Mahometans having this in common, that they scarcely do any thing without pronouncing some formula or benediction.

CHAP'MAN, *f.* [ceapman, Saxon.] A cheapner; one that offers as a purchaser:

Fair Diamede, you do as *chapmen* do,
Dispraise the thing that you intend to buy. *Shakespeare.*

CHAP'MAN (George), born in 1557, was a man highly celebrated for his dramatic writings and poetry. In 1574 he was sent to one of the universities, where he attained a liberal education. After this he went to London, and became intimate with Shakespeare, Johnson, Sidney, Spenser, and Daniel. Sir Thomas Walsingham was his patron, and after him his son. He was also patronized by prince Henry, and Robert earl of Somerset. Besides dramatic pieces, Chapman was the author of many other works. He translated Homer's Iliad, and dedicated it to prince Henry: it is yet looked upon with some respect. He translated his Odyssey, which was published in 1614, and dedicated it to the earl of Somerset. Pope calls him an enthusiast in poetry. He attempted also some part of Hesiod, and began a translation of Musæus de amoribus Herois et Leandri. He died in 1634, aged 77, and was buried at St. Giles's in the Fields: after

after which a monument was erected over his grave, at the expence and under the direction of the famous architect Inigo Jones. He wrote seventeen dramatic pieces; and among them a masque, called the Temple. This was composed at the request of the gentlemen of the Middle Temple and Lincoln's Inn, on the marriage of the princess Elizabeth, only daughter of James I. and Frederic V. count palatine of the Rhine, afterwards king of Bohemia: and it was performed before the king at Whitehall in February 1614, at the celebration of their nuptials.

CHAP'MAN (John), rector of Mersham and Aldington in Kent, and domestic chaplain to archbishop Potter. He was also archdeacon of Sudbury, and treasurer of Chichester. Being educated at Eton, and elected to King's in 1723, he was a candidate for the provostship of that college, and lost it but by a small majority. Among his pupils he had the honour to class the first lord Camden, Dr. Ashton, Horace Walpole, and others who afterwards attained to considerable distinction in literature. His Remarks on Dr. Middleton's celebrated letter to Dr. Waterland were published in 1731, and passed through three editions. In his Eusebius, 2 vols. 8vo. he defended Christianity against the objections of Morgan, and against those of Tindal in his Primitive Antiquity explained and vindicated; being remarks on a book intituled Christianity as old as the Creation. He was now honoured with the diploma of D. D. by the university of Oxford; and published the History of the Antient Hebrews Vindicated, 8vo. He published also two tracts relating to Phlegon, in answer to Dr. Sykes, who had maintained that the eclipse mentioned by that writer had no relation to the wonderful darkness that happened at our Saviour's crucifixion. In a Dissertation written in elegant Latin, and addressed to Mr. (afterwards Dr.) Tunstall, then public orator of the university of Cambridge, and published with his Latin Epistle to Dr. Middleton concerning the Genuineness of some of Cicero's Epistles, Dr. Chapman proved that Cicero published two editions of his Academics; an original thought that had escaped all former commentators, and which has been applauded by the bishop of Exeter in his edition of Cicero's Epistolæ ad Familiares. Dr. Chapman also published a few sermons, and died the 14th of October 1784, in the 80th year of his age.

CHAPPE', *s.* in heraldry, the dividing an escutcheon by lines drawn from the centre of the upper edge to the angles below, into three parts, the sections on the sides being of different metal or colour from the rest.

CHAP'PE (Jean d'Auteroche), a French astronomer, born at Mauriac, in Auvergne, March 2, 1728. A taste for drawing and mathematics appeared in him at a very tender age; and he owed to Dom Germain a knowledge of the first elements of mathematics and astronomy. M. Cassini, after assuring himself of the genius of this young man, undertook to improve it. He employed him upon the map of France, and the translation of Halley's tables, to which he made considerable additions. The king charged him in 1753, with drawing the plan of the county of Bitche, in Lorraine, all the elements of which he determined geographically. He occupied himself greatly with the two comets of 1760; and the fruit of his labour was his elementary treatise on the theory of those comets, enriched with observations on the zodiacal light, and on the aurora borealis. He soon after went to Tobolsk, in Siberia, to observe the transit of Venus over the sun; a journey which greatly impaired his health. After two years absence he returned to France, where he occupied himself for some time in putting in order the great quantity of observations he had made. M. Chappe also went to observe the next transit of Venus, viz. that of 1769, at California, on the west side of North America, where he died of a dangerous epidemic disease, the 1st of August 1769. He had been named adjunct astronomer to the academy the 17th of January 1759. The published works of M. Chappe, are, 1. The Astronomical Tables of Dr. Halley, with Observations and Additions, 8vo. 1754. 2. Voyages to California, 4to. 1772. 3. A considerable number of papers inserted in the Memoirs of the Academy, for the years 1760, 1761, 1764, 1765, 1766, 1767, and 1768; chiefly on astronomy.

CHAP'PEL (William), a very learned and pious divine, bishop of Cork, Cloyne, and Ross, in Ireland, was born at Lexington in Nottinghamshire, December 10, 1582. He was sent to Christ's college in Cambridge; of which he was elected fellow in 1607. He became an eminent tutor; and was also remarkable for his abilities as a disputant. In 1624, king James visited the university of Cambridge, lodged in Trinity college, and was entertained with a philosophical act, and other academical performances. At these exercises, Dr. Roberts, of Trinity, was respondent at St. Mary's; where Chappel as opponent pushed him so hard, that, finding himself unable to keep up the dispute, he fainted. Upon this the king undertook to maintain the question; but with no better success than the doctor; for Chappel was so much his superior at these logical weapons, that his majesty openly professed his joy to find a man of such talents. He was installed dean of Cashel, August 20, 1633. Soon after he was made provost of Trinity college in Dublin, by Laud, then archbishop of Canterbury, and chancellor of the university of Dublin; who, desirous of giving a new form to the university, looked upon Chappel as the fittest person to settle the new establishment. Chappel took vast pains to decline this charge, the burthen of which he thought too heavy for his shoulders. Yet he eventually complied, and succeeded admirably in regulating and restoring scholastic discipline; but, that he might mix something of the pleasant with the profitable, and that young minds might not be oppressed with too much severity, he instituted among the juniors, a Roman commonwealth, which continued during the Christmas vacation, and in which they had their dictators, consuls, censors, and other officers of state in great splendour. And this single circumstance may serve to give us a true idea of the man, who was remarkable for uniting in his disposition two very different qualities, sweetness of temper, and severity of manners. In 1638, his patrons, the earl of Strafford and the archbishop of Canterbury, preferred him to the bishoprics of Cork, Cloyne, and Ross; and he was consecrated at St. Patrick's, Dublin, November 11, though he had done all he could to avoid this honour. By the king's command, he continued in his provostship for some time, but at last resigned it, July 20, 1640; before which time he had endeavoured to obtain a small bishopric in England, that he might return to his native country, as he tells us, and die in peace. But his endeavours were fruitless; and he was left in Ireland to feel all the fury of the storm, which he had long foreseen. He was attacked in the Irish house of commons with great bitterness by the puritan party, and obliged to come to Dublin from Cork, and put in sureties for his appearance. June 1641, articles of impeachment were exhibited against him to the house of peers, founded on discontinuing the Irish lecture during the time of his being provost. The prosecution was urged with great violence, and for no other reason but because he had enforced uniformity and strict church discipline in the college, in opposition to the fanaticism of those times. His fate was peculiar; he was abused at Cambridge for being a puritan, and in Ireland for being a papist. He was under a kind of confinement at Dublin, on account of the impeachment; but at length obtained leave to remove to Cork. He however found an opportunity to embark for England, December 26, 1641, and the next day landed at Milford Haven, after a double escape, as himself phrases it, from the Irish wolves and the Irish sea. He went from Milford to Pembroke, and thence to Tenby, where information was made of him to the mayor, who committed him to goal. After lying there seven weeks, he was set at liberty by sir Hugh Owen, a member of parliament, upon giving bond in 1000l. for his appearance; and, March

March 16, set out for Bristol. Here he learnt that the ship bound from Cork to England, wherein were a great part of his effects, was lost near Minehead; and therein, among other things, perished his choice collection of books. After such a series of misfortunes, he withdrew to his native soil, where he spent the remainder of his life in retirement and study; and died at Derby, upon Whitsunday, 1649. He published, the year before his death, Methodus Concionandi, that is, the Method of Preaching; which for its usefulness was translated into English. His Use of Holy Scripture was printed afterwards in 1653. He left behind him also his own life, written by himself in Latin, which has been twice printed; first from a MS. in the hands of sir Philip Sydenham, bart. by Hearne, and a second time by Peck, from a MS. still preserved in Trinity-hall, Cambridge.

CHAP'PEL HILL, a town of United America, in Orange county, North-Carolina, situated on Newhope creek, which empties into Cape Fear River. This is the spot chosen for the seat of the University of North-Carolina; and students were admitted, and education commenced, in January 1796. The beautiful and elevated scite of this town commands a pleasing and extensive view of the surrounding country: twelve miles south by east of Hillsborough, and 472 south-west of Philadelphia. Lat. 35. 40. N. lon. 79. 6. W.

CHAP'PES, a town of France, in the department of the Aube, and chief place of a canton, in the district of Bar-sur-Seine: ten miles south-east of Troyes.

CHAPPOY', a town of France, in the department of Jura: two leagues and a half south-south-east of Salins.

CHAPRARAL', a town of South America, in the country of Chili, and jurisdiction of Coquimbo.

CHAPS, *s.* The mouth of a beast of prey:

Their whelps at home expect the promis'd food,
And long to temper their dry *chaps* in blood. *Dryden.*

It is used in contempt for the mouth of a man.

CHAPT, or CHAPPED, *part.* Like a table upon which you may run your finger without rubs, and your nail cannot find a joint; not horrid, rough, wrinkled, gaping, or *chapt*. *Ben. Jonson.*

Cooling ointment made,
Which on their sun-burnt cheeks and their *chapt* skins they laid. *Dryden.*

CHAP'TER, *s.* [*chapitre*, Fr.] A division of a book.—The first book we divide into three sections; whereof the first is these three *chapters*. *Burnet.*—From hence comes the proverbial phrase, *to the end of the chapter*; throughout; to the end.—Money does all things; for it gives and it takes away, it makes honest men and knaves fools and philosophers; and so forward, *mutatis mutandis, to the end of the chapter*. *L'Estrange.*

CHAP'TER, *s.* [*capitulum*, Lat.] A congregation of clergymen under the dean in a cathedral church: *congregatio clericorum in ecclesia cathedrali, conventuali, regulari, vel collegiata.* This collegiate company is metaphorically termed *capitulum*, signifying a little head, it being a kind of head, not only to govern the diocese in the vacation of the bishopric, but also in many things to advise and assist the bishop when the see is full, for which, with the dean, they form a council. *Co. Lit.* 103. The chapter consists of prebendaries or canons, which are some of the chief men of the church, and therefore are called *capita ecclesiæ*: they are a spiritual corporation aggregate, which they cannot surrender without leave of the bishop, because he hath an interest in them; they, with the dean, have power to confirm the bishop's grants; during the vacancy of an archbishopric, they are guardians of the spiritualties, and as such have authority, by the stat. 25 Hen. VIII. c. 21, to grant dispensations; likewise as a corporation they have power to make leases, &c. When the dean and chapter confirm grants of the bishop, the dean joins with the chapter, and there must be the consent of the major part; which consent is to be expressed by their affixing their seal to the deed, in one place, and at one time, either in the chapter-house, or some other place; and this consent is the will of many joined together. *Dyer* 233. They had also a check on the bishop at common law; for till stat. 32 Hen. VIII. c. 28, his grant or lease would not have bound his successors, unless confirmed by the dean and chapter. 1 *Inst.* 103.

A chapter is not capable to take by purchase or gift, without the dean, who is the head of the body: but there may be a chapter without a dean, as the chapter of the collegiate church of Southwell; and grants by or to them are as effectual as other grants by dean and chapter. Yet where there are chapters without deans, they are not properly chapters: and the chapter in a collegiate church, where there is no episcopal see, as at Westminster and Windsor, is more properly called a college. Chapters are said to have had their beginning before deans; and formerly the bishop had the rule and ordering of things without a dean and chapter, which were constituted afterwards; and all the ministers within his diocese were as his chapter, to assist him in spiritual matters. 2 *Rol. Rep.* 454. 3 *Co.* 75. The bishop hath a power of visiting the dean and chapter: but the dean and chapter have nothing to do with what the bishop transacts as ordinary. 3 *Rep.* 75. Though the bishop and chapter are but one body, yet their possessions are for the most part divided; as the bishop hath his part in right of his bishopric; the dean hath a part in right of his deanery; and each prebendary hath a certain part in right of his prebend; and each too is incorporated by himself. Deans and chapters have also some of them ecclesiastical jurisdiction in several parishes, (besides that authority they have within their own body,) executed by their officials; also temporal jurisdiction in several manors belonging to them, in the same manner as bishops, where their stewards keep courts, &c. 2 *Rol. Abr.* 229. It has been observed, that though the chapter have distinct parcels of the bishop's estate assigned for their maintenance, the bishop hath little more than a power over them in his visitations, and is scarce allowed to nominate half of those to their prebends, who were originally of his family: but of common right it is said he is their patron. They are now sometimes appointed by the king, sometimes by the bishop, and sometimes elected by each other. 1 *Comm.* 383.

CHAP'TER-HOUSE, *s.* The place in which assemblies of the clergy are held.—Though the canonical constitution does strictly require it to be made in the cathedral, yet it matters not where it be made, either in the choir or *chapter-house*. *Ayliffe.*

CHAP'TREL, *s.* The capitals of pillars, or pilasters, which support arches, commonly called imposts.—Let the keystone break without the arch, so much as you project over the jaums with the *chaptrels*. *Moxon.*

CHAQUILON', a town of Persia, in the province of Segestan, in ruins: ninety miles north-east of Zareng.

CHAR, *s.* A fish found only in Winander-meer, in Lancashire; it is a species of salmon. See SALMO.

To CHAR, *v. a.* To burn wood to a black cinder.—Spraywood, in *charring*, parts into various cracks. *Woodward.*

CHAR, *s.* [cyrne, work, Sax. *Lye.* It is derived by Skinner, either from *charge*, Fr. business; or carc, Sax. care; or *keeren*, Dutch, to sweep.] Work done by the day; a single job or task:

She, harvest done, to *char*-work did aspire;
Meat, drink, and twopence, were her daily hire. *Dryden.*

To CHAR, *v. n.* To work at other houses by the day, without being a hired servant.

CHAR-WOMAN, *s.* A woman hired occasionally for odd works, or single days.—Get three or four *char-women* to attend you constantly in the kitchen, whom you pay only with the broken meat, a few coals, and all the cinders. *Swift.*

CHAR, a town of Arabia: 140 miles north-west of Mecca.

CHAR, a river of France, which runs into the Boutonne, near St. Jean d'Angeli.

CHA'RA, *s.* [χαρα, the joy or delight of the water.] In botany, a genus of the class monoecia, order monandria, natural order inundatæ. The generic characters are—I. Female flower. Calyx: perianthium four-leaved: leaflets subulate, erect, permanent: the two opposite exterior ones longer than the others. Corolla: none. Pistillum: germ turbinate. Style: none. Stigma: five-cleft, oblong, deciduous. Pericarpium: crust ovate, unilocular, adhering. Seed: single ovate, spirally striated. II. Male flower at the base of the germ, beyond the calyx. Calyx: none. Corolla: none. Stamina: filament none. Anther: globose, before the germ, beyond the calyx, beneath. *Essential Character.* Male: Calyx and corolla none; anther before the germ, underneath. Female: Calyx four-leaved; corolla none; stigma five cleft; seed one.

Species. 1. Chara tomentosa, or brittle chara or stonewort: prickles on the stem ovate. These plants, which were ranged by Linnæus among the *cryptogamia algæ*, have in his latter works, on more accurate inspection, been removed to *monoecia monandria*. The first species is always flesh-coloured when alive, but when dry it becomes ash-coloured. Stem twisted, brittle and gritty in the mouth. Low and creeping in marshes and where there is little water, but in deep waters growing out in length and erect. The bristles at the joints sometimes naked, sometimes rough with little spines, especially towards the top. According to Weis, the stems much branched, flexible when young, but growing very stiff as they advance in age, and covered with a gritty tufo; when dry they are so brittle as to fly with the least touch. In summer this plant abounds in oblong berries, growing yellow when ripe, and having very small black seeds in them. Grows in salt marshes, ditches, pools, lakes, &c. in many parts of Europe. In England, Mr. Leonard Buckner first found it three miles beyond Oxford, near Evansham-ferry, in 1632; Mr. Bowles found it afterwards on a bog near Chislehurst in Kent. Found also near Bath; Beforfleigh; in the rivulet that runs from Malham Tarn; and common in peat ditches in Lancashire and Westmoreland. Annual; flowering from June to October.

2. Chara vulgaris, or common or stinking chara or stonewort: stems glossy; leaves toothed on the inside. The whole plant is yellowish or reddish green. Flowers in the divisions of the stem; green when fresh, and extremely fetid; glaucous when dry, and very brittle. Stem but little branched, six to nine inches long, flexible. Found in ditches and pools. Annual, flowering in July and August.

3. Chara hispida, or prickly chara or stonewort: prickles on the stem capillary crowded. Whitish or pale green when fresh; with spines or prickles usually bent down. Stem twisted spirally, its lower part, branches, and lower leaves, frequently naked; upper part thick set with prickles. The whole plant has a strong scent of garlic. It is found in several parts of Europe, on the sea-coasts, &c. with us by Hinton-moor near Cambridge; Ellingham, Norfolk; near Gayton, Staffordshire; in Yorkshire, Lancashire and Westmoreland; East-Lothian, Scotland; and on the turf bogs of Ireland. Annual, flowering from June to October.

4. Chara flexilis, or smooth chara or stonewort: joints of the stem unarmed, diaphanous, broader upwards. Stems eight or ten inches long, fistular, tender, smooth, flexible, dull green, pellucid. Place and time of growth as in the preceding.

Propagation and Culture. These plants having no beauty, nor any use that we are acquainted with, and growing only in water, are not cultivated in gardens.

CHARABAUN', or Tsieribon, a seaport town, on the north coast of the island of Java, situated in a country which produces plenty of rice, sugar, coffee, pepper, cotton, &c. which the Dutch purchase at a low price: about 130 miles east of Batavia. Lat. 6. 5. S. lon. 109. 4. E.

CHARABEY', a town of Persia, in the province of Mazanderan: sixty miles west of Asterabat.

CHARACE'NE. See Chorasan.

CHARA'CIAS, *s.* in botany. See Euphorbia.

CHA'RACTER, *s.* [*character*, Lat. χαρακτηρ, Gr. from χαρασσω, to engrave.] A mark; a stamp; a representation:

In outward also her resembling less
His image, who made both; and less expressing
The *character* of that dominion giv'n
O'er other creatures. *Milton.*

A letter used in writing or printing.—It were much to be wished, that there were throughout the world but one sort of *character* for each letter, to express it to the eye; and that exactly proportioned to the natural alphabet formed in the mouth. *Holder.*—The hand or manner of writing.—I found the letter thrown in at the casement of my closet. You know the *character* to be your brother's. *Shakespeare.*—A representation of any man as to his personal qualities.—Homer has excelled all the heroic poets that ever wrote, in the multitude and variety of his *characters*; every god that is admitted into his poem, acts a part which would have been suitable to no other deity. *Addison.*—An account of any thing as good or bad.—This subterraneous passage is much mended, since Seneca gave so bad a *character* of it. *Addison.*—The person with his assemblage of qualities; a personage.—In a tragedy or epic poem, the hero of the piece must be advanced foremost to the view of the reader or spectator; he must outshine the rest of all the *characters*; he must appear the prince of them, like the sun in the Copernican system, encompassed with the less noble planets. *Dryden.*—Personal qualities; particular constitution of the mind:

Nothing so true as what you once let fall,
Most women have no *characters* at all. *Pope.*

Adventitious qualities impressed by a post or office.—The chief honour of the magistrate consists in maintaining the dignity of his *character* by suitable actions. *Atterbury.*

CHARACTER, in respect to poetical composition, or the drama, is the result of the manners or peculiarities by which each person or part is distinguished from others. The poetical character, says M. Bossu, is not properly any particular virtue or quality, but a composition of several which are mixed together, in a different degree, according to the necessity of the fable and the unity of the action: there must be one, however, to reign over all the rest; and this must be found, in some degree, in every part. The first quality in Achilles, is wrath; in Ulysses, dissimulation; and in Æneas, mildness: but, as these characters cannot exist alone, they must be accompanied with others to embellish them, as far as they are capable, either by hiding their defects, as in the anger of Achilles, which is palliated by extraordinary valour; or by making them centre in some solid virtue, as in Ulysses, whose dissimulation makes a part of his prudence; and in Æneas, whose mildness is employed in a submission to the will of the gods. In the making up of this union, it is to be observed, the poets have joined together such qualities as are by nature the most compatible; valour with anger, piety with mildness, and prudence with dissimulation. The fable required prudence in Ulysses, and piety in Æneas; in this therefore the poets were not left to their choice: but Homer might have made Achilles a coward, without abating any thing from the justness of his fable: so that it was the necessity of adorning his character that obliged him to make him valiant. The character then of a hero in an epic poem is compounded of three sorts of qualities; the first, essential to the fable; the second, an embellishment of the first; and valour, which sustains the other two, makes the third. Unity of character, is as necessary as the unity of the fable. For this purpose a person should be the same from the beginning to the end; not that he is always to betray the same sentiments, or one passion, but that he should never speak or act inconsistently with his fundamental character. For instance, the weak may sally

faily into a warmth, and the breast of the passionate be calm, a change which often introduces in the drama a very affecting variety; but if the natural disposition of the former was to be represented as boisterous, and that of the latter mild and soft, they would both act out of character, and contradict probability. True characters are such as we truly and really see in men, or may exist without any contradiction to nature. No man questions but there have been men as generous and as good as Æneas, as passionate and as violent as Achilles, as prudent and wise as Ulysses, as impious and atheistical as Mezentius, and as amorous and passionate as Dido; all these characters, therefore, are true, and nothing but just imitations of nature. On the contrary, a character is false, when an author so feigns it, that one can see nothing like it in the course of nature, which should be his constant pattern and guide.

CHARACTER, in human life, is that which is peculiar to the manners and conduct of each respective individual. The importance of a good character, to those who are to make their way either to wealth or honours, is no less necessary than address and abilities. Though human nature is degenerate, and depraves itself still more by its own follies; yet it usually retains to the last an esteem for excellence. But even if we are arrived at such an extreme degree of depravity as to have lost our native reverence for virtue, yet a regard to our own interest and safety, which we seldom lose, will lead us to apply for aid, in all important transactions, to men whose integrity is unimpeached. When we choose an assistant, a partner, a servant, our first enquiry is concerning his character. When we have occasion for a counsellor or attorney, a physician or apothecary, whatever we may be ourselves, we always choose to trust our property and persons to men of the best character. When we fix on tradesmen who are to supply us with necessaries, we are not determined by the sign of the lamb, or the wolf, or the fox, nor by a shop fitted up in external elegance of taste, but by the internal reputation. Look into the daily prints, and we shall see, from the highest to the lowest rank, how important the characters of the employed appear to the employers. After the enumeration of the qualities required in a person wanted, there constantly follows, that none need apply who cannot bring an undeniable character. Of such importance then, is the preservation of a good character to all kinds of servants, that few persons will, and none *ought* ever to engage them without a written certificate of their good conduct and behaviour. And to prevent fraud or imposition on masters or mistresses by the fabrication of false or forged characters, it is enacted, by stat. 32 Geo. III. c. 56, that if any person shall give a false character of a servant, or a false account of his former services; or if any servant shall give such false account, or shall bring a false or forged character, or shall alter any written certificate of a character; he, or they, shall, upon conviction before a justice of the peace, forfeit twenty pounds, with ten shillings costs. An action on this statute was tried in Guildhall, in 1792, at the suit of a person whose servant had robbed him to a considerable amount, and who was convicted thereof, and executed; after which, the master, to recover the amount of his property, brought an action against the person who had given him a *good* character to the servant, yet *knowing* he did not *deserve* such good character; and the plaintiff recovered the whole of his loss, with all costs. See the article SERVANT.

To CHA'RACTER, *v. a.* To inscribe; to engrave. It seems to have had the accent formerly on the second syllable:

The pleasing poison
The visage quite transforms of him that drinks,
And the inglorious likeness of a beast
Fixes instead, unmoulding reason's mintage,
Character'd in the face. *Milton.*

CHARACTERIS'TIC, *s.* That which constitutes the character; that which distinguishes any thing or person from others.—This vast invention exerts itself in Homer, in a manner superior to that of any poet; it is the great and peculiar *characteristic* which distinguishes him from all others. *Pope.*

CHARACTERIS'TIC of a logarithm. The same with the index or exponent. See LOGARITHM.

CHARACTERIS'TICAL, *adj.* That which constitutes the character, or marks the peculiar properties, of any person or thing.—The shining quality of an epic hero, his magnanimity, his constancy, his patience, his piety, or whatever *characteristical* virtue his poet gives him, raises our admiration. *Dryden.*

CHARACTERIS'TICALNESS, *s.* The quality of being peculiar to a character; marking a character.

To CHARAC'TERIZE, *v. a.* To give a character or an account of the personal qualities of any man.—It is some commendation that we have avoided publicly to *characterize* any person, without long experience. *Swift.* To engrave, or imprint.—They may be called anticipations, prenotions, or sentiments, *characterized* and engraven in the soul, born with it, and growing up with it. *Hale.* To mark with a particular stamp or token.—There are faces not only individual, but gentilitious and national; European, Asiatic, Chinese, African, and Grecian, faces are *characterized*. *Arbuthnot.*

CHA'RACTERLESS, *adj.* Without a character:

When water-drops have worn the stones of Troy,
And blind oblivion swallow'd cities up,
And mighty states *characterless* are grated
To dusty nothing. *Shakespeare.*

CHA'RACTERS, *s.* In the different departments of literature and science, these are certain marks, signs, or symbols, of things, invented by artists and authors in different ages, and usually employed in the several branches of the mathematics, and in various professions; either to represent certain objects or substances, or as abbreviations; or, as the representatives of number, quantity, space, words, or sentences, in language; or, as sections and divisions in the arrangement and classification of different subjects in books; as in natural history, where *characters* imply the distinguishing marks of genera and species; and which are very often arbitrary, as in the works of Linnæus and others.

Algebraical CHARACTERS, are the marks or signs by which calculations or mathematical problems in that science are written or expressed; for which see ALGEBRA.

Astronomical CHARACTERS, are certain devices which represent the sun, moon, and planets; the signs of the zodiac; the constellations; the aspects of the stars and planets, with their motions, distances, &c. for which see ASTRONOMY.

Chemical CHARACTERS, are certain symbols or figures which denote the different metals, minerals, and other substances, with their combinations; for which see CHEMISTRY.

Emblematical CHARACTERS, are such as the hieroglyphics of the ancient Egyptians; or a mode of writing by the combination of figures of various animals, or parts of human bodies, mechanical instruments, &c. connected by letters and words. See HIEROGLYPHICS.

Mathematical CHARACTERS, are marks or signs used to express quantity, form, proportion, &c. in GEOMETRY, TRIGONOMETRY, &c. for which see under those heads.

Medical and Pharmaceutical CHARACTERS, are calculated principally to denote the quantities and proportions in the admixture of drugs; for which see MEDICINE, and PHARMACY.

Musical CHARACTERS, are the notes and signs used in composition, and to regulate time, the modulation of the voice, &c. for which see MUSIC.

National, and Oriental, CHARACTERS, are the types or letters of which the alphabets of different nations are formed; or in which their primitive language is written or printed, as the ancient Saxon, German, Norman, Irish

Irish, Gothic, &c. *Oriental* characters are those peculiar to the eastern nations, and are commonly understood of the Hebrew, Chaldean, Armenian, Coptic, Arabic, Persic, &c. See LANGUAGE, and PANTOGRAPHY.

Numeral CHARACTERS, are those used in notation, as the signs of given numbers, quantities, &c. for which see ARITHMETIC.

Pasigraphical CHARACTERS, are marks or figures lately introduced by several modern philologists, with a view to establish an *universal* language. See PASIGRAPHY, and LANGUAGE.

CHA'RACTERY, *s.* Impression, mark, distinction; *accented anciently on the second syllable:*

All my engagements I will construe to thee,
All the *charactery* of my sad brows. *Shakespeare.*

CHARA'DE, *s.* A species of composition or literary amusement in the nature of an enigma. Its subject must be a word of two syllables, each forming a distinct word; and these two syllables are to be concealed in an enigmatical description, first separately, and then together; as in the following examples, one in prose, and the other in verse:

My *first*, with the most rooted antipathy to a Frenchman, prides himself, whenever they meet upon sticking close to his jacket. My *second* has many virtues, nor is it its least that it gives name to my first. My *whole*, may I never catch thee! *Tar-tar.*

My *first* is called bad or good,
May pleasure or offend ye;
My *second* in a thirsty mood,
May very much befriend ye.
My *whole*, tho' styl'd "a cruel word,"
May yet appear a kind one;
It often may with joy be heard,
With tears may often blind one. *Fare-well.*

CHARA'DRIUS, *s.* [from χαραδρα, an excavation or fissure.] In ornithology, the PLOVER, a genus of birds belonging to the order of grallæ, and of which there are thirty species, besides varieties. It received its generic name from its sleeping in the clefts or fissures of rocks. The characters are: Bill somewhat taper, obtuse; nostrils linear. Feet cursory; three-toed. Plovers are found in England all the year; but in greatest plenty during the autumnal rains. They frequent the wet bottoms and slimy grounds, where they search for worms and insects; they go into the water in the morning to wash their bill and feet; a habit which is common also to the woodcocks, the lapwings, the curlews, and many other birds which feed on worms. Though they are usually very fat, their intestines are generally found to be empty; so that it has been supposed the soft substance of the worms turns wholly into nourishment, and leaves little excrement. They seem, however, capable of supporting a long abstinence: Schwenckfeld says, that he kept one fourteen days, which, during the whole time, only drank some water, and swallowed a few grains of sand. They seldom remain more than twenty-four hours in the same place, being fond of removing to other pastures. The first snows compel them to leave our climates; however, a considerable number of them remain till the hard frosts. They return in spring, and always in flocks; a single plover is never to be seen. When on the ground they are incessantly engaged in search of food; they are almost perpetually in motion, and are remarkably shy and wary; several keep watch while the rest of the flock are feeding, and on the least symptom of danger they utter a shrill scream, which is the signal of flight. On wing, they follow the wind, and maintain a singular arrangement Advancing in front, they form in the air transverse zones, very narrow and exceedingly long: sometimes there are several of these zones parallel, of small depth, but wide extended in cross lines When on the ground they run much, and very swiftly; they continue in a flock the whole day, and only separate to pass the night: they disperse in the evening to their haunts, where each reposes apart; but at daybreak, the one first awake, or the most watchful, which fowlers term the caller, gives a shrill cry, and in an instant they all obey the summons, and collect together. This is the time chosen for catching them: a clap-net is stretched before dawn, facing the place where they sleep; a number of fowlers encircle it, and as soon as the call is heard, they throw themselves flat on the ground till the birds gather; then they rise up, shout, and throw sticks into the air; so that the plovers are frightened, and, skimming along with a low flight, they strike against the net, which drops upon them, and numbers are taken. This plan is usually attended with great success; but a single bird-catcher can in a more simple way ensnare considerable numbers: he conceals himself behind his net, and attracts the birds by means of a call. They are esteemed in most countries as excellent game. We know but little of their natural history. Transient guests rather than inhabitants of our fields, they disappear on the snow's falling; repass without halting in the spring, and leave us when the other birds arrive. It would seem that the gentle warmth of that season, which awakens the dormant faculties of the other birds, makes a contrary impression on the plovers: they proceed to the more northern countries to breed, and rear their young, for, during the whole summer, we rarely see them. Then they inhabit Lapland, and other parts of the north of Europe, and probably those of Asia. Their progress is the same in America; they are observed in the spring at Hudson's Bay advancing farther north. After arriving in flocks in those arctic tracts, they separate into pairs; and the more intimate union of love breaks, or rather suspends for a time, the general society. Hence Klein, an inhabitant of Dantzick, was led to remark, that the plovers live solitary in low grounds and meadows.

1. Charadrius Pluvialis, the golden plover; length ten inches and a half; bill one inch; the upper part of the plumage dusky, spotted with golden yellow; round the eyes and the chin almost white; sides of the head, the neck, and sides of the body, the same as the upper parts, but much paler; middle of the belly dusky white; tail barred with yellow; legs black. Individuals of this species often vary in colour; in some the belly is black, in others spotted; and a small claw is sometimes observed instead of an hind toe. The male and female differ very little. In young birds the spots are not of a full yellow colour, inclining more to grey. This elegant species is found in England the whole year, and breeds on several of our unfrequented mountains; is very common on those of the Isle of Rum, and the loftier Hebrides. Also on the Grampian, and all the heathy hills of the highlands of Scotland. They make a shrill whistling noise, and may be inticed within gun-shot by a skilful imitator of their voice. Their eggs are four in number, two inches and one-eighth in length, pointed in shape, of a pale cinereous olive, marked with blackish spots. On the continent they are met with in Sweden, Denmark, Lapland, Iceland, and other northern parts; to the south as far as Aleppo; and, if the species be not mistaken, in the island of Batavia, as well as in China: our last voyagers met with them at Owhyhee, and York Islands, in the South Seas, but of a smaller size. In America they inhabit the coast of Labrador, and Hudson's Bay; from thence to New York, as low as Carolina; migrating from one to the other according to the seasons; and often to the island of St. Domingo and Cayenne. There is a smaller variety of this species, which seems to differ only in size.

2. Charadrius Rubidus, or ruddy plover; bill strait, one inch long, and black; head, neck, breast, wing coverts, and those of the tail of a ruddy colour, spotted with black, and powdered with white; in the scapulars

and

CHARADRIUS

1 The spotted Plover. 2 The spur winged Plover.

and wing-coverts the black prevails. It inhabits Hudson's Bay, where it is known by the name of Mistchaychekiskaweshish.

3. Charadrius Himantopus, or long-legged plover; which is a very singular species, on account of its great length of legs; it measures, from the end of the bill to that of the tail, thirteen inches, but to the claws nearly one foot and a half. The bill is two inches and a half long, slender, and black; the crown of the head, back, and wings, glossy black; the hind part of the neck marked with dusky spots; rump and tail white; legs red. This is met with in England, but very seldom. Sir R. Sibbald mentions two being shot in Scotland; Mr. Pennant, one killed near Oxford; and Mr. White another, which was shot at Frencham Ponds, in Hampshire. The plumage of this bird was wholly white, except the wings, and the back as far as the rump; this difference is attributed to sex. They are common in Egypt, and on the shores of the Caspian sea, as well as the rivers which run into it; also in the southern deserts of Independent Tartary, in China, and at Madras in the East Indies. In the warmer parts of America it is plentiful, as far north as Connecticut; and is found in Jamaica.

4. Charadrius Calidris, or sanderling plover; small and slender; length eight inches; bill one inch, and black; the fore-part of the head and sides, from chin to vent, white; through the eyes runs a greyish streak; the upper part of the head, neck, and body, streaked with black; tail ash-colour, with pale margins; legs black. This species is found in flocks on the sea-coasts of Cornwall, and has also been shot in Lancashire. It is not frequent on the continent, except in the neighbourhood of Lake Baikal; but is more plentiful in North America, and abounds in the Seal Islands on the coast of Labrador. There is a variety of this species at Newfoundland, about the size of a snipe; and is gregarious.

5. Charadrius Apricarius, the alwargrim, or spotted plover, size of the golden plover; bill one inch long, and black; eyes large; the plumage on all the upper parts is black, spotted with orange; the forehead between the eyes white, which passes over each eye in a line, down the sides of the neck, to the breast, uniting to form a band across the breast; all the fore parts of the neck, breast, and under parts, are black, except where the white band crosses; the tail barred with brown and black. This inhabits the northern parts of Europe, Sweden, Denmark, the Isle of Oeland, Iceland, and Greenland; where it feeds on mollusca, and the buds of black-berried heath; it arrives in spring, and after breeding retires southward. It inhabits all the arctic parts of Russia and Siberia. In America, at Hudson's Bay, it is known by the name of Hawk's Eye; comes to New York in May; breeds there, departing in collected flocks about the end of October. The flesh is delicious.

6. Charadrius Vociferus, the noisy plover; a small species; size of a snipe; bill above an inch long, and black; eyelids red, the forehead white; between the eyes, and across the head, a bar of black passes on each side to the hind head; the chin and fore part of the neck is white, at the lower part of which the white encircles it like a ring, and is accompanied by a bar of black all round; on the breast is another black bar; and, except these, all the under parts are white; the hind part of the head, neck, and upper part of the body and wings, are dusky brown; rump rusty orange; the feathers very long; some of the feathers which fall over the greater quills are fringed with white; legs pale yellow. This species is confined to America, and is found at New York, Virginia, and Carolina, where it is called Kill-deer; it lays three or four eggs; is very clamorous and restless; and, like the jay in England, sets up its cry the moment any one approaches, to the great disappointment of those who carry a gun.

7. Charadrius Torquatus, the collared plover of St. Domingo; rather smaller than the last; bill blue grey, with a black tip; the forehead white, passing over the eyes on each side, and ending at some distance behind them; on the forehead is a black spot; the chin, throat, and fore part of the neck, white, passing round the last as a collar; beneath this is a collar of black, broad on the fore part; the rest of the under parts white, except a bar of black mixed with white on the breast; the back and scapulars grey brown, like the head; legs blue grey; found abundantly at St. Domingo. A variety of this collared species is also found at Jamaica, where it frequents the banks of rivers.

8. Charadrius Hiaticula, the ringed plover; length from six to seven inches and upwards; bill orange; the base of the upper mandible, and from thence through the eyes, and behind them to the ears, black; forehead white; behind this, from eye to eye, black; the rest of the head pale brown, chin and throat white, passing round the neck in a broad collar; beneath this, on the lower part of the neck, is a second collar of black, encircling the neck behind, but growing narrow as it passes backward; breast and all the under parts white; back and wing coverts pale brown. These birds migrate into England in the spring, and depart in autumn, but frequent our shores during the summer. They lay four eggs, an inch and a half in length, of a pale ash-colour, spotted with black; these they lay on the ground, under some shelter, but make no nest. They run very fast, sometimes taking short flights, twittering loud at the same time, then alight and run again, and, if much disturbed, fly quite off. They inhabit several parts of the continent, Greenland, and America. A variety of this species, but much paler in its plumage, is found at Hudson's Bay and Cayenne.

9. Charadrius Alexandrinus, the Alexandrine plover; very small, the size only of a lark; bill black; forehead white, passing backwards in a streak over the eye; from the base of the bill a streak of black runs through the eye, and reaches behind to the ears; the top of the head, the back, and wings, brown; round the neck a collar of white; belly white; the quills blackish grey. It inhabits Egypt, on the canal of the Nile; where it feeds on insects and small frogs.

10. Charadrius Ægyptius, the Egyptian plover; size of a thrush; a line of white passes over the eye to the hind head; the crown, sides of the head, and middle of the back, black; on the breast a band of black passes backwards, and ends in a point on the back; the breast, sides of the belly, thighs, and vent, yellowish white; throat and middle of the belly white. Inhabits the sunny plains of Egypt, and feeds on insects. There are two varieties of this species; one found at the Cape of Good Hope, the other in the island of Luçon; both feed on insects and frogs.

11. Charadrius Novæ Zealandiæ, the New Zealand plover; a trifle bigger than the preceding; bill one inch long, red, with a black tip; eye-lids red; the fore part of the head, taking in the eye, chin, and throat, black, passing backwards in a collar at the hind head; all the back part of the head, behind the eye, green and ash-colour, divided by white; the plumage on the upper parts of the body the same colour as the back of the head, and forming a bar on the wing; the under parts of the body white; legs red. It inhabits Queen Charlotte's Sound, and is in the collection of Sir Joseph Banks.

12. Charadrius Gregarius, the gregarious plover; length thirteen inches or more; bill one inch, and black; crown of the head brown, mottled with white; forehead white, passing in a streak over each eye to the hind head; through the eyes a black streak; body ash-colour, somewhat approaching to that of the turtle-dove; at the lower part of the breast a large crescent of black, and behind it a rufous one; tail white, crossed with a black band, which is not conspicuous in the side feathers; legs furnished with an imperfect back toe. This frequents the fields about the Volga, Jaick, and Samara, in flocks, but

but is not seen farther north than fifty-four degrees. It is called by some the hen of the steppes.

13. Charadrius Asiaticus, the Asiatic plover; a little bigger than the ringed plover; bill as in that bird; crown of the head, the back, and wings, ash-coloured brown; forehead, and sides of the head, white; from thence to the middle of the neck ferruginous, bounded by a transverse band of brown; the rest of the under parts white; tail brown, the feathers whitish on the edges, and tipped with black; legs red. Inhabits the salt lakes of the southern deserts of Tartary, and is a very rare and solitary species.

14. Charadrius Mongolus, the Mongolian plover; size of the dotterel; forehead white, crown black; from the bill arises a streak of black, which encircles its white throat; the fore part of the neck is ferruginous; breast the same, but paler; belly white; back cinereous brown. Inhabits the salt lakes on the confines of the Mongolian country, and is a solitary species.

15. Charadrius Morinellus, the dotterel; length from nine to ten inches; bill less than an inch long, and black; the forehead is dusky and grey mixed; over the eye is a white band, which bends downwards, and passes to the hind head; sides of the head and throat white; the hind part of the neck, the back, and wings, greyish brown; fore part of the neck, cinereous olive, bounded with a line of black, and beneath it another of white; the breast and sides of a pale dull orange; tail olive brown, and near the end a bar of dusky, the tip white; legs black. These birds are common in some parts of England, but are not known in others; they are plentiful in Cambridgeshire, Lincolnshire, and Derbyshire. They appear in flocks of eight or ten the latter end of April, and stay all May and June, when they grow fat, and are much esteemed for the table. In April and September, they are taken on the Wiltshire and Berkshire downs; they are also seen on the sea-side in Lancashire about three weeks in April; from thence they remove northward to Leyton Haws, where they stay about a fortnight; and at the same time are in plenty about Holderness, and upon the Yorkshire wolds. It is probable that they breed in the mountains of Cumberland and Westmoreland, as they appear there in May, but are not observed there after the breeding season. They inhabit the northern parts of Europe, where they likewise breed. Linnæus says, that they are very frequent in Dalecarlia, and the Lapland Alps; and that they visit Sweden in May. They are known to breed in the northern parts of Russia and Siberia; appearing southward only in their migrations. They are very tame, and easily enticed into a net, or destroyed by the gun. There are two varieties of this species, differing only in a trifling variation of the plumage.

16. Charadrius Atricapillus, the black-crowned plover; length ten inches; bill an inch long, red, with the end black; head black, surrounded with a circle of white; throat white; breast light ash-coloured brown, divided from the belly by a dusky transverse line; back and wing coverts, cinereous brown; tail white at the base, and black towards the end; the tip white; legs very long; naked an inch above the knees, and of a blood red. It chiefly inhabits the province of New York, and has much the habit of the European dotterel.

17. Charadrius Obscurus, the dusky plover; somewhat larger than a snipe; bill black; forehead pale reddish white; plumage on the upper part of the bird, and fore part of the neck, dusky; lower part of the neck, breast, and under parts, yellow-oker-colour, with a tinge of red; the neck marked with pale and dusky streaks, and transversely mottled on the sides with narrow lines; legs blue. Inhabits New Zealand, and found at Dusky Bay. It is in the collection of Sir Joseph Banks.

18. Charadrius Fulvus, the fulvous plover; length twelve inches and a half; bill dusky; the plumage above, from the crown of the head to the rump, black, margined with fulvous yellow; the forehead and throat dusky white; breast fulvous, spotted with black; the wing-coverts are black, spotted with fulvous; tail brownish black, crossed with whitish bands; legs blue. It inhabits the shores and marshy places of Otaheite, where our late navigators first found it. There is a variety of this species considerably smaller, but corresponding in every other respect.

19. Charadrius Leucogaster, the white-bellied plover; length six inches; bill one inch; the plumage on the upper parts dirty brown; the forehead white; above and beneath the eye a streak of the same, and the under parts entirely white; six of the middle tail-feathers brown; the outer ones white just at the tip and base; the three exterior ones white; legs pale blue. Native country uncertain.

20. Charadrius Rubricollis, the red-necked plover; length seven inches or more; bill flesh-coloured, the head and neck black; on each side of the neck a square chesnut spot, the size of a silver penny, almost meeting together at the back part; the upper part of the body ash-colour, with a little mixture of white about the bastard wing; the breast and under parts white; quills and tail dusky; legs flesh-colour. Inhabits the South Seas, and was found in Adventure Bay, Van Diemen's Land.

21. Charadrius Spinosus, the spur-winged plover; about the size of the golden plover; bill an inch long, and black; the crown of the head and throat are black, passing a little way down the neck before; the hind head a little crested; the back part of the neck, and upper part of the body, and scapulars, reddish grey; sides of the head, and all the under part, from throat to vent, yellowish white, except a crescent of black on the breast; on the fore part of the wing, just within the bend, is a spur half an inch in length, a little bent, and black; tail yellowish white, tipped with black. This species inhabits the marshy places of Lower Egypt, in the month of September, where it goes by the name of dominican; the neck being black, with white sides, is analagous to the habit of that order. There is a variety of the spur-winged species, very similar to the preceding in all respects, except a trifling variation in the plumage. It inhabits Russia, and is found near Aleppo, about the river Coic.

22. Charadrius Cayanus, or Cayenne plover; in length about nine inches; bill one inch; the back part of the head, and nape of the neck, are white, mixed with grey; the fore part and sides black, passing back to the nape, and occupying all the hind part of the neck; and then comes forward on the fore part, above the breast; between this and the chin it is white; the middle of the back and wings is rufous grey; near the bend of the wing is a sharp bent spur; scapulars and quills black; the under parts from the breast white; the base part of the tail is white, the rest black; legs yellowish. Inhabits Cayenne.

23. Charadrius Pileatus, the hooded plover; somewhat larger than the preceding; bill yellow, red towards the end, and black at the tip; the forehead covered with a carunculated yellow membrane, passing round the eyes; the head and part of the neck black; the hind head furnished with a few short pointed feathers, hanging like a small crest; beneath this the hind head is white; the upper parts of the body are rufous grey; the under parts white, with a few dusky spots down the fore part of the neck; the quills and end of the tail black; legs red. Native of Senegal.

24. Charadrius Coronatus, the wreathed plover; twelve inches in length; the bill is red, and towards the point dusky; the top of the head black; round the crown runs a list of white, encircling the head like a wreath; the hind part of the neck, and upper part of the body, are brown, with a gloss of greenish purple, changing with different lights; the same on the breast, which is marked with a few spots of black; the neck, as far as the breast, is grey; the belly white; as are the greater coverts; the tail white, with a broad band of black near the end. Inhabits the Cape of Good Hope.

25. Charadrius

25. Charadrius Bilobus, the wattled plover; about the size of the golden plover; length nine inches and a half. The bill is yellow; on the forehead is a naked bare skin, hanging down in a pointed flap on each side of the jaw; crown of the head black; through the eye runs a white streak; the neck and upper parts of the body yellowish grey, deepest on the back; the under parts, from the breast, white; across the greater wing coverts a band of white; quills black; the tail is crossed with a black bar at the end; legs pale yellow. Found on the coast of Malabar.

26. Charadrius Melanocephalus, the black-headed plover; length seven inches; bill black, and one inch long; the top of the head, taking in the eyes, is black; the forehead yellowish, passing over each eye in a broad streak; the hind part of the neck and back are black; the wings, rump, and tail, greyish ash-colour; the quills black, mottled with white on the outer part of the wing: all the tail feathers except the two middle ones are marked with black near the ends; the tips white; the under part of the body pale rufous, deepest on the breast, where it is mottled with transverse dusky markings; legs cinereous grey. Native place not known.

27. Charadrius Lactæa, the cream-coloured plover; length ten inches; bill three quarters of an inch, slender, and bent at the tip; plumage in general cream-colour, palest beneath; behind the eyes a patch of black; through them runs a pale streak, passing to the hind head, and dividing the black; tail marked with black near the tip; legs yellowish white. This species is very rare; one was killed in France, and another was shot in England, near St. Alban's in Herts, which had a curved bill. These were observed to run very swiftly, and were remarkably tame.

28. Charadrius Coromandelensis, the Coromandel plover: size of the preceding; top of the head, and fore parts, as far as the breast, reddish chesnut; behind the eye a white streak, and through the eye a black one, passing to the hind head, the white entering a little way into the black; upper part of the neck, the back, wings, and tail, brown; belly dusky; upper tail coverts, and tip of the tail, white; quills black; legs yellowish white. Native of the coast of Coromandel. These two last differ much from the plovers in the shape of the bill; but have so great an affinity to them on account of the toes, which are only three in number, and all placed forward, that they cannot with propriety be ranked in any other genus.

29. Charadrius Indicus, the Indian plover; nearly the size of a lark; length six inches; bill nine lines long, and blackish; the upper part of the body is brown; the under, dusky white; on the breast are two transverse brown bands; the prime quills brown, the secondaries dusky; tail feathers white at the base, the rest of their length brown; wings and tail of equal length when closed; legs black. Inhabits the East Indies.

30. Charadrius Œdicnemus, the thick-kneed plover; a large species, from sixteen to eighteen inches in length; bill almost two inches long; yellow at the base, and black towards the tip; eyes large; irides and eyelids pale yellow; the head is of a saffron colour; the neck, and upper parts of the body, are of a pale tawny brown, with a dash of blackish down the shaft; the under parts much the same, but very pale, except the belly, thighs, and vent, the feathers of which are of a pale yellowish white; above and beneath the eye is a pale band, and another on the wing coverts parallel to the edge; the tail is composed of twelve feathers; the six middle ones banded with brown; the three outer ones on each side white, barred with dusky; all but the two middle ones marked more or less at the end with black; legs yellow; knees very thick, as if swelled; the outer toe united to the middle as far as the first joint. This bird is common to three parts of the globe, being found in Europe, Africa, and Asia; but not farther north than England, of which Norfolk, Hampshire, and Lincolnshire, seem the places most frequented by it. It is also seen in some parts of Kent, frequenting the rising slopes and hills on each side of the vale between Dartford and Farningham, especially the parts which are stony and dry; whence it is called the *stone curlew*. It makes no nest, but lays two or three cinereous white eggs, two inches and a quarter long, blotched with blackish brown; these it places on the bare ground, or in a small excavation of the earth, or sheltered by a stone, and sits thirty days. The cry of this bird is singular, being an hoarse kind of whistle three or four times repeated, and heard more than a mile; somewhat resembling the creaking of a well-handle, or that of a grindstone wanting grease. This noise it makes in the evening and night only. Buffon says this bird is common in several parts of France; and, if the same with the Kervan of Hasselquist, it is found in Arabia. The Turks and Egyptians, he says, keep it alive in cages for the sake of the noise, which to them is agreeable. He likewise adds, that it is useful in destroying mice, too common in Palestine; with us it is supposed to live on worms, caterpillars, toads, and frogs. It inhabits the Cape of Good Hope, and is also a native of Owhyhee. This bird is placed by Pennant and Latham in the genus *Otis*, or bustards; but by Linnæus and Gmelin, among the plovers.

CHARAG', *s.* the tribute which Christians and Jews pay to the grand signior, or emperor of the Turks. It consists of ten, twelve, or fifteen, francs per annum, according to the estate of the party. Men begin to pay it at nine or at sixteen years old; women are dispensed with, as are also priests, rabbins, and religious.

CHARA'GIO, a town of the island of Corsica: two miles south of Cervione.

CHA'RAIMS, a particular sect of the Jews in Egypt. They live by themselves, and have a separate synagogue. These are the ancient Essenes. They strictly observe the five books of Moses, according to the letter; and receive no written traditions.

CHARAMOKOTAN', one of the small Kurule islands, in the Northern Pacific Ocean. Lat. 49. 50. N. lon. 172. 40. E. Ferro.

CHARAN'CY, a town of France, in the department of the Moselle, and chief place of a canton, in the district of Longwy: three leagues and a half west-south-west of Longwy.

CHARAN'TIA, *s.* in botany, See MOMORDICA.

CHA'RAS (Moses), a skilful apothecary, born at Usez, followed his profession at Orange, from whence he went and settled at Paris. Having obtained a considerable share of reputation by his Treatise on the Virtues and Properties of Treacle, he was chosen to deliver a course of chemistry at the royal botanical garden at Paris, in which he acquitted himself with general applause during nine years. His Pharmacopœia, 1653, 2 vols. 4to. was the fruit of his lectures and his studies. It has been translated into all the languages of Europe, and even into the Chinese, for the accommodation of the emperor. The edicts against the Calvinists obliged him to quit his country in 1680. He went to England, from thence to Holland, and afterwards into Spain with the ambassador, who took him to the assistance of his master Charles II. then languishing in sickness. Every good Spaniard was at that time convinced, that the vipers for twelve leagues round Toledo were innoxious, ever since they were deprived of their venom by the fiat of a famous archbishop. The French doctor set himself to combat this error. The physicians of the court, envious of the merit of Charas, failed not to take advantage of this impiety: they complained of him to the inquisition, from whence he was not dismissed till he abjured the protestant faith. Charas was then seventy-two years old. He returned to Paris, was admitted of the academy of sciences, and died in 1698, aged 80.

CHA'RASM, or KHARASM, a country of Asia, bordered

dered on the north by Turkestan, on the east by Grand Bukharia, on the south by Chorasan, and on the west by the Caspian Sea; about 320 miles from north to south, and about as much from east to west. The country is in general fertile, and is divided among several Tartarian princes, of whom one takes the title of Khan, with a degree of pre-eminence over the rest. Urgens is the capital, and the usual residence of the khan in the winter, but during the summer he generally encamps on the sides of the river Amol; and, as his camp is called *Khiva*, the people have generally been called the Tartars of Khiva. The khan is said to be able to raise an army of forty or fifty thousand horsemen.

CHARATZAIS'KA, a fortress of Siberia, on the borders of China, eighty-four miles south-west of Selengisk.

CHARAVEND', a town of Persia, in the province of Irak Agemi: 120 miles south-east of Ispahan.

CHAR'BON, *s.* a little black spot or mark which remains after a large spot in the cavity of the corner teeth of a horse: about the seventh or eighth year, when the cavity fills up, the tooth being smooth and equal, the horse is said to be aged.

CHABUISOV'KA, a river of Kamtchatka, which runs into the Penzinskoi Gulf: seventy miles south-south-west of Tigilskoi.

CHAR'CAS (Los), a province of South America, in Peru, near the coast of the Pacific Ocean: one of the richest provinces in the world for mines. La Plata is the capital.

CHAR'COAL, *s.* [imagined by Skinner to be derived from *char*, business; but, by Mr. Lye, from *to chark*, to burn.] Coal produced by charring wood, an operation very similar to that of distillation. It consists in forming pyramids of wood, or cones truncated at their summit. The whole is closely covered with earth, well beaten, leaving a lower and upper aperture. The pile is then kindled, and the fire continued till the smoke has wholly subsided, at which time the wood is thoroughly red hot. The external air is then totally excluded, by closing the apertures through which it passed, and thus the fire is extinguished. By this means the water, the oil, and all the principles of the vegetable, are dissipated, except the fibre. The wood in this operation loses three-fourths of its weight, and one-fourth of its bulk. The suturbrand of the Icelanders is said by Von Troil to be nothing but wood converted into charcoal by the burning lava which has surrounded it.

Charcoal, in the modern chemistry, is known by the name of *carbon*. It consists of the vegetable fibre very slightly changed; and most commonly preserves its original form. The primitive texture is not only distinguishable, but serves likewise to indicate the state and nature of the vegetable which has afforded it. It is black, hard, sonorous, and brittle; in some cases light, spongy, and friable. The charcoal of oily or bituminous substances is of a light pulverulent form, and rises in soot: this charcoal of oils is called lamp-black. Charcoal well made has neither taste nor smell; and it is one of the most indecomposable substances hitherto known. All the metallic substances are more combustible than charcoal, and consequently are revived or reduced to the metallic state, by being heated with it. An important consequence seems to follow from this circumstance, namely, that there may exist many metallic substances whose combustibility may be greater than that of charcoal, and which consequently are unknown to us as such, because we possess no means of reducing them. Thus the alkalis and earths may consist of peculiar combustible or metallic substances, dephlogisticated or combined with vital air, by an union which the art of chemistry has not yet found means to break.

The vapours that arise from charcoal are extremely pernicious, producing a species of apoplexy in those persons who are exposed to them. They produce at first a sense of uneasiness, then a chillness, sickishness, and kind of head-ach, which usher in a loss of sense, a fixedness of the eyes, a rigidity of the whole body, a ghastly countenance, a small, frequent, and irregular, pulse, feverishness, &c. In this case the noxious vapours act on the brain and nerves, and not, as has been generally said, on the lungs; these vapours, and those from fermenting vegetables, putrefying animal substances, or from caverns, operate in the same manner; and, as accumulated and confined, their effect is more or less instantaneous. They attack the vital principle, and extinguish it if they are copious; and a less quantity produces the symptoms of a debility in the nervous system. To prevent suffering from this cause, avoid close rooms where these substances are burning, and never enter their repositories but when a candle will continue to burn there. In order to the cure, expose the patient to the open air; if the patient can swallow, give him acidulated liquors; if he is insensible, throw cold water on his face; strong vinegar may be rubbed about his nostrils, and held under them; blood may be taken from the arm; as soon as possible make him swallow cold water with vinegar in it; stimulating clysters are useful: to remove the spasms, the sps. ætheris vitriolicus compositus, with small doses of opium, will be proper. If these fail, let a strong healthy person breathe forcibly into the mouth of the patient, so as to distend his lungs. For the chemical properties of charcoal, see the article CHEMISTRY.

CHARCUO'N, a town of Persia, in the province of Farsistan: seventy miles south-east of Schiras.

CHARD, *s.* [*charde*, French.] *Chards* of artichokes, are the leaves of artichoke plants, tied and wrapped up all over but the top, in straw, during the autumn and winter; this makes them grow white, and lose some of their bitterness.—*Chards* of beet, are plants of white beet transplanted, producing great tops, which, in the midst, have a large, white, thick, downy, and cotton-like, main shoot, which is the true *chard*. *Mortimer.*

CHARD, a market-town in Somersetshire, pleasantly situated on the southern verge of the county, a few miles only from the counties of Dorset and Devon. It stands on the lower road from London to Exeter, between Crewkherne and Axminster, seven miles from each; distant also from Taunton fifteen miles, from Honiton fourteen miles, and 141 from London. The streets are spacious, clean, and commodious; the buildings good. In the reign of Henry III. Chard was made a free borough, and sent members to parliament; but has since lost that privilege: the assizes were also held here formerly. Several streams run through the town, which keep it clean. A manufacture of linen cloth is carried on here; but the principal support of the place is the clothing trade. At the entrance from the south-east, is a large building, used as a school, which was anciently a palace of Cerdic, king of the West Saxons. The town being within a moderate distance of the fruitful corn-fields of Ilminster, South Petherton, Martock, &c. is well supplied with wheat, barley, oats, beans, &c. Market-day is on Mondays. Fairs for cattle and pedlary-wares on 4th of May, 3d of August, and 2d of November.

CHARDIN (Sir John), a famous voyager, the son of a protestant jeweller at Paris, was born there in 1643; but quitted his native country, and removed to London, upon the revocation of the edict of Nantz in 1685. He went to Persia and the East-Indies to traffic in jewels. Charles II. king of England, conferred upon him the honour of knighthood. He died at London in 1713. His Voyages, translated into English, Flemish, and German, have always been much esteemed. He gives a very good idea of Persia, its religion, customs, and manners; and his description of the other oriental countries, which he visited, is no less exact.

CHARDO'GNE, a town of France, in the department of the Meuse, and chief place of a canton, in the district of Bar-le-Duc: four miles north of Bar-le-Duc.

CHA'RE CUL'LOU, a town of Asia, in the province of Cabul: forty-two miles south-west of Cabul.

CHARE'NTE,

CHARE'NTE, a river of France, which rises in the department of the Upper Vienne, passes by, or near to, Civray, Ruffec, Verteuil, Mansle, Angoulesme, Jarnac, Cognac, Saintes, Rochefort, &c. and runs into the sea, about eight miles below Rochefort, opposite the Isle of Oleron.

CHARE'NTE (department of), one of the new divisions of France, bounded on the north by the department of the Vienne, on the east by Upper Vienne, on the south by the department of the Dordogne, and on the west by the department of the Lower Charente. It takes its name from the river Charente, which passes through it: above fifty-six miles in length from north-east to south-west and thirty wide on an average. Angoulesme is the capital.

CHARE'NTE (Lower, department of), one of the new divisions of France, situated on the sea coast, north of the river Gironde, taking its name from the river Charente, which crosses it nearly in its centre: rather more than eighty miles in length; the breadth is very unequal, towards the south about ten miles, towards the north twenty, and in some parts nearly forty. Saintes is the capital.

CHARENTENAY', a town of France, in the department of the Yonne: seven miles south of Auxerre.

CHARENTON', a town of France, in the department of Paris, and chief place of a canton, in the district of Bourg-la-Reine: one league south-east of Paris.

CHARENTON', a town of France, in the department of the Cher, and chief place of a canton, in the district of St. Amand: five miles east of St. Amand, and twenty-one south-south-east of Bourges.

CHARE'RA (La), a town of the island of Cuba: five miles west of Havannah.

CHARE'RI, a town of Italy, in the kingdom of Naples, and province of Calabria Ultra: nine miles south of Girace.

CHARE'RI, a river of Italy, in the kingdom of Naples, which runs into the sea, ten miles south-south-east of Girace.

CHA'RES, *f.* An ancient statuary and disciple of Lysippus, who immortalized himself by the coloss of the sun at Rhodes, which has been reckoned one of the seven wonders of the world. This statue was of brass, and above a hundred feet high; and was placed at the entrance of the harbour at Rhodes, with the feet upon two rocks, in such a manner, that ships could pass in full sail betwixt its legs. Chares employed twelve years in erecting it; and, after standing forty-six, it was thrown down by an earthquake. Moavius, a caliph of the Saracens, who invaded Rhodes in 667, sold it to a Jew merchant, who is said to have loaded nine hundred camels with the fragments of it.

CHARET'TE (M.), the celebrated leader of the French royalists in La Vendée. He was born at Machecould, near Nantz; where, on the 10th of March 1792, he set up the royal standard, and proclaimed Louis XVII. At this time he was only twenty-eight years of age; he had been brought up to the sea, and was, at the time of the revolution, a lieutenant in the royal navy. His army consisted at first of a rude and hardy race of men, called the *Chouans*, who took their name from three sons of a blacksmith of the name of Chouan, near Fougeres. They had been for many years no better than highway robbers, a kind of banditti, who sheltered themselves in the vast forests of La Vendée, and, as they increased, they supported themselves by smuggling. The rugged face of the country, full of impenetrable woods, interspersed with bogs and swamps, always afforded them a secure retreat; and it is said, that under the sanguinary government of Robespierre, so many flew to the woods for safety, and joined the Chouans, that they were soon 30,000 strong, and afterwards increased to a prodigious number. We cannot, in this place, follow Charette through his arduous and interesting campaigns, it being a subject that comes more properly under the article FRANCE; but we must observe that, since the beginning of the war, in no part whatever have the battles been so dreadful as in La Vendée. Many obstinate contentions on the frontiers were but skirmishes compared with these: scarcely did a single action take place, in which one or other of the contending armies was not almost wholly destroyed. The battle of Mortagne cost both sides 30,000 men, in that of Saumur 10,000 republicans were killed, and 15,000 made prisoners; and in that of Mons the royalists left 15,000 dead on the field of battle, while the loss of the republicans was not much less. Reports made to the directory have stated that the war in La Vendée cost the republic upwards of 200,000 men. The failure of our co-operation at Quiberon, gave a death blow to the exertions of Charette; and his subsequent defeat at St. Christopher's, by Traveaux, put an end to the Vendéan war, and hastened his fate. The peasants who escaped from the action, abandoning him entirely, he remained with about forty men, who would not quit him, either because they were deserters from the enemy, or because their conscience would not suffer them to break the oath they had taken not to leave him in any extremity. Charette now came to a resolution to take refuge in the woods, out of which he never ventured more. The republicans, who pursued him, marched in small columns of from fifty to sixty men, beating about, particularly in the forests of Jauvoye, of Grasa, the woods of Des Essarts, and all those that exist in the commune of Leger. His great knowledge of the country often contributed to save him, no less than the excellent system of tactics he had adopted. He knew, by means of his spies, the place at which his pursuers were to halt for the night. The next morning he watched the moment of their departure, and the road they took, and in that manner followed them till they halted again, so that when they believed they had him in front of them, he was almost always in their rear. It sometimes happened that they pursued him a whole day in the forest of Jauvoye, without being able to discover him, although perfectly sure he was there, while the only way he took to escape, was by keeping the same path as they. The peasants always concealed him, some out of fear, and others from a principle of attachment. He was however grown cruel, even towards those who had served him; and more than once killed peasants who were ploughing their grounds, lest they should betray him and indicate his route. In the commune of St. Hillaire, near Paluan, he put to death, with his own hand, the father, the son, and the son-in-law, upon mere suspicion. He was also grown melancholy; the idea of his destruction incessantly haunting his mind. At length his evil destiny overtook him.

A republican column was returning to their cantonment at the Chateau de Pont-de-vic, near the town of Poires, four days after they had left it, in order to procure provisions, and take a little rest, when two horsemen, upon the look-out, saw the gleam of arms break through the trees. Of this they immediately informed the general, who advanced, without losing a moment, at the head of the few troopers he had with him, and soon perceived that it was the band of Charette, which was defiling two a-breast across a heath of small extent. The general rode through the two ranks, in order to discover if their chief was among them, while they, more eager to save than to defend themselves, fired only two or three shot, which took no effect. The general ordered the infantry to attack them, when, out of thirty-seven, four only escaped. The cavalry being dispersed along the different roads in search of the principal chief, a young man without arms, and in the livery of a servant, was perceived by two horse chasseurs coming out of a morass. They rode up to him, and requested him to tell them where Charette was to be found. The young man at first denied having seen him, but a few strokes of the sabre made him confess that the renowned commander of the royalists was in the very morass that he had just

just left. The chasseurs immediately rode back to convey this information to the general, who ordered three or four soldiers to search the suspected place; and at last Charette was discovered by a corporal of the chasseurs. Traveaux also perceived him, and gave orders that not a shot should be fired. The corporal caught hold of him by the skirts of his jacket and endeavoured to stop him, but Charette, who, at that fatal moment had lost his customary presence of mind, kept running, and dragged the corporal after him till he came to a hedge, over which he attempted to leap, but fell into the midst of it, and was taken out in a state of insensibility; being entirely exhausted by his long-continued efforts to escape. A little water thrown in his face having restored him to his senses, the first words he spoke, were, "Whose prisoner am I?" "Traveaux," was the answer. "So much the better," said he, "he is the only man worthy to take me." He was armed with a carbine and two pistols, which he had discharged in the previous action. His dress was a green jacket, with the skirts turned back, and embroidered with *fleur-de-lis* in gold; a pink waistcoat, a sash of white silk with gold fringe at the ends; half boots, and a round hat with a handkerchief over it. He had been struck by a ball, which had grazed his forehead over the left eye; and had been wounded in the left arm by the bursting of his carbine. As he was too weak to walk, he was put on a horse, and conducted to the Chateau de Pont-de-vie, where he passed the night in the general's room, under a strong guard. He ate, and chatted all the night, and, in short, supported that character of fortitude, which he had acquired in so many trying situations. The next day he was taken to Angers, whence he was conveyed to Nantz, and there tried and shot. Before his punishment, the executioner asked him if he would permit him to tie a bandage over his eyes. "No," answered Charette; "I have looked death often enough in the face to be able to brave him." Being asked by general Traveaux, why he had not emigrated when he had found an opportunity? "I had sworn," said he, "to put the king upon the throne, or perish in the attempt. I have kept my oath."

To CHARGE, *v. a.* [*charger*, Fr. *caricare*, Ital. from *carrus*, Lat.] To entrust; to commission for a certain purpose: it has *with* before the thing entrusted.—And the captain of the guard *charged* Joseph *with* them, and he served them. *Genesis.*—To impute as a debt: with *on* before the debtor:

My father's, mother's, brother's, death I pardon:
That's somewhat sure; a mighty sum of murder,
Of innocent and kindred blood, struck off:
My prayers and penance shall discount for these,
And beg of Heav'n to *charge* the bill *on* me. *Dryden.*

To impute, with *on* before the person to whom any thing is imputed.—It is not barely the ploughman's pains, the reaper's and thresher's toil, and the baker's sweat, is to be counted into the bread we eat; the plough, mill, oven, or any other utensils, must all be *charged on* the account of labour. *Locke.*

Perverse mankind! whose wills, created free,
Charge all their woes *on* absolute decree;
All to the dooming gods their guilt translate,
And follies are miscall'd the crimes of fate. *Pope.*

To impute to, as cost or hazard.—He was so great an encourager of commerce, that he *charged* himself with all the sea risk of such vessels, as carried corn to Rome in winter. *Arbuthnot.*—To impose as a task: it has *with* before the thing imposed.—The gospel *chargeth* us *with* piety towards God, and justice and charity to men, and temperance and chastity in reference to ourselves. *Tillotson.*—To accuse; to censure.—Speaking thus to you, I am so far from *charging* you as guilty in this matter, that I can sincerely say, I believe the exhortation wholly needless. *Wake.*—To accuse: it has *with* before the crime.—And his angels he *charged with* folly. *Job.*—To challenge.—The priest shall *charge* her by an oath. *Numbers.*—To command; to enjoin:

I *charge* thee, stand,
And tell thy name, and business in the land. *Dryden.*

To fall upon; to attack:

The Grecians rally, and their pow'rs unite;
With fury *charge* us, and renew the fight. *Dryden.*

To burden; to load.—Meat swallowed down for pleasure and greediness, only *charges* the stomach, or fumes into the brain. *Temple.*—To cover with something adventitious.—It is pity the obelisks in Rome had not been *charged* with several parts of the Egyptian histories, instead of hieroglyphics. *Addison.*—To fix, as for fight. *Obsolete.*—He rode up and down, gallantly mounted, and *charged* and discharged his lance. *Knolles.*—To load a gun with powder and bullets.

To CHARGE, *v. n.* To make an onset.—Like your heroes of antiquity, he *charges* in iron, and seems to despise all ornament but intrinsic merit. *Granville.*

CHARGE, *s.* Care; custody; trust to defend.—He enquired many things, as well concerning the princes which had the *charge* of the city, whether they were in hope to defend the same. *Knolles.*—Precept; mandate; command:

He, who requires
From us no other service than to keep
This one, this easy *charge*; of all the trees
In Paradise, that bear delicious fruit
So various, not to taste that only tree
Of knowledge, planted by the tree of life. *Milton.*

Commission; trust conferred; office.—If large possessions, pompous titles, honourable *charges*, and profitable commissions, could have made a proud man happy, there would have been nothing wanting. *L'Estrange.*—It had anciently sometimes *over* before the thing committed to trust.—I gave my brother *charge over* Jerusalem; for he was a faithful man, and feared God above many. *Nehemiah.*—It has *of* before the subject of command or trust:

Hast thou eaten of the tree,
Whereof I gave thee *charge* thou should'st not eat? *Milton.*

It has *upon* before the person charged.—He loves God with all his heart, that is, with that degree of love, which is the highest point of our duty, and of God's *charge upon* us. *Taylor.*—Accusation; imputation.—These very men are continually reproaching the clergy, and laying to their *charge* the pride, the avarice, the luxury, the ignorance, and superstition, of popish times. *Swift.*—The person or thing entrusted to the care or management of another:

More had he said, but, fearful of her stay,
The starry guardian drove his *charge* away. *Dryden.*

An exhortation of a judge to a jury, or bishop to his clergy.—The bishop has recommended this author in his *charge* to the clergy. *Dryden.*—Expence; cost:

He liv'd as kings retire, though more at large,
From public business, yet of equal *charge*. *Dryden.*

It is in later times commonly used in the plural, *charges.*—A man ought warily to begin *charges*, which, once begun, will continue. *Bacon.*—Onset.—Honourable retreats are no ways inferior to brave *charges*; as having less of fortune, more of discipline, and as much of valour. *Bacon.*—The signal to fall upon enemies.—Our author seems to sound a *charge*, and begins like the clangour of a trumpet. *Dryden.*—The posture of a weapon fitted for the attack or combat:

Their neighing coursers daring of the spur,
Their armed staves in *charge*, their beavers down. *Shakesp.*

A load, or burthen.—Asses of great *charge*. *Shakespeare.*

speare.—What any thing can bear.—Take of aqua-fortis two ounces, of quickfilver two drachms, for that *charge* the aqua-fortis will bear, the diffolution will not bear a flint as big as a nutmeg. *Bacon.*—The quantity of powder and ball put into a gun or cannon; for the adjustment whereof, see the articles GUNNERY, and SHOOTING.—Among farriers, *charge* is a preparation, or a fort of ointment of the confiftence of a thick decoction, which is applied to the fhoulder-fplaits, inflammations, and fprains of horfes. A *charge* is of a middle nature, between an ointment and a plafter, or between a plafter and a cataplafm.—In heraldry; the *charge* is that which is borne upon the colour, except it be a coat divided only by partition. *Peacham.*

CHARGE, in electricity. See ELECTRICITY.

CHARGE of Juftices in Seffions, &c. See CHAPITERS.

CHARGE AND DISCHARGE, in law, are defined as follows: A charge is faid to be a thing done that bindeth him that doeth it, or that which is his, to the performance thereof: and difcharge is the removal, or taking away, of that charge. Land may be charged divers ways; as by grant of rent out of it, by ftatutes, judgments, conditions, warrants, &c. Lands in fee-fimple may be charged in fee: and where a man may difpofe of the land itfelf, he may charge it by a rent, or ftatute, one way or other. *Lit.* 648. If one charge land in tail, and land in fee-fimple, and die, the land in fee only fhall be chargeable. *Bro. Cha.* 9. Lands intailed may be charged in fee, if the eftate-tail be cut off by recovery: if tenant in tail charge the land, and after levy a fine, or fuffer a recovery of the lands, to his own ufe, this confirms the charge, and it fhall continue. 1 *Rep.* 61. A tenant for life charges the land, and then makes a feoffment to a ftranger, or doth wafte, &c. whereby it is forfeited, he in reverfion fhall hold it charged during his (the tenant's) life: and if one have a leafe for life, or years, of land, and grant a rent out of it; if after he furrenders his eftate, yet the charge fhall continue fo long as the eftate had endured, in cafe it had not been furrendered. 1 *Rep.* 67, 145. *Dyer* 10.

If one jointenant charge land, and after releafe to his companion and die, the furvivor fhall hold it charged; but, if it had come to him by furvivorfhip, it would be otherwife. 6 *Rep.* 76. 1 *Shep. Abr.* 325. He that hath a remainder or reverfion of land may charge it, becaufe of the poffibility that the land will come into poffeffion, and then the poffeffion fhall be charged. But where one leafes land for life, and grants the reverfion or remainder over to A. B. who charges the land, and dies, and the tenant for life is heir to the fee, in this cafe he fhall hold it difcharged, for he had the poffeffion by purchafe, though he had the fee by defcent. *Bro.* 11, 16. 1 *Rep.* 62. If a rent be iffuing out of a houfe, &c. and it falls down, the charge fhall remain upon the foil. 9 *Ed.* 4, 20. But when the eftate is gone upon which the charge was grounded, there, generally, the charge is determined. *Co. Lit.* 349. And in all cafes where any executory thing is created by deed, there, by confent of all the parties, it may be by deed defeated and difcharged. 10 *Rep.* 49.

CHAR'GEABLE, *adj.* Expenfive; coftly.—Divers bulwarks were demolifhed upon the fea-coafts, in peace *chargeable*, and little ferviceable in war. *Hayward.*—Imputable, as a debt or crime: with *on.*—Nothing can be a reafonable ground of defpifing a man, but fome fault or other *chargeable upon* him. *South.*—Subject to charge or accufation; accufable: followed by *with.*—Your papers would be *chargeable with* fomething worfe than indelicacy; they would be immoral. *Spectator.*

CHAR'GEABLENESS, *f.* Expence; coft; coftlinefs. —That which moft deters me from fuch trials, is not their *chargeablenefs*, but their unfatisfactorinefs, though they they fhould fucceed. *Boyle.*

CHAR'GEABLY, *adv.* Expenfively; at great coft.—He procured it not with his money, but by his wifdom; not *chargeably* bought by him, but liberally given by others by his means. *Afcham.*

CHAR'GEFUL, *adj.* Expenfive; coftly. *Not in ufe:*

> Here's the note
> How much your chain weighs to the utmoft carat,
> The finenefs of the gold, the *chargeful* fafhion. *Shakef.*

CHAR'GER, *f.* A large difh:

> This golden *charger*, fnatch'd from burning Troy,
> Anchifes did in facrifice employ. *Dryden.*

CHAR'GEY, a town of France, in the department of the Upper Saone, and chief place of a canton, in the diftrict of Champlitte: one league north of Gray.

CHARIENTIS'MUS, *f.* [χαριεντισμος, Gr.] Gracefulnefs; a good grace in fpeaking. Alfo a figure in rhetoric, in which a taunting expreffion is foftened with a jeft.

CHARIL'LOS (Los), a town of South America, in Peru, and jurifdiction of Lima.

CHA'RILY, *adv.* Warily; frugally.—What paper do you take up fo *charily*? *Shakefpeare.*

CHA'RINESS, *f.* Caution; nicety; fcrupuloufnefs.—I will confent to act any villany againft him, that may not fully the *charinefs* of our honefty. *Shakefpeare.*

CHA'RING, a fmall town in Kent, diftant from London fifty miles, Canterbury fifteen, Faverfham ten, and Maidftone, fifteen. It lies between Lenham and Weftwell, on the fouth of the road from Maidftone to Canterbury, and ftands on a fpring-head of the river Len, and has the ruins of a caftellated palace of the archbifhops, given them by fome of the firft Saxon kings. The fairs are April 29 and October 29. Mr. Ludwell left by will to this parifh 2550l. ftock for a free fchool, and other charitable ufes; and to which purpofes the money hath been advantageoufly applied.

CHA'RING-CROSS (near Weftminfter), a crofs erected by king Edward I. in memory of queen Eleanor, who fucked the poifon out of his wounds, made by a Moor's envenomed fword in the holy war.

CHA'RIOT, *f.* [*car-rhod*, Welfh, a wheeled car; *charriot*, French; *carretta*, Ital.] A wheel-carriage of pleafure, or ftate; a vehicle for men rather than wares:

> Thy grand captain Anthony
> Shall fet thee on triumphant *chariots*, and
> Put garlands on thy head. *Shakefpeare.*

A car in which men of arms were anciently placed:

> He fkims the liquid plains
> High on his *chariot*, and with loofen'd reins
> Majeftic moves along. *Dryden.*

A lighter kind of modern coach, with only front feats.

To CHA'RIOT, *v. a.* To convey in a chariot. This word is now rarely ufed:

> An angel all in flames afcended,
> As in a fiery column *charioting*
> His godlike prefence. *Milton.*

The chariots of the ancients were chiefly ufed in war. By the Greek and Roman hiftorians, there are defcribed the fix following, viz. Benna, Petoritum, Currus or Carrus, Covinus, Effedum, and Rheda. The benna feems to have been a chariot defigned rather for travelling than war: it contained two perfons, who were called *combennones*, from their fitting together in the fame machine. The petoritum feems to have been a larger kind of chariot, and is thought to have derived its name from the Britifh word *pedwar*, fignifying four; this kind of chariot having four wheels. The carrus, or currus, was the common cart or waggon; this was ufed by the ancient Britons, in time of peace, for the purpofes of agriculture and merchandize, and, in time of war, for carrying their baggage, and wives and children, who commonly

monly followed the armies of all the Celtic nations: The covinus was a war-chariot, and a very terrible instrument of destruction; being armed with scythes and hooks for cutting and tearing all who stood in its way. The essedum and rheda were also war-chariots, probably of a larger size, designed for containing a charioteer, and two warriors for fighting. The far greater number of the British war-chariots seem to have been of this kind; and, as Cæsar relates, were found in such numbers among the Britons, that Cassibelanus, after dismissing all his other forces, retained no fewer than 4000 war-chariots about his person. The same author relates, that, by continual experience, they had arrived at such perfection in the management of their chariots, that, "in the most steep and difficult places, they could stop their horses upon full stretch, turn them which way they pleased, run along the pole, rest on the harness, and throw themselves back into their chariots, with incredible dexterity. We find, in the heathen mythology, that chariots were sometimes consecrated to the sun; and the scripture informs us, that Josiah burnt those which had been offered up to the sun by his predecessors. This superstitious custom was in imitation of the heathens, and principally of the Persians, who had horses and chariots consecrated in honour of the sun. Herodotus, Xenophon, and Quintus Curtius, speak of white chariots crowned, that were consecrated to the sun, among the Persians, which, in their ceremonies, were drawn by white horses consecrated to the same luminary.

Triumphal CHA'RIOT, was one of the principal ornaments of the celebration of a victory. The Roman triumphal chariot was generally made of ivory, round like a tower, or rather of a cylindrical figure; it was gilt at the top, and ornamented with crowns; and, to represent a victory more naturally, they often stained it with blood. It was usually drawn by four white horses; but oftentimes by lions, elephants, tygers, bears, leopards, dogs, &c.

CHARIQUIL', a town of Persia, in the province of Irak Agemi: ninety miles south-east of Amadan.

CHARISA'SAR, a town of Asia in the country Candahar: fifteen miles north-east of Candahar.

CHARIOTE'ER, *s.* He that drives the chariot. It is used only in speaking of military chariots, and those in the ancient public games:

The burning chariot, and the *charioteer*,
In bright Boötes and his wane appear. *Addison.*

CHA'RIOT RACE, *s.* A sport anciently used, where chariots were driven for the prize, as now horses run.—There is a wonderful vigour and spirit in the description of the horse and *chariot race*. *Addison.*

CHA'RIS, a goddess among the Greeks, surrounded with pleasures, graces, and delight. She was the mistress of Vulcan. *Homer.*

CHARI'SIA, *s.* in the heathen theology, a festival instituted in honour of the graces. It continued the whole night, most of which time was spent in dancing; after which, cakes made of flour mixed with honey were distributed among the guests.

CHARI'SIUS, a surname of Jupiter. The word is derived from χαρις, *gratia*, grace, or favour; and the Greeks used at their meals to make a libation to Jupiter Charisius.

CHARIS'TICARY, *s.* A person to whom is given the enjoyment of the revenues of a monastery, hospital, or benefice. The charisticaries among the Greek Christians, were a kind of donatories, or commendatories, who enjoyed all the revenues of hospitals and monasteries, without giving an account thereof to any person. The origin of this abuse is referred to the Iconoclastæ, particularly Constantine Copronymus, the avowed enemy of the monks, whose monasteries he gave away to strangers.

CHA'RIT, a town of Arabia: twenty-four miles north of Sana.

CHA'RITABLE, *adj.* [*charitable*, Fr. from *charité.*] Kind in giving alms; liberal to the poor.—How shall we then wish, that it might be allowed us to live over our lives again, in order to fill every minute of them with *charitable* offices. *Atterbury.*—Kind in judging of others; disposed to tenderness; benevolent.

CHA'RITABLE CORPORA'TION, *s.* A society in the reign of Geo. II. who obtained a statute to lend money to industrious poor, at 5l. per cent. interest on pawns and pledges, to prevent their falling into the hands of the pawnbrokers, and therefore they were called the *charitable corporation*: but they likewise took 5l. per cent. for the charge of officers, warehouses, &c. But the chief officers of this corporation, by connivance of the principal directors, absconded and broke, and defrauded the public proprietors of great sums; for relief of the sufferers, several statutes were made. See 5 *Geo.* 2. c. 31, 32. 7 *Geo.* 2. c. 11.

CHA'RITABLE U'SES, *s.* The laws against devises in mortmain do not extend to any thing but superstitious uses; it is therefore held, that a man may give lands for the maintenance of a school, an hospital, or any other charitable uses. But as it was apprehended, from recent experience, that persons on their death-beds might make large and improvident dispositions, even for these good purposes, and defeat the political end of the statutes of mortmain, it is therefore enacted by stat. 9 Geo. II. c. 36, that no lands or tenements, or money to be laid out thereon, shall be given for, or charged with, any charitable uses whatsoever, unless by deed indented, executed in the presence of two witnesses, twelve calendar months before the death of the donor; and enrolled in the court of chancery, within six months after its execution; (except stock in the public funds, and which must be transferred at least six calendar months previous to the donor's death;) and unless such gift be made to take effect immediately, and be without power of revocation; and that all other gifts shall be void. The two Universities, their colleges, and the scholars on the foundation of the colleges of Eaton, Winchester, and Westminster, are exempted out of this act; but with this proviso, that no college shall be at liberty to purchase more advowsons than are equal in number to one moiety of the fellows or students on their foundations. Corporations are excepted out of the statutes of wills (32 H. 8. c. 1. 34 H. 8. c. 5), to prevent the extension of gifts in mortmain; but now, by construction of stat. 43 Eliz. c. 4, it is held that a devise to a corporation for a charitable use is valid, as operating in the nature of an appointment, rather than of a bequest. And indeed the piety of judges hath formerly carried them great lengths in supporting such charitable uses: it being held that the stat. of Eliz. which favours appointments to charities, supersedes and repeals all former statutes: (Gilb. Rep. 45. 1 P. Wms. 248:) and supplies all defects of assurances. And therefore not only a devise to a corporation, but a devise by a copyhold tenant, without surrender, to the use of his will, and a devise, nay even a settlement by tenant in tail, without either fine or recovery, if made to a charitable use, is good by way of appointment. *Moor* 890. 2 *Vern.* 453. *Pre. Ch.* 16. 2 *Comm.* 375.

The king as *parens patriæ* has the general superintendance of all charities, which he exercises by the lord chancellor. And therefore, whenever it is necessary, the attorney-general, at the relation of some informant, who is usually called the relator, files, *ex officio*, an information in the court of chancery, to have the charity properly established. Also by stat. 43 Eliz. c. 4, authority is given to the lord chancellor or lord keeper, and to the chancellor of the Duchy of Lancaster, respectively, to grant commissions under their several seals, to enquire into any abuses of charitable donations, and rectify the same by decree; which may be reviewed in the respective courts of the several chancellors, upon exceptions taken thereto. But, though this is done in the petty bag office in the court of chancery, because the commission is there returned,

turned, it is not a proceeding at common law, but treated as an original cause in the court of equity. The evidence below is not taken down in writing, and the respondent in his answer to the exceptions may allege what new matter he pleases; upon which they go to proof, and examine witnesses in writing upon all the matters in issue: and the court may decree the respondent to pay all the costs, though no such authority is given by the statute. An appeal lies from the chancellor's decree to the house of peers, notwithstanding any loose opinion to the contrary. 3 *Comm.* 427. Lands given to alms and aliened, may be recovered by the donor. 13 *Ed.* 1. c. 41. Lands, &c. may be given for the maintenance of houses of correction, or of the poor; stat. 35 *Eliz.* c. 7.

CHA'RITABLY, *adv.* Kindly; liberally; with inclination to help the poor.—Benevolently; without malignity.—Nothing will more enable us to bear our cross patiently, injuries *charitably*, and the labour of religion comfortably. *Taylor.*

'Tis best sometimes your censure to restrain,
And *charitably* let the dull be vain. *Pope.*

CHARITE' (La), a town of France, and principal place of a district, in the department of Nyevre, on the Loire, containing about 4000 inhabitants. Here are manufactures of woollen and hardware: thirteen miles north-north-west of Nevers. Lat. 47. 11. N. lon. 20. 41. E. Ferro.

CHA'RITES, or GRATIÆ, the Graces, daughters of Venus by Jupiter or Bacchus, are three in number, Aglaia, Thalia, and Euphrosyne. They were the constant attendants of Venus, and they were represented as three young, beautiful, and modest, virgins, all holding one another by the hand. They presided over kindness and all good offices, and their worship was the same as that of the nine Muses, with whom they had a temple in common. They were generally represented naked, because kindnesses ought to be done with sincerity and candour. The moderns explains the allegory of their holding their hands joined, by observing, that there ought to be a perpetual and never-ceasing intercourse of kindness and benevolence among friends. Their youth denotes the constant remembrance that we ought ever to have of kindnesses received, and their virgin purity and innocence teaches us, that acts of benevolence ought to be done without any expectations of restoration, and that we ought never to suffer others or ourselves to be guilty of base or impure favours.

CHA'RITON, a writer of Aphrodisium, at the latter end of the fourth century. He composed a Greek romance, called The Loves of Chæreas and Callirhoe, which has been much admired for its elegance, and the originality of the characters it describes. There is a very learned edition of Chariton, by Reiske, with d'Orville's notes, 2 vols. 4to. Amst. 1750.

CHA'RITY, *s.* [*charité,* Fr. *charitas,* Lat.] Tenderness; kindness; love:

Founded in reason, loyal, just, and pure,
Relations dear, and all the *charities*
Of father, son, and brother, first were known. *Milton.*

Godwill, benevolence; disposition to think well of others.—My errors, I hope, are only those of *charity* to mankind; and such as my own *charity* has caused me to commit, that of others may more easily excuse. *Dryden.*—The theological virtue of universal love:

But lasting *charity's* more ample sway,
Nor bound by time, nor subject to decay,
In happy triumph shall for ever live. *Prior.*

Alms; relief given to the poor.—The ant did well to reprove the grasshopper for her slothfulness; but she did ill then to refuse her a *charity* in her distress. *L'Estrange.*

"CHARITY BEGINS AT HOME." This proverb was grounded upon the passage of that apostle, which says, That *he who provides not for his own household is worse than an infidel:* but, as the best institutions have been abused, so this proverb is become an excusatory reply by the uncharitable, who have not the natural affection to relieve the necessitous poor out of their abundance, thereby intimating, most unchristianly, that self-love is the measure of our love to our neighbour. It is the same in sense with Terence, *Proximus sum egomet mihi,* Lat. and the Greeks, Φιλει δ' εαυτε μαλλος υδεις υδενα.

CHARITY is generally represented in painting and sculpture by a beautiful woman of a friendly aspect, clad in red, a flame proceeding from the crown of her head; a child sucking at her breast, and one on each side of her, embracing her with seemingly pleased countenances. Beautiful, because no character is more so in either sex; of a friendly aspect, because true charity and friendliness are inseparable; the garment of red shews her sprightliness, as the flame does her activity. The number of children are limited to three, to signify the triple power of charity, for, without her, we are taught, that faith and hope are nothing.

Brothers of CHARITY, a society of religious hospitallers, founded about the year 1297, since denominated *Billetins.* They took the third order of St. Francis, and the scapulary, making three usual vows, but without begging. There is also an order of hospitallers of this name, still subsisting in Romish countries, whose business is to attend the sick poor, and minister to them both spiritual and temporal succour. They are laymen, except a few priests for administering the sacraments to the sick in their hospitals. The brothers of charity usually cultivate botany, pharmacy, surgery, and chemistry, which they practise with success. They were first founded at Granada, by St. John de Dieu; and a second establishment was made at Madrid in 1553: the order was confirmed by Gregory XIII. in 1572: Gregory XIV. forbad them to take holy orders; but by leave of Paul V. in 1609, a few of the brothers were admitted to orders. In 1619, they were exempted from the jurisdiction of the bishop.

CHARITY OF St. HIPPOLITUS, a religious congregation founded about the end of the 14th century, by Bernadin Alvarez, a Mexican, in honour of St. Hippolitus the martyr, patron of the city of Mexico; and approved by pope Gregory XIII.

To CHARK, *v. a.* To burn to a black cinder, as wood is burned to make charcoal.—Excess either with an apoplexy knocks a man on the head, or with a fever, like fire in a strong-water shop, burns him down to the ground; or, if it flames not out, *charks* him to a coal. *Grew.*

CHARKI'NA, a fortress of Russian Tartary, on the Don, in the government of Caucasus: 200 miles north-east of Astrachan.

CHARKLIQUEU', a town of Asiatic Turkey, chiefly inhabited by tanners, who manufacture the beautiful Morocco leather: the caravans stop here two or three days: it is situated between Erzerum and Tocat.

CHAR'KOV, a city of Russia, and capital of a government of the same name, containing ten churches, two convents, and several public seminaries: 352 miles south of Moscow, and 640 south-south-east of Petersburgh. Lat. 50. N. lon. 53. 40. E. Ferro.

CHAR'KOV, a government of Russia, bounded on the north by Kursk, on the east by Voronetz, on the south by Ekaterinoslav, on the west by Tchernigov and Kiov; Charkov is the capital: about 180 miles in length, and from forty to eighty in breadth.

CHAR'LATAN, *s.* [*charlatan,* Fr. *ciarlatano,* Ital. from *ciarlare,* to chatter.] A quack; a mountebank; an empiric.—Saltimbanchoes, quacksalvers, and *charlatans,* deceive them in lower degrees. *Brown.*

CHARLATA'NICAL, *adj.* Quackish; ignorant.—A cowardly soldier, and a *charlatanical* doctor, are the principal subjects of comedy. *Cowley.*

CHAR'LATANRY, *s.* Wheedling; deceit; cheating with fair words.

CHARL'BURY, a small town in Oxfordshire, situated on a healthy dry soil, nearly in the centre of Woodstock, Whitney, Chipping-Norton, and Burford. It has five large fairs annually, for horses, cows, and all sorts of cattle, on the following days, viz. the first of January, the second Friday in Lent, the second Friday in May, the second Friday in July, and the tenth of October. Here was formerly a considerable market on Fridays, and a manufactory of locks, both which have been for some years on the decline. In the vicinity of Charlbury, about a mile south-west, are Blandford-house, and park, belonging to his grace the duke of Marlborough. About two miles east, is Ditchley, a noble house, built by the late earl of Litchfield, now belonging to lord Dillon, with an elegant park; and at a mile on the north side of the town, is Spelsbury, where the celebrated earl of Rochester, and the Litchfield family, are interred.

CHARLEMA'GNE, or Charles I. king of France by succession, and emperor of the west by conquest in 800, which laid the foundation of the dynasty of the western Franks, who ruled the empire 472 years till the time of Radolphus Auspurgensis, the founder of the house of Austria. Charlemagne was as illustrious in the cabinet as in the field; and, though he could not write his name, was the patron of men of letters, the restorer of learning, and a wise legislator. France had nine sovereigns of this name, for particulars of whom, see FRANCE.

CHARLEMO'NT, a town of the Netherlands, in the county of Namur, ceded to France by the treaty of Nimeguen. It was built by Charles V. in 1555, not far from Giver, on a mountain near the Meuse. It is small but well fortified: eight leagues south-west of Namur, and seven north-east of Rocroy.

CHARLEMO'NT, a town of Ireland, in the county of Armagh. It is a garrison, with barracks for three companies of foot. This town surrendered to king William in 1690: eight miles north of Armagh.

CHARLEMO'NT, a town of the United States in Hampshire county, Massachusetts, sixteen miles west of Deerfield, having, besides state consuls, 665 inhabitants.

CHAR'LEROY, or CHARLES-SUR-SAMBRE, a town of the Netherlands, in the county of Namur, situated on the confines of Hainault, and built on the north side of the river Sambre, in a place formerly called Charnoy, which was a village and signiory belonging to the prince of Isenghein. The marquis de Castel-Rodrigo, governor of the Netherlands, fortified and made it a city in the year 1666, changing its name to Charleroi, in honour of Charles II. king of Spain. In 1792, it again changed its name to Charles-sur-Sambre. It was given to France at the peace of Aix-la-Chappelle, in 1668. In the year 1672, it was besieged by the prince of Orange, who invested the place the 13th of December, with a design to draw the French from Holland, but the bravery of Comte de Montal, the governor, and a report of the king of France advancing in person, with an army to succour that place, obliged the prince to retire before he had opened the trenches. In 1677, the same prince invested it again, with an army of 60,000 men, but was soon obliged to retire. By the treaty of Nimeguen it was ceded to Spain; in 1698, it was taken by the French, after the battle of Landen. In 1697, it was given to the emperor by the barrier treaty; and again, in 1746, surrendered to France. It was taken by the French republican army, under general Valence, in the month of November, 1792, with 4000 prisoners. It was recovered by the Austrians, in the month of June, 1793, when the French were twice defeated, once with the loss of 4000 men, and again of 7000. On the 25th of July, 1794, it again surrendered to the French at discretion, with the garrison of 3000 men, and sixty pieces of cannon. It carries on considerable trade in iron-works and foundery: twenty miles east-north-east of Mons, and twenty north-east of Maubeuge. Lat. 50. 26. N. lon. 22. 2. E. Ferro.

CHARLES, [of Can, *Sax.* stout] a proper name of men.

CHARLES I. and II. kings of England; for the events of their lives and reign, see ENGLAND.

CHARLES V. (emperor and king of Spain), was son of Philip I. archduke of Austria, and of Jane queen of Castile. He was chosen emperor at Francfort after the death of Maximilian his grandfather. He was a great warrior and politician: and his ambition was not satisfied with the many kingdoms and provinces he possessed; for he is supposed to have aspired at universal empire. For particulars of the reign of this monarch, and the other sovereigns of Spain, see SPAIN.

CHARLES XII. king of Sweden; for particulars of his extraordinary life and reign, see SWEDEN.

CHARLES-COUNTY CITY, in Virginia, North America, between Chickahominy and James rivers. It contained formerly part of what now forms Prince George's county. It has 5588 inhabitants.

CHARLES COUNTY, on the western shore of Maryland, in the United States, between Potowmack and Patuxent rivers. Its chief town is Port Tobacco, on the river of that name. Its extreme length is twenty-eight miles, its breadth twenty-four, and it contains 20,613 inhabitants. The country has few hills, is generally low and sandy, and produces tobacco, Indian corn, potatoes, &c.

CHARLES FORT, a fort of Ireland, at the east side of the entrance into Kinsale harbour, in the county of Cork: one mile and a half south of Kinsale.

CHARLES FORT, a fort on the west coast of the island of St. Christopher: one mile south-east of Sandy Point Town.

CHARLES ISLAND, or ISLAND OF DOGS, at the mouth of the river Gambia, in Africa, where the English had a settlement, but were driven from it; since which time the island has been uninhabited.

CHARLES ISLAND, an island in Hudson's Straits. Lat. 62. 40. N. lon. 79. 55. W. Greenwich.

CHARLES ISLAND, a small island in that part of the Straights of Magellan called Royal Reach.

CHARLES RIVER, in Massachussetts, in the United States, called anciently Quinobequin, the principal branch of which rises from a pond bordering on Hopkinton. It passes through Hollinston and Bellingham, and divides Medway from Medfield, Wrentham, and Franklin, and thence into Dedham, where by a curious bend it forms a peninsula of 900 acres of land. A stream called Mother Brook, runs out of this river in this town, and falls into Neponsit river, forming a natural canal, uniting the two rivers, and affording a number of excellent mills. From Dedham the course of the river is northerly, dividing Newton from Needham, Weston, and Waltham, passing over romantic falls; it then bends to the north-east, through Watertown and Cambridge, and, passing into Boston harbour, mingles with the waters of Mystic river, at the point of the peninsula of Charlestown. It is navigable for boats to Watertown, seven miles. The most remarkable bridges on this river are those which connect Boston with Charlestown and Cambridge. There are seven paper-mills now on this river.

CHARLES's WAIN, a name by which astronomical writers have called Ursa Major, or the great bear; though some say it is the lesser bear. Indeed both of the bears have been called waggons or wains, and by the Latins, who have followed the Arabians, two biers, Feretrum majus and minus.

CHAR'LESTON, a district in the lower country of South Carolina, subdivided into fourteen parishes. This district, of which the city of Charleston is the chief town, lies between Santee and Combahee rivers. It pays 21,473l. 14s. 6d. sterling to the taxes. It sends to the state legislature forty-eight representatives and thirteen senators,

tors, and one member to Congress. It contains by the state census 66,986 inhabitants.

CHAR'LESTON, the metropolis of South Carolina, in the United States of America, situated in the district of the same name, and on a tongue of land formed by the confluent streams of Ashley and Cooper, which are short rivers, but large and navigable. These waters unite immediately below the city, and form a spacious and convenient harbour; which communicates with the ocean just below Sullivan's Island; which it leaves seven miles south-east of Charlestown. In these rivers the tide rises about six feet and a half; but uniformly ten or twelve inches more during a night tide: this fact is certain, but the cause unknown. The continual agitation which the tides occasion in the waters surrounding Charleston, the refreshing sea-breezes which are regularly felt, and the smoke arising from so many chimneys, render this city more healthy than any part of the low country in the southern states. On this account it is the resort of great numbers of valetudinarians from the West Indian islands, and of the rich planters from the country, who come here to spend the sickly months, as they are termed, in quest of health and of the social enjoyments which the city affords. And in no part of America are the social blessings enjoyed more rationally and liberally than here. Unaffected hospitality; affability; ease of manners and address; are characteristics of the people of Charleston. In speaking of the capital, it ought to be observed, for the honour of the people of Carolina in general, that when in common with the other colonies, in the contest with Britain, they resolved against the use of certain luxuries, and even necessaries of life; yet those articles which improve the mind, enlarge the understanding, and correct the taste, were excepted; and the importation of books was permitted as before.

The land on which the town is built, is flat and low, and the water brackish and unwholesome. The streets are pretty regular, and open beautiful prospects, and have subterranean drains or shores to carry off filth, and keep the city clean and healthy. The houses are of brick, with tiled roofs. The buildings in general are elegant, and most of them are neat, airy, and well furnished. The public buildings are, an exchange, a state-house, an armory, a poor-house, and an orphan's-house. Here are several respectable academies. Part of the old barracks has been handsomely fitted up, and converted into a college; and there are a number of students. Little attention is paid to the public markets; a great proportion of the most wealthy inhabitants having plantations from which they receive supplies of almost every necessary of life. The country abounds with poultry and wild ducks. Their beef, mutton, and veal, are not generally of the best kind; and few fish are found in the market. In 1787, it was computed that there were 1600 houses in the city, and 15,000 inhabitants; and what evinces the healthiness of the place, upwards of 200 of the white inhabitants were above sixty years of age. By the census of 1791, there were 16,359 inhabitants. This city has often suffered much by fire, the last and most destructive happened as late as June, 1796.

Charleston was incorporated in 1783, and divided into three wards, which chose as many wardens, from among whom the citizens elect an intendant of the city. The intendant and wardens form the city-council, who have power to make and enforce bye-laws for the regulation of the city. The value of exports from this port, in the year ending November 1787, amounted to 505,279l. 19s. 5d. sterling. The number of vessels cleared from the custom-house the same year, was 947, measuring 62,118 tons; 735 of these, measuring 41,531 tons, were American; the others belonged to Great Britain, Ireland, Spain, France, and the United Netherlands. In 1794, the value of exports amounted to 3,846,392 dollars. It is sixty miles south-west by south of George-town; 150 east by south of Augusta; 497 south by west of Richmond; 630 south-west by south of Washington city; 763 south-west by south of Philadelphia; and 1110 south-west of Boston. The light-house lies in lat. 32. 41. 52. N. White Point at the south end of the town, lat. 32. 44. 30 N. lon. 80. 39. 45. W. Knoxville, the capital of the state of Tennessee, is much nearer to this than to any sea-port in the Atlantic Ocean. Charleston was besieged by the British army, the latter end of March, 1780, and surrendered on the 13th of May, with 6000 troops, prisoners of war.

CHAR'LESTOWN, a township in Montgomery county, New York, on the south side of Mohawk river, about thirty-two miles west of Schenectady.

CHAR'LESTOWN, a township in Mason county, Kentucky, situated on the Ohio at the mouth of Lauren's creek. It contains but few houses, and is six miles north of Washington, and sixty north-east of Lexington. Lat. 38. 43. N.

CHAR'LESTOWN, a township in Chester county, Pennsylvania.

CHAR'LESTOWN, a post town in Cheshire county, New Hampshire, on the east side of Connecticut river, thirty miles south of Dartmouth college; upwards of seventy north of Northampton, 116 north-west of Boston, 120 west by north of Portsmouth, and 431 north-north-east of Philadelphia. It was incorporated in 1753, and contains 100 houses, a congregational church, a court-house, and an academy. The road from Boston to Quebec passes through this town. Lat. 43. 16. N. lon. 72. 19. W.

CHAR'LESTOWN, the principal town in Middlesex county, Massachusetts, called Mishawun by the aboriginal inhabitants, situated north of Boston, with which it is connected by Charles-river bridge. The town, properly so called, is built on a peninsula, formed by Mystic river on the east, and a bay setting up from Charles-river on the west. It is very advantageously situated for health, navigation, trade, and manufactures of almost all the various kinds. Bunker's, Breed's, and Cobble, hills, which overlook the town, are celebrated in the history of the American revolution. The second hill has upon its summit a monument erected to the memory of major-general Warren, near the spot where he fell. All these hills afford elegant and delightful prospects of Boston, and its charmingly variegated harbour, of Cambridge and its colleges, and of an extensive tract of highly cultivated country. It contains within the neck or parish about 250 houses, and about 2000 inhabitants. The only public buildings of consequence are a handsome congregational church, with an elegant steeple and clock, and an alms-house, very commodious, and pleasantly situated. Before the destruction of this town by the British, who burnt it to the ground on the 17th of June, 1775, several branches of manufactures were carried on to great advantage, some of which have been since revived; particularly the manufacture of pot and pearl ashes, ship-building, rum, leather in all its branches, silver, tin, brass, and pewter. This town is a port of entry in conjunction with Boston. At the head of the neck there is a bridge over Mystic river which connects Charlestown with Malden.

CHAR'LESTOWN, a town in Berkley county, Virginia, situated on the great road leading from Philadelphia to Winchester; eight miles from Shepherdstown, and twenty from Winchester.

CHAR'LESTOWN, a township in Washington county, state of Rhode Island, having the Atlantic ocean on the southward, and separated from Richmond on the north by Charles-river. Some of its ponds empty into Pawcatuck river, others into the sea. It is nineteen miles north-west of Newport, and contains 2022 inhabitants. A few years ago there were about 500 Indians in the state; the greater part of whom resided in this township. They are peaceable and well disposed to the government, and speak the English language.

CHAR'LESTOWN,

CHAR'LESTOWN, the only town in the island of Nevis, one of the Caribbees, belonging to Great-Britain. In it are large houses, and well-furnished shops, and it is defended by Charles fort. In the parish of St. John, on the south side of the town, is a large spot of sulphureous ground, at the upper end of a deep chasm in the earth, commonly called Sulphur Gut, which is so hot as to be felt through the soles of one's shoes. A small hot river, called the Bath, is thought to proceed from this gut; and, after running half a mile, loses itself in the sands of the sea. Black-Rock pond, about a quarter of a mile north from the town, is milk-warm, owing to the mixture of hot and cold springs, yet it yields excellent fish. A prodigious piece of Nevis mountain, falling in an earthquake a few years ago, left a large vacuity, which is still to be seen. The altitude of this mountain, taken by a quadrant from Charlestown bay, is said to be a mile and a half perpendicular; and from the bay to the top, four miles. The declivity is very steep half-way, but afterwards easy of ascent. Lat. 16. 55. N. lon. 62. 42. W.

CHAR'LESTOWN, a township in Maryland, a few miles distant from Elkton, and about thirty from Wilmington, chiefly inhabited by people who carry on a herring fishery. Here the country is singularly diversified with hill and dale; and the soil being but of an indifferent quality, the lands are so little cleared, that in many parts the roads wind through uninterrupted woods for many miles together. The scenery in this part of North America is extremely interesting. From the tops of the hills we meet with numberless bold and extensive prospects of the Chesapeak bay, and of the Susquehannah river; and scarcely do we cross a valley without beholding, in the depths of the woods, many creeks and rivulets rushing over ledges of rocks in beautiful cascades. Near the town is a small foundery for cannon, where they are bored by water; and the iron is so extremely tough, that very few of the guns ever burst in proving.

CHAR'LESTOWN, or OSTINS, one of the four principal towns in the island of Barbadoes.

CHAR'LETON (Walter), a learned physician, son of Walter Charleton, rector of Shepton Mallet in Somersetshire, born February 2, 1619. He was in 1635 entered at Magdalen-hall, Oxford. He very early applied himself to Medicine, and had the degree of doctor conferred on him in February, 1642. Soon after, he was made one of the physicians in ordinary to Charles I. Upon the decline of that prince's affairs, he removed to London, was admitted into the college of physicians, and acquired considerable practice. In the space of ten years before the restoration, he wrote and published several treatises on various subjects. He became physician in ordinary to Charles II. while in exile, and retained that honour after the king's return. Upon the founding of the royal society, he was made one of its first members. In 1689, he was chosen president of the college of physicians. Soon after, the narrowness of his circumstances obliged him to retire to the island of Jersey, where he died in 1707, aged 87.

CHAR'LETON, a township in Saratoga county, New York. By the state census of 1796, 268 of its inhabitants were electors.

CHAR'LETON, a township in Worcester county, Massachusetts, incorporated in 1754, and, until then, formed the westerly part of Oxford. It is sixty miles south-west of Boston, fifteen south-west of Worcester, and contains 1965 inhabitants.

CHAR'LETON ISLAND, or CHARLES ISLAND, is situated at the bottom of James's bay, in New South Wales, on the coast of Labrador, and yields a beautiful prospect, in spring, to those who are near it, after a voyage of three or four months in the most uncomfortable seas on the globe, and that by the vast mountains of ice in Hudson's-bay and straights. The whole island, spread with trees and branches, exhibits, as it were, a beautiful green tuft. The air, even at the bottom of the bay, though in fifty-one degrees, a latitude nearer the sun than London, is excessively cold for nine months, and very hot the other three, except on the blowing of a north-west wind. The soil on the east side, as well as the west, bears all kinds of grain; and some fruits, gooseberries, strawberries, and dewberries, grow about Rupert's bay. Lat. 52. 30. N. lon. 82. W.

CHARLEVAL' (Charles Faucon de Ry, lord of), was born with a very delicate body, and a mind of the same quality. He was fond of polite literature, and gained the love of all that cultivated it. His conversation was mingled with gentleness and ingenuity; which form the character of his writings both in prose and verse. Scarron, who was ludicrous in all he said, speaking of the delicacy of his genius and taste, said, "that the muses had fed him upon blanc-manger and chicken broth." The qualities of his heart resembled those of his mind. Having learnt that M. and madame Dacier were about to leave Paris, in order to retrieve their affairs by retirement in the country, he went immediately, and offered them ten thousand francs in gold, and insisted on their acceptance of it. By strictly adhering to regimen, he spun out his life to the age of 80. The frequent use of rhubarb heated him so much, that it brought on a fever. The physicians thought of curing him by copious bleeding, and one of them said to the rest: "There, the fever is now going off." "I tell you," replied Thevenot, "that it is not the fever, but the patient, that is going off;" and Charleval died in an hour after; which was in 1693. His poetical pieces fell into the hands of the president de Ry, his nephew, who never would consent to publish them. A small collection however was printed in 1759, 12mo. Several of his epigrams are frequently quoted. The conversation of the marechal d'Horquincourt and father Canaye, printed in the works of St. Evremond, a piece full of originality and humour, is the composition of Charleval.

CHARLEVAL', a town of France, in the department of the Eure, and chief place of a canton, in the district of Grand Andelis: ten miles south-east of Rouen.

CHARLEVIL'LE, a town of France, and principal place of a district, in the department of the Ardennes, on the Meuse, which separates it from Mezieres, with a bridge of communicition. It was built in 1660, by Gonzagu, duke of Nevers; and before the revolution belonged to the prince of Condé, being exempt from the general taxes of the kingdom.

CHARLEVIL'LE, a borough town of Ireland, in the county of Cork: twenty-two miles south of Limeric, and thirty-one north of Cork.

CHARLEVOI'X (Peter Fr. Xavier de), a learned French jesuit, born at St. Quintin in 1684, and died in 1761, aged 78, memorable for the histories of his travels, which were prodigiously extensive, and his accounts in general are reckoned very good authority. They consist of: 1. Histoire du Christianisme dans le Japon, 12mo. 9 vols. 1715. 2. Histoire et Description générale du Japon, 4to. 2 vols. 1738, and 12mo. 6 vols. 1754. 3. Histoire de l'Isle de St. Dominique, 4to. 2 vols. 1720. 4. Histoire générale de la Nouvelle France, 4to. 3 vols. 1744, and 12mo. 6 vols. 5. Histoire générale du Paraguay, 12mo. 6 vols.

CHAR'LEY, a town in Lancashire. See CHORLEY.

CHARLIEU', a town of France, in the department of the Rhône and Loire, and chief place of a canton, in the district of Roanne: twelve miles north-west of Lyons, and three north of Roanne.

CHAR'LOCK, *s.* in botany. See SINAPIS ARVENSIS.

CHAR'LOTTE, a considerable township of the American States, on the east side of Lake Champlain, and on the south westermost in Chittenden county, Vermont. Shelburne on the north separates this town from Burlington. It contains 635 inhabitants. Split Rock, in Lake Champlain, lies opposite this town.

CHAR'LOTTE, or CHARLOTTESVILLE, a post-town in Salisbury district, North Carolina, and chief town of Mecklenburg county, situated on Steel creek, which joins the Sugaw, and falls into Catabaw river about ten miles north of the South Carolina boundary, and forty-four south of Salisbury.

CHAR'LOTTE, a county of United America, in Virginia, lies south-west of Richmond, on the head waters of Staunton river, and contains 10,078 inhabitants. The court-house is twenty-one miles south-south-west of Prince Edward court-house, and 379 about the same course from Philadelphia.

CHAR'LOTTE FORT, in South Carolina, is situated on the point of land where Tugloo and Broad rivers uniting their waters, form Savannah river. According to Bartram, it is one mile below Fort James, Dartmouth. Lat. 34. N. lon. 82. 35. W.

CHAR'LOTTE HA'VEN, is situate at the mouth of Charlotte river in East Florida; having Carlos bay on the south, and Rock point on the north, in lat. 27. N. lon. 82. 40. Charlotte river is fed by Spiritu Santo Lagoon, which communicates by Delaware river with Chatham or Punjo bay, which is ninety miles south-east from Charlotte Haven.

CHAR'LOTTE TOWN, a town of the island of Dominica, on the west, formerly called Roseau. Lat. 15. 25. N. lon. 69. 24. W. Greenwich.

CHAR'LOTTE TOWN, a town of St. John, in the Gulf St. Lawrence, situated about the centre of the island, towards the south coast. Lat. 46. 15. N. lon. 62. 50. W. Greenwich.

CHARLOT'TEBURG, a town of United America, in Brunswick county, North Carolina. It stands on an island, and has an inlet and sound of the same name a little south of it.

CHARLOT'TENBURG, a town of Germany, in the circle of Westphalia, and county of Holzapfel, built by the French refugees: four miles south-west of Holzapfel.

CHARLOT'TENLUND, a town of Denmark, in the island of Zealand: four miles north of Copenhagen.

CHARLOTTESVIL'LE, the capital of Albemarle county in Virginia, in United America, situate on the post road from Richmond to Danville, in Kentucky, eighty-six miles west-north-west of the former, and 557 eastward of the latter, and forty south-east by east of Staunton. It contains a court-house and a goal, and is about half a mile north from a water of Rivanna river.

CHARLOT'TIA, a town of United America, on the east shore of St. John's river, East Florida, were that river is about half a mile wide. It was founded by Dennis Rolle, esq. and is situated on a high cliff, fifteen or twenty feet perpendicular from the river. The aborigines of America had a large town in this place, as appears from the great tumuli and conical mounts of earth and shells, and other traces of a settlement which yet remain. The river, for near twelve miles above Charlottia, is divided into many channels by a number of islands.

CHARL'TON, an island in the southern part of Hudson's Bay. Lat. 52. 8. N. lon. 80. W. Greenwich.

CHAR'LY, a town of France, in the department of Aisne, and chief place of a canton, in the district of Chateau Thierry: two leagues south-west of Chateau Thierry.

CHARM, *s.* [*charme*, Fr. *carmen*, Lat.] Words, or philtres, or characters, imagined to have some occult or unintelligible power. See MAGIC.—There have been used, either barbarous words, of no sense, lest they should disturb the imagination; or words of similitude, that may second and feed the imagination: and this was ever in heathen *charms*, as in *charms* of later times. *Bacon.*

Antæus could, by magic *charms*,
Recover strength whene'er he fell. *Swift.*

Something of power to subdue opposition, and gain the affections; something that can please irresistibly:

Well-sounding verses are the *charm* we use,
Heroic thoughts and virtue to infuse. *Roscommon.*

To CHARM, *v. a.* To fortify with charms against evil:

Let fall thy blade on vulnerable crests;
I bear a *charmed* life which must not yield
To one of women born. *Shakespeare.*

To make powerful by charms.—To summon by incantation:

I *charm* you by my once commended beauty,
By all your vows of love, and that great vow
Which did incorporate and make us one. *Shakespeare.*

To subdue by some secret power; to amaze; to overpower:

Music the fiercest grief can *charm*. *Pope.*

To subdue the mind by pleasure:

Amoret! my lovely foe,
Tell me where thy strength doth lie:
Where the power that *charms* us so,
In thy soul, or in thy eye? *Waller.*

CHARM'ED, *adj.* Enchanted.—Arcadia was the *charmed* circle, where all his spirits for ever shall be enchanted. *Sidney.*

CHARM'ER, *s.* One that has the power of charms or enchantments. See the article MAGIC.

She was a *charmer*, and could almost read
The thoughts of people. *Shakespeare.*

Words of endearment among lovers.

CHAR'MES, a town of France, in the department of the Vosges, and chief place of a canton, in the district of Mirecourt: two leagues and a half north-east of Mirecourt. This place is famous for a treaty between the duke of Loraine and cardinal Richelieu, in the year 1633, by which the duke surrendered the dukedom to France.

CHARM'ING, *part. adj.* Pleasing in the highest degree.—For ever all goodness will be *charming*, for ever all wickedness will be most odious. *Spratt.*

CHARM'INGLY, *adv.* In such a manner as to please exceedingly.—She smiled very *charmingly*, and discovered as fine a set of teeth as ever eye beheld. *Addison.*

CHARM'INGNESS, *s.* The power of pleasing.

CHARMOGOL', a town of Persia, in the province of Chorasan: 200 miles north of Herat.

CHARMONT', a town of France, in the department of the Marne, and chief place of a canton, in the district of Vitry-le-François: fourteen miles north east of Vitry.

CHAR'MOUTH, a village of England, on the coast of the county of Dorset, at the mouth of a small river called Char, where the Danes made a descent and ravaged the country in 883, and 840: three miles east of Lim.

CHAR'NEL, *adj.* Containing flesh, or carcasses:

Such are those thick and gloomy shadows damp,
Oft found in *charnel* vaults and sepulchres
Ling'ring, and sitting by a new-made grave. *Milton.*

CHAR'NEL-HOUSE, *s.* [*charnier*, Fr. from *caro*, *carnis*, Lat.] The place in or near churches, where the bones of the dead are reposited:

If *charnel-houses* and our graves must send
Those, that we bury, back; our monuments
Shall be the maws of kites. *Shakespeare.*

CHARNIZAY', a town of France, in the department of the Indre and Loire: ten miles south of Loches.

CHAR'NOCK (Stephen), descended from an ancient family of that name in Lancashire, was born in London, and educated first in Emanuel college, Cambridge, from whence he removed to Oxford in 1649, and obtained a fellowship by the parlimentarian interest. Afterwards he went into Ireland, where he preached, and was much esteemed by the presbyterians and independents. Upon the

the restoration of Charles II. being incapacitated to appear in the church, he returned to London, where he preached in private meetings, and had the reputation of a man of learning and elocution. He died in 1680. His works are printed in two vols. folio.

CHAR'NY, a town of France, in the department of the Yonne, and chief place of a canton, in the district of Joigny: nineteen miles north-west of Auxerre.

CHAR'NY, a town of France, in the department of the Meuse, and chief place of a canton, in the district of Verdun: one league north of Verdun.

CHAROLLAIS', before the revolution, a small country of France, called from Charolles, the capital.

CHAROL'LES, a town of France, and principal place of a district, in the department of the Saone and Loire: seven leagues east-south-east of Bourbon Lancy, and eight west of Maçon.

CHA'RON, a Theban, who received into his house Pelopidas and his friends, when they delivered Thebes from tyranny. An historian of Lampsacus, who wrote two books on Persia besides other treatises B. C. 479. An historian of Naucratis, who wrote an history of his country, and of Egypt.

CHA'RON, in fabulous history, one of the infernal deities, son of Erebus and Nox, who conducted the souls of the dead in a boat over the rivers Styx and Acheron, to the infernal regions, for an obolus. Such as had not been honoured with a funeral were not permitted to enter his boat, without previously wandering on the shore for one hundred years. If any living person presented himself to cross the Stygian lake, he could not be admitted before he showed Charon a golden bough, which he received from the sybil; and Charon was imprisoned for one year, because he had ferried over, against his own will, Hercules, without this passport. Charon is represented as an old robust man, with a hideous countenance, long white beard, and piercing eyes. His garment is ragged and filthy, and his forehead is covered with wrinkles. As all the dead were obliged to pay a small piece of money for their admission, it was usual, among the ancients, to place under the tongue of the deceased a piece of money for Charon. This fable of Charon and his boat is borrowed from the Egyptians, whose dead were carried across a lake, where sentence was passed over them, and according to their good or bad actions, they were honoured with a splendid burial, or left unnoticed in the open air. *Diodorus.*

CHA'RON, a town of France, in the department of the Lower Charente: three leagues north of Rochefort.

CHARON'DAS, a celebrated legislator of the Thurians, and a native of Catana in Sicily, flourished 440 years before Christ. He made a law that no man should be permitted to come armed into the assembly. He inadvertently broke this law, and, when told of it, he fell upon his sword, and thus killed himself for being the violator of his own law.

CHARON'NE, a village of France: about a mile east of Paris.

CHAROST', a town of France, in the department of the Cher, and chief place of a canton, in the district of Bourges, situated on the river Arnon: four leagues south-west of Bourges, and two north-east Issoudon.

CHARPENTIER' (Francis), dean of the French academy, was born at Paris, February 1620. His early acuteness made his friends design him for the bar: but his taste carried him another way. He preferred the repose of the a closet to a noisy and tumultuous life; and was infinitely more delighted with languages and antiquity, than the study of the law. He was made a member of the French academy in 1651, and had the advantage of the best conversation for his improvement. When Colbert projected the setting up a French East-India company, he thought it proper that a discourse should be published to recommend it. He employed Charpentier to draw one up, and was so pleased with his performance that he kept him in his family, and made use of him in establishing his new academy of Inscriptions and Medals. The learned languages, in which Charpentier was a considerable master, his great knowledge of antiquity, and his exact and critical judgment, made him very serviceable; and it is agreed that no person contributed more than himself towards that noble series of medals, which represented the most considerable events of the reign of Louis XIV. He published several works, which were well received. He died April 22, 1702, aged 82. His harangues and discourses are extant in the collections of the academy. There are likewise of his in print several poems, such as odes, sonnets, paraphrases upon the psalms, and many other works which have not been printed.

CHAR'PEY, a town of France, in the department of the Drome: three leagues east of Valence.

CHAR'RARA, a town of Persia, in the province of Farsistan: forty-eight miles north-west of Schiras.

CHARRE OF LEAD, *s.* A quantity of lead consisting of thirty pigs, each pig containing six stone wanting two pounds, and every stone being twelve pounds.

CHAR'RES, a town of Arabia, nine miles north-north-east of Sana.

CHAR'RON (Peter), born at Paris in 1541. After making a considerable proficiency in grammar-learning, he applied to logic, metaphysics, moral and natural philosophy. He studied civil and common law at the universities of Orleans and Bourges, and commenced doctor in that faculty. Upon his return to Paris, he was admitted an advocate in the court of parliament. He always declared the bar to be the best and most improving school in the world; and accordingly attended at all the public hearings for several years: but, foreseeing that preferment in this way was like to come very slow, he gave over this pursuit, and closely applied to the study of divinity. By his superior eloquence, he soon came into high reputation, and was chosen by queen Margaret, duchess of Bulois, for her preacher in ordinary. He never took any degree or title in divinity, but satisfied himself with deserving and being capable of the highest. He composed a work intituled, Les Trois Verités, "The Three Truths," which he published in 1594. This procured him the acquaintance of M. de Sulpice, bishop and count of Cahors, who appointed him his vicar-general. He was deputed to the general assembly of the clergy in 1595, and was chosen first secretary to the assembly. In 1601, he printed at Bourdeaux his books "Of Wisdom," which gave him a great reputation, and made his character generally known. He died November 16, 1603, of an apoplexy. His Treatise on Wisdom is a kind of commentary on the Essays of Montagne. The old Gascon was so pleased with his book and his conversation, that he permitted him to take his name, and to bear his arms. The times in which he wrote could so ill bear the truths advanced in the Treatise upon Wisdom, that he was denounced by the university of Paris as a man of irreligious principles. His friend, the president Jeannin, so well known by his negociations in Holland, saved his book from being condemned, by permitting the sale of it as a book of politics. The frontispiece to the Elzevir edition of his treatise, represents the goddess of folly leading mankind by their passions. Charron begins one of his chapters upon wisdom thus: *Nihil est æqualitate inæqualius*: "There is nothing so unequal as equality. There is no such great hatred as that which takes place amongst persons who are equal to one another. The envy and the jealousy with which equals are possessed, are the causes of troubles, seditions, and of civil wars. In all governments there must be inequality of rank, but it should be moderate. Harmony itself consists not in a complete equality of tones, but in a difference of tones, that still agree one with another."

CHARROU X, a town of France, in the department of the Allier, and chief place of a canton, in the district of Gannat: five miles north of Gannat.

CHARROU'X, a town of France, in the department of the Vienne, and chief place of a canton in the diſtrict of Civray: eight leagues and a half north of Vienne, and one and a half eaſt of Civray.

CHART, *ſ.* [*charta*, Lat.] A delineation or map of coaſts. It is diſtinguiſhed from a map, by repreſenting only the coaſts; being a projection of ſome part of the ſea in plano, ſhewing the ſea-coaſts, rocks, ſands, bearings, &c. Fournier aſcribes the invention of ſea-charts to Henry ſon of John king of Portugal. Theſe charts are of various kinds, the Plain Chart, Mercator's or Wright's Chart, the Globular Chart, &c. In the conſtruction of charts, great care ſhould be taken that the ſeveral parts of them preſerve their poſition to one another, in the ſame order as on the earth; and it is probable that the finding out of proper methods to do this, gave riſe to the various modes of projection. There are many ways of conſtructing maps and charts; but they depend chiefly on two principles. Firſt, by conſidering the earth as a large extended flat ſurface; and the charts made on this ſuppoſition are uſually called plain charts. Secondly, by conſidering the earth as a ſphere; and the charts made on this principle are ſometimes called globular charts, or Mercator's charts, or reduced charts, or projected charts.

Plain Charts have the meridians, as well as the parallels of latitude, drawn parallel to each other, and the degrees of longitude and latitude everywhere equal to thoſe at the equator. And therefore ſuch charts muſt be deficient in ſeveral reſpects. For, 1ſt, ſince in reality all the meridians meet in the poles, it is abſurd to repreſent them, eſpecially in large charts, by parallel right lines. 2dly, As plain charts ſhew the degrees of the ſeveral parallels as equal to thoſe of the equator, therefore the diſtances of places lying eaſt and weſt muſt be repreſented much larger than they really are. And 3dly, In a plain chart, where the ſame rhumb is kept, the veſſel appears to ſail on a great circle, which is not really the caſe. Yet plain charts made for a ſmall extent, as a few degrees in length and breadth, may be tolerably exact, eſpecially for any part within the torrid zone; and even a plain chart made for the whole of this zone will differ but little from the truth.

Mercator's Chart, like the plain charts, has the meridians repreſented by parallel right lines, and the degrees of the parallels, or longitude, everywhere equal to thoſe at the equator, ſo that they are increaſed more and more, above their natural ſize, as they approach towards the pole; but then the degrees of the meridians, or of latitude, are increaſed in the ſame proportion at the ſame part; ſo that the ſame proportion is preſerved between them as on the globe itſelf. This chart has its name from that of the author, Girard Mercator, who firſt propoſed it for uſe in 1556, and made the firſt charts of this kind; though they were not altogether on true or exact principles, nor does it appear that he perfectly underſtood them. Neither, indeed, was the thought originally his own, viz. of lengthening the degrees of the meridian in ſome proportions; for this was hinted by Ptolemy near two thouſand years ago. It was not perfected, however, till Mr. Wright firſt demonſtrated it about the year 1590, and ſhewed a ready way of conſtructing it, by enlarging the meridian line by the continual addition of the ſecants. See his Correction of Errors in Navigation, publiſhed in 1599.

Globular Chart, is a projection ſo called from the conformity it bears to the globe itſelf; and was propoſed by Meſſrs. Senex, Wilſon, and Harris. This is a meridional projection, in which the parallels are equidiſtant circles, having the pole for their common centre, and the meridians curvilinear and inclined, ſo as all to meet in the pole, or common centre of the parallels. By this means the ſeveral parts of the earth have their proper proportion of magnitude, diſtance, and ſituation, nearly the ſame as on the globe itſelf; which renders it a good method for geographical maps.

Hydrographical Charts, are ſheets of large paper, on which ſeveral parts of the land and ſea are deſcribed, with their reſpective coaſts, harbours, ſounds, flats, rocks, ſhelves, ſands, &c. alſo the points of the compaſs, and the latitudes and longitudes of the places.

Selenographic Charts, are particular deſcriptions of the appearances, ſpots, and maculæ, of the moon.

Topographic Charts, are draughts of ſome ſmall parts only of the earth, or of ſome particular place, without regard to its relative ſituation, as London, York, &c. For the conſtruction of charts, ſee GEOGRAPHY.

CHAR'TER, *ſ.* [*charta*, Lat. *chartres*, Fr.] A written evidence of things done between man and man. *Charters* are divided into *charters* of the king, and *charters* of private perſons. *Charters* of the king are thoſe, whereby the king paſſeth any grant to any perſon or more, or to any body politic: as a *charter* of exemption, that no man ſhall be empannelled on a jury; *charter* of pardon, whereby a man is forgiven a felony, or other offence. *Cowel*.—Any writing beſtowing privileges or rights.—It is not to be wondered, that the great *charter* whereby God beſtowed the whole earth upon Adam, and confirmed it unto the ſons of Noah, being as brief in words as large in effect, hath bred much quarrel of interpretation. *Raleigh*.

Here was that *charter* ſeal'd, wherein the crown
All marks of arbitrary pow'r lays down. *Denham*.

Privilege; immunity; exemption:

I muſt have liberty,
Withal as large a *charter* as the wind,
To blow on whom I pleaſe; for ſo fools have;
And they that are moſt galled with my folly,
They moſt muſt laugh. *Shakeſpeare*.

Charters of private perſons, are deeds and inſtruments for the conveyance of lands. The purchaſer of lands ſhall have all the charters, deeds, and evidences, as incident to the ſame, and for the maintenance of his title. *Co. Lit. 6.* Charters belong to a feoffee, although they be not ſold to him, where the feoffor is not bound to a general warranty of the land; for there they ſhall belong to the feoffor, if they be ſealed deeds or wills in writing: but other charters go to the tertenant. *Moor. Ca. 687.* The charters belonging to the feoffor in caſe of warranty, the heir ſhall have, though he hath no land by deſcent, for the poſſibility of deſcent after. *1 Rep. 1.* *Charter land*, is ſuch land as a perſon holds by charter; that is, by evidence in writing, otherwiſe called freehold.

Charter of the Foreſt, is that wherein the laws of the foreſt are compriſed, ſuch as the charter of Canute, &c.

CHAR'TER, or the Great Charter; ſee MAGNA CHARTA.

CHAR'TER, a town of United America, in the ſtate of South Carolina: twenty-five miles eaſt-ſouth-eaſt of Camden.

CHAR'TER-PAR'TY, *ſ.* [*charta partita*, Lat. *chartre parti*, Fr. a deed or writing divided.] Is what among merchants and ſea-faring men is called a pair of indentures, containing the covenants and agreements made between them, touching their merchandize and maritime affairs. *2 Inſt. 673.* Charter-parties of affreightment ſettle agreements, as to the cargo of ſhips, and bind the maſter to deliver the goods in good condition at the place of diſcharge, according to agreement; and the maſter ſometimes obliges himſelf, ſhip, tackle, and furniture, for performance. The common law conſtrues charter-parties, as near as may be, according to the intention of them, and not according to the literal ſenſe of traders, or thoſe that merchandiſe by ſea; but they muſt be regularly pleaded. In covenant by charter-party, that the ſhip ſhould return to the river Thames, by a certain time,

dangers of the sea excepted, and after, in the voyage, and within the time of the return, the ship was taken upon the sea by pirates, so that the master could not return at the time mentioned in the agreement, it was adjudged that this impediment was within the exception of the charter-party, which extends as well to any danger upon the sea by pirates and men of war, as dangers of the sea by shipwreck, tempest, &c. *Stile* 132. 2 *Rol. Abr.* 248. A ship is freighted at so much per month that she shall be out, covenanted to be paid after her arrival at the port of London; the ship is cast away coming up from the Downs, but the lading is all preserved, the freight shall in this case be paid; for the money becomes due monthly by the contract, and the place mentioned is only to ascertain where the money is to be paid, and the ship is intitled to wages, like a mariner that serves by the month, who, if he dies in the voyage, his executors are to be answered *pro rata*. *Molloy de Jur. Maritim.* 260. If a part-owner of a ship refuse to join with the other owners in setting out of the ship, he shall not be entitled to his share of the freight; but, by the course of the admiralty, the other owners ought to give security, if the ship perish in the voyage, to make good to the owner standing out, his share of the ship, sir L. Jenkins, in a case of this nature, certified that by the law marine and course of the admiralty, the plaintiff was to have no share of the freight; and that it was so in all places, for otherwise there would be no navigation.

CHAR'TERED, *adj.* Invested with privileges by charter; privileged:

When he speaks
The air, a *charter'd* libertine, is still. *Shakespeare.*

CHAR'TIS REDDEN'DIS, *s.* An ancient writ which lay against one that had charters of feoffment entrusted to his keeping, and refused to deliver them. *Reg. Orig.* 159.

CHARTO'PHYLAX, *s.* An officer of the Greek church at Constantinople, who attends at the rails when the sacrament is administered, and gives notice to the priests to come to the holy table. He represents the patriarch upon the bench, tries all ecclesiastical causes, keeps all the marriage registers, assists at the consecration of bishops, and presents the bishop elect at the solemnity, and likewise all other subordinate clergy. This office resembles that of the bibliothecarius at Rome.

CHAR'TRAIN, before the revolution, a small country of France, in the environs of Chartres, which is the capital.

CHAR'TRE SUR LE LOIR (La), a town of France, in the department of the Sarte, and chief place of a canton in the district of Chateau-du-Loir: seven leagues and a half south-south-east of Le Mans, and two east-north-east of Chateau-du-Loir.

CHAR'TRES, a city of France, and principal place of a district, in the department of the Eure and Loire, one of the most ancient towns of the country; before the revolution, the see of a bishop, suffragan of Paris; the cathedral is esteemed one of the most beautiful churches in the kingdom. It is situated on the Eure, over which is a bridge, the work of the celebrated Vauban, and contains about 10,000 inhabitants. The principal trade is corn: eighteen posts and a half north-north-east of Tours, and eleven south-west of Paris. Lat. 48. 27. N. lon. 19. 9. E. Ferro.

CHARTREU'SE, or CHARTREUSE GRAND, *s.* A celebrated monastery, the capital of all the convents of the Carthusian monks, situated on a steep rock in the middle of a large forest of fir-trees, about seven miles north-east of Grenoble, in the former province of Dauphiny in France. See CARTHUSIANS. From this mother-convent all the others of the same order took their names; among which was the Chartreuse of London, corruptly called the Charterhouse, now converted into an hospital, and endowed with a revenue of 600l. per annum. Here are maintained eighty decayed gentlemen, not under fifty years of age; also forty boys are educated and fitted either for the university, or for trades. Those sent to the university have an exhibition of twenty pounds a year for eight years; and have an immediate title to nine church livings in the gift of the governors of the hospital, who are sixteen in number, and take their turn in the nomination of pensioners and scholars.

CHAR'TULARY, *s.* [*chartularius*, Lat.] An ancient officer in the Latin church, who had the care of charters and papers relating to public affairs. The chartulary presided in ecclesiastical judgments in lieu of the pope. In the Greek church the chatulary was called chartophylax.

CHAR'WELL, a river of England, which runs into the Thames at Oxford.

CHA'RY, *adj.* Careful; cautious; wary; frugal.—Over his kindred he held a wary and *chary* care, which bountifully was expressed, when occasion so required. *Carew.*

CHARYB'DIS, *s.* [a word of Phœnician or Hebrew extract, as the learned Bochart has proved, of *chor*, a hole, and *abaddon*, perdition, and in compound, *chor-obdan*, the hole of perdition.] A dangerous whirlpool on the coast of Sicily, opposite another whirlpool called Scylla on the coast of Italy. It was very dangerous to sailors, and it proved fatal to part of the fleet of Ulysses. The words, *Incidit in Scyllam qui vult vitare Charybdim*, became a proverb, to shew that in our eagerness to avoid an evil, we fall into a greater. This whirlpool, which was in the gulph of Messina, is said to have been entirely removed by an earthquake in 1783. The name of Charybdis was bestowed on mistresses who repay affection and tenderness with ingratitude. It is supposed that Charybdis was an avaricious woman, who stole the oxen of Hercules, for which theft she was struck with thunder by Jupiter, and changed into a whirlpool.

To CHASE, *v. a.* [*chasser*, Fr.] To hunt.—It shall be as the *chased* roe. *Isaiah.*—To pursue as an enemy. And Abimelech *chased* him, and he fled before him. *Judges.*—To drive away.—He that *chaseth* away his mother, is a son that causeth shame. *Proverbs.*—To follow as a thing desirable; to drive:

As when the following morn had *chas'd* away
The flying stars, and light restor'd the day. *Dryden.*

To CHASE Metals. See *To* ENCHASE.

CHASE, *s.* Hunting; as, the pleasures of the *chase*. Pursuit of any thing as game.—There is no *chase* more pleasant, methinks, than to drive a thought, by good conduct, from one end of the world to another, and never to lose sight of it till it fall into eternity. *Burnet.*—Fitness to be hunted; appropriation to *chase* or sport:

A maid I am, and of thy virgin train;
Oh! let me still that spotless name retain,
Frequent the forests, thy chaste will obey,
And only make the beasts of *chase* my prey. *Dryden.*

Pursuit of an enemy or of some thing noxious.—He sallied out upon them with certain troops of horsemen, with such violence, that he overthrew them, and, having them in *chase*, did speedy execution. *Knolles.*—Pursuit of something as desirable:

Yet this mad *chase* of fame, by few pursu'd,
Has drawn destruction on the multitude. *Dryden.*

The game hunted:

Honour's the noblest *chase*; pursue that game,
And recompense the loss of love with fame. *Granville.*

The *chase* of a gun, is the whole bore or length of a piece, taken withinside.

CHASE, [*chasse*, Fr.] In its legal signification, is a great quantity of woody ground lying open, and privileged, for wild beasts and wild fowl: and the beasts of chase

chase properly extend to the buck, doe, fox, martin, and roe; and in common and legal sense to all the beasts of the forest. *Co. Lit.* 233. A chase differs from a park in that it is not inclosed; and also in that a man may have a chase in another man's ground, as well as in his own; being indeed the liberty of keeping beasts of chase or royal game therein, protected even from the owner of the land, with a power of hunting them thereon. 2 *Comm.* 38. But if one have a chase within a forest, and he kill or hunt any stag or red deer, or other beasts of the forest, he is fineable. 1 *Jones's Rep.* 278. A chase is of a middle nature between a forest and a park, being commonly less than a forest, and not endowed with so many liberties, as the courts of attachment, swainmote, and justice-seat; though of a larger compass, and stored with greater diversity both of keepers, and wild beasts or game, than a park. A chase differs from a forest in this, because it may be in the hands of a subject, which a forest in its proper and true nature cannot; and from a park, in that it is not enclosed, and hath a greater compass, and more variety of game. A forest and a chase may have different officers and laws: every forest is a chase, *& quiddam amplius*; but any chase is not a forest. A chase is *ad communem legem*, and not to be guided by the forest laws; and it is the same of parks. 4 *Inst.* 314. A man may have a free chase as belonging to his manor in his own woods, as well as a warren and a park in his own grounds; for a chase, warren, and park, are collateral inheritances, and not issuing out of the soil; and, therefore, if a person hath a chase in other men's grounds, and after purchaseth the grounds, the chase remaineth. *Ibid.* 318. If a man have freehold in a free chase, he may cut his timber and wood growing upon it, without view or licence of any; though it is not so of a forest: but if he cut so much that there is not sufficient for covert, and to maintain the game, he shall be punished at the suit of the king; and so if a common person hath a chase in another's soil, the owner of the soil cannot destroy all the covert, but ought to leave sufficient thereof, and also browsewood, as hath been accustomed. 11 *Rep.* 22. And it has been adjudged, that, within such chase, the owner of the soil, by prescription, may have common for his sheep, and warren for his conies, but he cannot surcharge with more than has been usual, nor make coney-burrows in other places than hath been used. *Ibid.* It a free chase be inclosed, it is said to be a good cause of seizure into the king's hands. It is not lawful to make a chase, park, or warren, without licence from the king under the broad seal.

The following account of the English chases is given by Mr. Pennant: "At first the beasts of chase had this whole island for their range; they knew no other limits than the ocean, nor confessed any particular master. When the Saxons had established themselves in the heptarchy, they were reserved by each sovereign for his own particular diversion; hunting and war, in those uncivilized ages, were the only employ of the great; their active, but uncultivated, minds, being susceptible of no pleasure but those of a violent kind, such as gave exercise to their bodies, and prevented the pain of thinking. But as the Saxon kings only appropriated those lands to the use of forests which were unoccupied, so no individuals received any injury; but, when the conquest had settled the Norman line on the throne, this passion for the chase was carried to an excess which involved every civil right in a general ruin: it superseded the consideration of religion even in a superstitious age: the village communities, nay, even the most sacred edifices, were turned into one vast waste, to make room for animals, the objects of a lawless tyrant's pleasure. The new forest in Hampshire, is too trite an instance to be dwelt on; sanguinary laws were enacted to preserve the game; and, in the reigns of William Rufus and Henry I. it was less criminal to destroy one of the human species than a beast of chase. Thus it continued while the Norman line filled the throne; but, when the Saxon line was restored under Henry II. the rigour of the forest laws was immediately softened.

"When our barons began to form a power, they claimed a vast, but more limited, tract, for a diversion that the English were always fond of. They were very jealous of any encroachments on their respective bounds, which were often the cause of deadly feuds; such a one gave cause to the fatal day of Chevy-chase; a fact which, though recorded only in a ballad, may, from what we know of the manners of the times, be founded on truth; not that it was attended with all the circumstances which the author of that natural but heroic composition hath given it; for, on that day, neither a Percy nor a Douglas fell: here the poet seems to have claimed his privilege, and mixed with this fray some of the events of the battle of Otterbourne. When property became happily more divided by the relaxation of the feodal tenures, these extensive hunting-grounds became more limited; and, as tillage and husbandry increased, the beasts of chase were obliged to give way to others more useful to the community. The vast tracts of land, before dedicated to hunting, were then contracted; and, in proportion as the useful arts gained ground, either lost their original destination, or gave rise to the invention of parks. Liberty and the arts seem coeval; for, when once the latter got footing, the former protected the labours of the industrious from being ruined by the licentious sportsman, or being devoured by the objects of his diversion: for this reason, the subjects of a despotic government still experience the inconveniences of vast wastes and forests, the terrors of the neighbouring husbandmen; while in our well-regulated monarchy very few chases remain. The English still indulge themselves in the pleasure of hunting; but confine the deer-kind to parks, of which England boasts more than any other kingdom in Europe. The laws allow every man his pleasure; but confine them in such bounds as prevent them from being injurious to the meanest of the community. Before the reformation, the prelates seem to have guarded sufficiently against this want of amusement, the see of Norwich, in particular, being possessed, about that time, of thirteen parks."

CHASE, in the sea language, is to pursue a ship; which is also called giving chase. *Stern-chase*, is when the chaser follows the chased a-stern directly upon the same point of the compass. *To lie with a ship's fore-foot in a chase*, is to sail and meet with her by the nearest distance, to cross her in her way, or to come across her fore-foot. A ship is said to have a good chase, when she is so built forward on, or a-stern, that she can bring many guns to bear forwards or backwards; according to which she is said to have a good forward or good stern-chase. *Chase-guns*, are such whose ports are either in the head (and then they are used in chasing of others) or in the stern, which are only useful when they are pursued or chased by an enemy.

Wild-goose CHASE, an absurd kind of racing on horseback, in which the two horses, after running about twelve score yards, had liberty, which horse soever could take the lead, to ride what ground the jockey pleased, the hindmost horse being bound to follow him within a certain distance fixed by the articles, or else to be whipped in by the populace; and whichever horse could distance the other, won the race. This sort of racing was not long in use, for it was found destructive to good horses, when two such were matched together; for, in this case, neither was able to distance the other till they were both ready to sink under their riders; and often two very good horses were both spoiled, and the stakes forced to be drawn. The mischief of this racing soon brought in the method now in use, of running only a certain quantity of ground, and determining the plate by the coming in at the post.

CHA'SER, *s.* Hunter; pursuer; driver; an enchaser:

Stretch'd on the lawn, his second hope survey,
At once the *chaser*, and at once the prey!
Lo, Rufus, tugging at the deadly dart,
Bleeds in the forest like a wounded hart! *Pope.*

CHASM', *s.* [χασμα.] A breach unclosed; a cleft; a gap; an opening.—In all that visible corporeal world, we see no *chasms* or gaps. *Locke.*

CHASSAIR', or CASAIR, a town of Africa, in the kingdom of Morocco, about six leagues from Mount Atlas: near it are mines of lead and antimony, which the inhabitants carry to Fez to dispose of.

CHASSELAY', a town of France, in the department of the Rhone and Loire, and chief place of a canton, in the district of Camp de Lyon: two leagues north of Lyons.

CHASSENEU'IL, a town of France, in the department of Charente, and chief place of a canton, in the district of La Rochefoucauld: eleven miles north-east of La Rochefoucauld.

CHAS'SENSAL, a river of France, which runs into the Ardeche, not far from its source.

CHASSERA'DES, a town of France, in the department of the Lozere, and chief place of a canton, in the district of Villefort: eight miles north of Villefort.

CHASSIE'RS, a town of France, in the department of the Ardeche: ten miles west of Viviers.

CHAS'SIRON (Tower of), a lighthouse on the north point of the island of Oleron, near the coast of France, which has two fires to distinguish it from the tower of Cordovan.

CHASTE, *adj.* [*chaste*, Fr. *castus*, Lat.] Pure from all commerce of sexes; as, a *chaste* virgin:

Diana *chaste*, and Hebe fair. *Prior.*

With respect to language, pure; uncorrupt; not mixed with barbarous phrases.—Free from obscenity.—Among words which signify the same principal ideas, some are clean and decent, others unclean; some *chaste*, others obscene. *Watts.*—True to the marriage bed.—Love your children; be discreet; *chaste*; keepers at home. *Titus.*

CHASTE-TREE, *s.* in botany. See VITEX.

CHASTELET', a town of Germany, in the circle of Westphalia, and the bishopric of Liege, situated on the south side of the Sambre: thirty miles south-west of Brussels, and fifty west-south-west of Liege.

CHASTELLAR', a town of Savoy: eight miles and a half north-east Chambery.

CHA'STELY, *adv.* Without incontinence; purely; without contamination.—You should not pass here; no, though it were as virtuous to lie as to live *chastely*. *Shakesp.*

CHA'STENESS, *s.* Chastity; purity.

To CHA'STEN, *v. a.* [*chastier*, Fr. *castigo*, Lat.] To correct; to punish; to mortify.—*Chasten* thy son while there is hope, and let not thy soul spare for his crying. *Proverbs.*

I follow thee, safe guide! the path
Thou lead'st me; and to the hand of heav'n submit,
However *chast'ning*. *Milton.*

To CHASTI'SE, *v. a.* [*castigo*, Lat. anciently accented on the first syllable, now on the last.] To punish; to correct by punishment; to afflict for faults.—Seldom is the world affrighted or *chastised* with signs or prodigies, earthquakes or inundations, famines or plagues. *Grew.* To reduce to order, or obedience; to repress; to restrain; to awe:

The gay social sense
By decency *chastis'd*. *Thompson.*

CHA'STISEMENT, *s.* [*chastiment*, Fr.] Correction; punishment; commonly, though not always, used of domestic or parental punishment.—He receives a fit of sickness as the kind *chastisement* and discipline of his heavenly Father, to wean his affections from the world. *Bentley.*

CHASTI'SER, *s.* The person that chastises; a punisher; a corrector.

CHA'STITY, *s.* [*castitas*, Lat.] Purity of the body.—*Chastity* is either abstinence or continence: abstinence is that of virgins or widows; continence, of married persons: chaste marriages are honourable and pleasing to God. *Taylor.*—Freedom from obscenity. Freedom from bad mixture of any kind; purity of language, opposed to barbarisms.

Chastity is a virtue universally celebrated. There is indeed no charm in the female sex that can supply its place. Without it, beauty is unlovely, and rank is contemptible; good breeding degenerates into wantonness, and wit into impudence. The best preservative of female honour is female delicacy; modesty is the handmaid of virtue, appointed to tend, to dress, and serve, her; it is as it were a kind of armour, which the sex should always wear, both to adorn and defend them; and, when that is laid aside, they are neither beautiful nor desirable, nor secure against the wiles of seduction. Out of the numerous instances of eminent chastity recorded by authors, the two following are selected on account of the lesson afforded by the different modes of conduct which they exhibit.

Lucretia was a Roman lady of great beauty and noble extraction; she married Collatinus, a relation of Tarquinius Superbus. During the siege of Ardea, which lasted much longer than was expected, the young princes passed their time in entertainments and diversions. One day as they were at supper, at Sextus Tarquin's the king's eldest son, with Collatinus, Lucretia's husband, the conversation turned on the merits of their wives: every one gave his own the preference. "What signify so many words?" says Collatinus; "you may in a few hours, if you please, be convinced by your own eyes, how much my Lucretia excels the rest. We are young: let us mount our horses, and go and surprise them. Nothing can better decide our dispute than the state we shall find them in at a time when most certainly they will not expect us." They were a little heated with wine: "Come on, let us go," they all cried together. They quickly galloped to Rome, which was about twenty miles from Ardea, where they find the princesses, wives of the young Tarquins, surrounded with company, and every circumstance of the highest mirth and pleasure. From thence they rode to Collatia, where they saw Lucretia in a very different situation. With her maids about her, she was at work in the inner part of her house, talking on the dangers to which her husband was exposed. The victory was adjudged to her unanimously. She received her guests with all possible politeness and civility. Lucretia's virtue, which should have commanded respect, was the very thing which kindled in the breast of Sextus Tarquin a strong and detestable passion. Within a few days he returned to Collatia; and, upon the plausible excuse he made for his visit, he was received with all the politeness due to a near relation, and the eldest son of a king. Watching the fittest opportunity, he declares the passion she had excited at his last visit, and employed the most tender intreaties, and all the artifices possible, to touch a woman's heart; but all to no purpose. He then endeavoured to extort her compliance by the most terrible threatnings. It was in vain. She still persisted in her resolution; nor could she be moved even by the fear of death. But when the monster told her that he would first dispatch her, and then, having murdered a slave, would lay him by her side, after which he would spread a report, that, having caught them in the act of adultery, he had punished them as they deserved; this seemed to shake her resolution. She hesitated, not knowing which of these dreadful alternatives to take: whether, by consenting, to dishonour the bed of her husband, whom she tenderly loved; or, by refusing, to die under the odious character of having prostituted her person to the lust of a

 slave,

ſlave. He ſaw the ſtruggle of her ſoul; and ſeizing the fatal moment, obtained an inglorious conqueſt. Thus Lucretia's virtue, which had been proof againſt the fear of death, could not hold out againſt the fear of infamy. The young prince, having gratified his paſſion, returned home as in triumph. On the morrow, Lucretia, overwhelmed with grief and deſpair, ſent early in the morning to deſire her father and her huſband to come to her, and bring with them each a truſty friend, aſſuring them there was no time to loſe. They came with all ſpeed, the one accompanied with Valerius (ſo famous after under the name of Publicola), and the other with Brutus. The moment ſhe ſaw them come, ſhe could not command her tears; and when her huſband aſked her if all was well? "By no means," ſaid ſhe, "it cannot be well with a woman after ſhe has loſt her honour. Yes, Collatinus, thy bed has been defiled by a ſtranger; but my body only is polluted; my mind is innocent, as my death ſhall witneſs. Promiſe me only not to ſuffer the adulterer to go unpuniſhed: it is Sextus Tarquinius, who laſt night, a treacherous gueſt, or rather cruel foe, offered me violence, and reaped a joy fatal to me; but, if you are men, it will be ſtill more fatal to him;" All promiſed to revenge her; and at the ſame time, tried to comfort her with repreſenting, "That the mind only ſins, not the body; and where the conſent is wanting, there can be no guilt." "What Sextus deſerves," replies Lucretia, "I leave you to judge; but for me, though I declare myſelf innocent of the crime, I exempt not myſelf from puniſhment. No immodeſt woman ſhall plead Lucretia's example to outlive her diſhonour." Thus ſaying, ſhe plunged into her breaſt a dagger ſhe had concealed under her robe, and expired at their feet. Lucretia's tragical death has been praiſed and extolled by pagan writers, as the higheſt and moſt noble act of heroiſm. The goſpel thinks not ſo: it is murder, even according to Lucretia's own principles, ſince ſhe puniſhed with death an innocent perſon, at leaſt acknowledged as ſuch by herſelf. She was ignorant that our life is not in our own power, but in his diſpoſal from whom we receive it. St. Auſtin, who carefully examines, in his book *De Civitate Dei*, what we are to think of Lucretia's death, conſiders it not as a courageous action, flowing from a true love of chaſtity, but as an infirmity of a woman too ſenſible of worldly fame and glory; and who, from a dread of appearing in the eyes of men an accomplice of the violence ſhe abhorred, and of a crime to which ſhe was entirely a ſtranger, commits a real crime upon herſelf voluntarily and deſignedly. But what cannot be ſufficiently admired in this Roman lady, is her abhorrence of adultery, which ſhe ſeems to hold ſo deteſtable as not to bear the thoughts of it. In this ſenſe, ſhe is a noble example for all her ſex.

Chiomara, the wife of Ortiagon, a Gauliſh prince, was equally admirable for her beauty and chaſtity. During the war between the Romans and the Gauls, the latter were totally defeated on Mount Olympus. Chiomara, among many other ladies, was taken priſoner, and committed to the care of a centurion, no leſs paſſionate for money than women. He, at firſt, endeavoured to gain her conſent to his infamous deſires; but not being able to prevail upon her, and ſubvert her conſtancy, he thought he might employ force with a woman whom misfortune had reduced to ſlavery. Afterwards, to make her amends for that treatment, he offered to reſtore her liberty; but not without ranſom. He agreed with her for a certain ſum, and, to conceal this deſign from the other Romans, he permitted her to ſend any of the priſoners ſhe ſhould chooſe to her relations, and aſſigned a place near the river where the lady ſhould be exchanged for gold. By accident there was one of her own ſlaves amongſt the priſoners. Upon him ſhe fixed; and the centurion ſoon after carried her beyond the advanced poſts, under cover of a dark night. The next evening two of the relations of the princeſs came to the place appointed, whither the centurion alſo carried his captive. When they had delivered him the attic talent they had brought, which was the ſum they had agreed on, the lady, in her own language, ordered thoſe who came to receive her to draw their ſwords and kill the centurion, who was then amuſing himſelf with weighing the gold. Then, charmed with having revenged the injury done her chaſtity, ſhe took the head of the officer, which ſhe had cut off with her own hands, and hiding it under her robe, went to her huſband Ortiagon, who had returned home after the defeat of his troops. As ſoon as ſhe came into his preſence, ſhe threw the centurion's head at his feet. He was ſtrangely ſurpriſed at ſuch a ſight; and aſked her whoſe head it was, and what had induced her to do an act ſo inconſiſtent with her ſex? With a face covered with a ſudden bluſh, and at the ſame time expreſſing her fierce indignation, ſhe declared the outrage which had been done her, and the revenge ſhe had taken for it. During the reſt of her life, ſhe ſtedfaſtly retained the ſame attachment for the purity of manners which conſtitutes the principal glory of the ſex, and nobly ſuſtained the honour of ſo glorious, bold, and heroic, an action. This lady was much more prudent than Lucretia, in revenging her injured honour by the death of her raviſher, rather than her own. Plutarch relates this fact, in his treatiſe upon the virtue and great actions of women; and it is from him we have the name of this, which is well worthy of being tranſmitted to poſterity.

The Roman law juſtified homicide in defence of the chaſtity either of one's ſelf or relations; and ſo alſo, according to Selden, ſtood the law in the Jewiſh republic. The Engliſh law likewiſe juſtifies a woman, killing one who attempts to raviſh her. So the huſband or father may juſtify killing a man, who attempts a rape upon his wife or daughter; but not if he takes them in adultery by conſent, for the one is forcible and felonious, but not the other. 1 *Hal. P. C.* 485. 6. And without doubt the forcibly attempting a crime, of a ſtill more deteſtable nature, may be equally reſiſted by the death of the unnatural aggreſſor. For the one uniform principle, that runs through our own and all other laws, ſeems to be this; that where a crime, in itſelf capital, is endeavoured to be committed by force, it is lawful to repel that force by the death of the party attempting. 4 *Comm.* 181.

CHASTITY is repreſented in painting and ſculpture, by a woman of a modeſt aſpect, holding in one hand a whip, as a mark of chaſtiſement, clad in white like a veſtal, to ſhew her purity and innocence. At her feet Cupid blinded, and his bow and arrows lying broken by him, to denote that ſhe has ſubdued concupiſcence, and that the paſſion of love has no more dominion over her. Or, her face covered with a veil of lawn, holding in her right hand a ſceptre, and in her left two turtle-doves. By others ſhe has been repreſented by the goddeſs Pallas, keeping down Cupid (who is ſtriking fire into a heart) with a yoke; at her feet, an ermin. Conjugal chaſtity by an agreeable damſel, whoſe robe is embroidered with lilies; holding in one hand a ſprig of laurel, and in the other a turtle-dove.

To CHAT, *v. n.* [from *caqueter*, Fr. Skinner; perhaps from *achat*, purchaſe or cheapening, on account of the prate naturally produced in a bargain; or only, as it is moſt likely, contracted from *chatter*.] To prate; to talk idly; to prattle; to cackle; to chatter; to converſe at eaſe:

With much good-will the motion was embrac'd,
To *chat* a while on their adventures paſt. *Dryden.*

To CHAT, *v. a.* To talk of. Not in uſe, unleſs ludicrouſly:

All tongues ſpeak of him, and the bleared ſights
Are ſpectacled to ſee him. Your prattling nurſe
Into a rapture lets her baby cry,
While ſhe *chats* him. *Shakeſpeare.*

CHAT, *ſ.* Idle talk; prate, ſlight or negligent tattle.

—The

—The least is good, far greater than the tickling of his palate with a glass of wine, or the idle *chat* of a soaking club. *Locke.*

Snuff, or the fan, supplies each pause of *chat*,
With singing, laughing, ogling, and all that. *Pope.*

CHAT, *s.* The keys of trees are called *chats*; as, ash *chats*.

CHA'TA-HAT'CHI, or HATCHI, the largest river which falls into St. Rose's bay in West Florida. It is also called Pea river, and runs from north-east entering the bottom of the bay through several mouths; but so shoal that only a small boat or canoe can pass them. Mr. Hutchins ascended this river about twenty-five leagues, where there was a small settlement of Coussac Indians. The soil and timber on the banks of the river resemble very much those of Escambia.

CHATAIGNERAY'E (La), a town of France, and principal place of a district, in the department of Vendée: fifteen leagues south-east of Nantes, and three and a half north of Fontenay le Comte. In April, 1793, this town was taken from the republicans by the royalists of La Vendée.

CHATAIS'KA, a river of Siberia, which runs into the Enisei, near Turuchansk.

CHATAIS'KO, a town of Siberia, on the east side of the Enisei: 156 miles north of Turuchansk.

CHATAN'GA, a river of Russia, which runs into the Frozen Sea, extending itself by the addition of many rivers into a large gulf at its mouth. Lat. 74. 40. N.

CHATAU'CHE, or CHATAHUTHE, a river in Georgia. The northern part of Appalachicola river bears this name. It is about thirty rods wide, very rapid, and full of shoals. The lands on its banks are light and sandy, and the clay of a bright red. The lower creeks are settled by the United States in scattering clans and villages from the head to the mouth of this river. Their huts and cabins, from the high colour of the clay, resemble clusters of new-burned brick kilns. The distance from this river to the Talapose river is about seventy miles, by the war-path, which crosses at the falls, just above the town of the Tuckabatches.

CHATAUGH'QUE, a lake of North America, in Ontario county, New-York, about eighteen miles long, and three broad. Conewango river, which runs a south-south-east course, connects it with Alleghany river. This lake is conveniently situated for a communication between the Erie and the Ohio; there being water enough for boats from Fort Franklin on the Alleghany to the north-west corner of this lake; from thence there is a portage of nine miles to Chataughque harbour on lake Erie, over ground capable of being made a good waggon road. This communication was once used by the French.

CHA-TCHEOU', or QUA-TCHEOU, a town of Asia, in the country of Thibet: 160 miles south-south-east of Hami. Lat. 40. 22. N. lon. 113. 5. E. Ferro.

CHATEAU'-ARNOU'X, a town of France, in the department of the Lower Alps, and chief place of a canton, in the district of Sisteron: seven miles south of Sisteron.

CHATEAU'-BELAIR' BAY, a bay on the west coast of the island of St. Vincent, in the West Indies. Lat. 13. 14. N. lon. 61. 17. W. Greenwich.

CHATEAU'-BOURG, a town of France, in the department of the Ille and Vilaine, and chief place of a canton, in the district of Vitré: two leagues and a half west of Vitré.

CHATEAU'-BRIA'NT, a town of France, and principal place of a district, in the department of the Lower Loire, containing about 3000 inhabitants: eleven leagues north of Nantes, and nine south-south-east of Rennes. Lat. 47. 44. N. lon. 16. 17. E. Ferro.

CHATEAU'-CHALO'NS, a town of France, in the department of Jura, and chief place of a canton, in the district of Poligny: two leagues north of Lons-le-Saunier.

CHATEAU'-CHINO'N, a town of France, and principal place of a district, in the department of Nyevre, situated near the source of the Yonne. It has a considerable trade in cloth, leather, wood, and wool: eleven leagues east of Nevers, and five and a half west-north-west of Autun. Lat. 47. 3. N. lon. 21. 35. E. Ferro.

CHATEAU'-CORNET', a fortress of the island of Guernsey.

CHATEAU'-DAUPHIN', a strong fortress of Piedmont, in the marquisate of Saluzzo, ceded to the duke of Savoy by the treaty of Utrecht. It was taken by the combined armies of France and Spain in 1744: fifteen miles west of Saluzzo, and thirty south-south-west of Turin. Lat. 44. 33. N lon. 24. 44. E. Ferro.

CHATEAU'-DUN, a town of France, and principal place of a district, in the department of the Eure and Loire. It contains two churches, and about 3000 inhabitants: twenty-five miles south of Chartres. Lat. 48. 4. N. lon. 19. 1. E. Ferro.

CHATEAU'-FORT, a town of France, in the department of the Seine and Oise: one league north-east of Chevreuse.

CHATEAU'-GAY, a town of France, in the department of the Puy-de-Dome: one league south-west of Riom.

CHATEAU'-GERA'RD, a town of France, in the department of the Yonne, and chief place of a canton, in the district of Tonnerre: fourteen miles south-south-east of Tonnerre.

CHATEAU'-GIRON', a town of France, in the department of the Ille and Vilaine, and chief place of a canton, in the district of Rennes: two leagues and a half south-east of Rennes, and four west-north-west of La Guerche.

CHATEAU'-GOMBE'RT, a town of France, in the department of the Mouths of the Rhone, and chief place of a canton, in the district of Marseilles: four miles north-east of Marseilles.

CHATEAU'-GONTIE'R, a town of France, and principal place of a district, in the department of the Mayenne, on the Mayenne; here is a manufacture of linen and woollen. The number of inhabitants is computed at 7000: five leagues south of Laval, and five west of Sablé. Lat. 47. 57. N. lon. 16. 57. E. Ferro.

CHATEAU'-d'IF, a fortress and three small islands near the coast of France, in the Mediterranean: about three miles west-south-west of Marseilles.

CHATEAU'-JOUX, a fortress of France, in the department of the Doubs, near Pontarlier.

CHATEAU'-LANDON', a town of France, in the department of the Seine and Marne, and chief place of a canton, in the district of Nemours. It contains three parishes: two leagues and a half south of Nemours, and six south-south-west Montereau.

CHATEAU'-LAUDREN', a town of France, in the department of the North Coasts, and chief place of a canton, in the district of St. Brieuc: two leagues and a half west-north-west of St. Brieuc.

CHATEAU'-LIN, a town of France, and principal place of a district, in the department of Finisterre: the inhabitants carry on a considerable trade in slates for covering houses; in the environs is a medicinal spring, and some mines of copper and iron: four leagues north of Quimper. Lat. 48. 12. N. lon. 13. 34. E. Ferro.

CHATEAU' DU LOIR, a town of France, and principal place of a district, in the department of the Sarte. It contains about 2000 inhabitants. In the environs is made a great deal of that excellent wine called claret: seven leagues north-north-west of Tours, and seven south-south-east of Le Mans. Lat. 47. 42. N. lon. 18. 6. E. Ferro.

CHATEAU'-LOMBA'RD, a fortress of Asiatic Lombardy, in the province of Caramania: 104 miles south-south-west of Cogni.

CHATEAU' EN MARCHE, a town of France, in the department of the Lower Seine: two leagues north of Montvilliers.

CHATEAU-MEILLA'NT, a town of France, and principal

principal place of a diſtrict, in the department of the Cher, with an ancient caſtle, ſaid to have been built by Julius Cæſar: eight leagues ſouth-ſouth-eaſt of Iſſoudun, and ten and a half ſouth of Bourges. Lat. 46. 34. N. lon. 19. 52. E. Ferro.

CHATEAU'-NEUF, a town of France, in the department of Cote d'Or, and chief place of a canton, in the diſtrict of Arnay-le-duc: ſeventeen miles ſouth-weſt of Dijon.

CHATEAU'-NEUF, a town of France, and principal place of a diſtrict, in the department of the Mayne and Loire: thirteen miles north of Angers, and four and a half weſt of La Fleche.

CHATEAU'-NEUF, a town of France, in the department of the Var, and chief place of a canton in the diſtrict of Graſſe: three miles north-eaſt of Graſſe.

CHATEAU'-NEUF, a town of France, in the department of the Ille and Vilaine, and chief place of a canton, in the diſtrict of St. Malo: ſeven miles ſouth of St. Malo.

CHATEAU'-NEUF, a town of France, in the department of the Saone and Loire, and chief place of a canton, in the diſtrict of Marcigny: three leagues eaſt-ſouth-eaſt of Marcigny.

CHATEAU'-NEUF, a town of France, in the department of the Loiret, and chief place of a canton, in the diſtrict of Orleans: twelve miles eaſt of Orleans.

CHATEAU'-NEUF, a town of France, in the department of the Upper Vienne, and chief place of a canton, in the diſtrict of St. Leonard: ſeventeen miles ſouth-eaſt of Limoges.

CHATEAU'-NEUF SUR CHAREN'TE, a town of France, in the department of the Charente, and chief place of a canton, in the diſtrict of Cognac: ten miles weſt-ſouth-weſt of Angouleſme.

CHATEAU'-POINSA'T, a town of France, in the department of the Upper Vienne, and chief place of a canton, in the diſtrict of Le Dorat: eighteen miles north of Limoges.

CHATEAU'-PORTIEN', a town of France, in the department of the Ardennes, and chief place of a canton, in the diſtrict of Rethel. It contains about 2500 inhabitants: two leagues weſt of Rethel.

CHATEAU'-REGNAU'LT, a town of France, and principal place of a diſtrict, in the department of Indre and Loire: five leagues north-eaſt of Tours, and ſix weſt of Blois.

CHATEAU'-RENA'RD, a town of France, in the department of the Loiret, and chief place of a canton, in the diſtrict of Montargis: four leagues and a half ſouth-weſt of Sens, and four and a half eaſt of Montargis.

CHATEAU'-RENA'RD, a town of France, in the department of the Mouths of the Rhine, and chief place of a canton, in the diſtrict of Taraſcon, celebrated for its excellent white wine: nine miles north-eaſt of Taraſcon.

CHATEAU'-RENA'RD, a town of France, in the department of the Ardennes: ten miles north-weſt of Sedan.

CHATEAU'-SALI'NS, a town of France, and principal place of a diſtrict, in the department of the Meurte, ſo called from the ſalt works, which are very extenſive: ſeven leagues ſouth-eaſt of Metz, and five north-eaſt of Nancy. Lat. 48. 49. N. lon. 24. 10. E. Ferro.

CHATEAU'-THIERRY', a town of France, and principal place of a diſtrict, in the department of the Aiſne, ſituated on the Marne, and contains three pariſhes; near it is a medicinal ſpring: five poſts and a half weſt of Epernay, and ten and three quarters north-north-eaſt of Paris. Lat. 49. 3. N. lon. 21. 4. E. Ferro.

CHATEAU' LA VALLIE'RE, a town of France, in the Indre and Loire, and chief place of a canton, in the diſtrict of Langeais: five leagues north of Langeais.

CHATEAU'-VILLAIN', a town of France, in the department of the Iſere: ſixteen miles eaſt of Vienne.

CHATEAU'-VILLAIN', a town of France, in the department of the Upper Marne, and chief place of a canton, in the diſtrict of Chaumont: five leagues and a half weſt-north-weſt of Langres.

CHATEAUNEU'F, a town of France, in the department of the Higher Alps, and chief place of a canton, in the diſtrict of Serres: ten miles ſouth of Serres.

CHATEAUNEU'F, a town of France, in the department of the Cher, and chief place of a canton, in the diſtrict of St. Amand: four leagues and a half ſouth of Bourges, and four and a half eaſt-ſouth-eaſt of Iſſoudun.

CHATEAUNEU'F DU FAON, a town of France, in the department of Finiſterre, and chief place of a canton, in the diſtrict of Carhaix: ſixteen miles north-eaſt of Quimper.

CHATEAUNEU'F DE GALAU'RE, a town of France, in the department of the Drome, and chief place of a canton, in the diſtrict of Romans: thirteen miles north of Romans.

CHATEAUNEU'F DE MAZE'NC, a town of France, in the department of the Drome, and chief place of a canton, in the diſtrict of Montelimart: nine miles eaſt of Montelimart.

CHATEAUNEU'F DU PAPE, a town of France, in the department of the Mouths of the Rhone: three leagues north of Avignon.

CHATEAUNEU'F DE RAN'DON, a town of France, in the department of the Lozere, and chief place of a canton, in the diſtrict of Langogne: four leagues north-eaſt of Mende.

CHATEAUNEU'F DE RHONE, a town of France, on the eaſt ſide of the Rhone, oppoſite Viviers.

CHATEAUNEU'F EN THIMERAI'S, a town of France, and principal place of a diſtrict, in the department of the Eure: thirteen miles north-weſt of Chartres, and twelve ſouth of Dreux. Lat. 48. 36. N. lon. 18. 55. E. Ferro.

CHATEAUNEU'F-AU-VAL-DE-BARGI'S, a town of France, in the department of the Nyevre, and chief place of a canton, in the diſtrict of La Charité: ten miles north-eaſt of Charité.

CHATEAUROU'X, a town of France, and capital of the department of the Indre, ſituated in a fertile country, on the Indre. Here is a large woollen manufacture. It contains four pariſhes, and about 5500 inhabitants: fifteen poſts north Limoges, and thirty-one and three quarters ſouth-ſouth-weſt of Paris. Lat. 46. 49. N. lon. 19. 21. E. Ferro.

CHATEAUROU'X, a town of France, in the department of the Higher Alps: five miles north of Embrun.

CHATEEN', a town of Little Bukharia.

CHATEL', or CHATE, a town of France, in the department of the Ardennes, and chief place of a canton, in the diſtrict of Grandpré: five miles ſouth-eaſt of Grandpré.

CHATEL'-CEN'SOY, a town of France, in the department of the Yonne, and chief place of a canton, in the diſtrict of Avalon: four leagues weſt of Avalon.

CHATEL'-GUI'ON, a village of France, in the department of Puy-de-Dome, celebrated for its mineral water: one league north of Riom.

CHATEL' SUR MOZEL'LE, a town of France, in the department of the Voſges: three leagues and a half eaſt of Mirecour.

CHATEL'-DE-NEUVE, a town of France, in the department of the Allier, and chief place of a canton, in the diſtrict of Moulins: ten miles ſouth of Moulins.

CHATEL' (John), the ſon of a woollen-draper at Paris, attempted the life of Henry IV. of France, December 27, 1594. This prince, having taken a journey to the borders of Artois, was returned to Paris that very day. He had a levee in the chamber of his miſtreſs Gabriella d'Eſtrées, who lived then at the hotel de Bouchage; and, as he was going to embrace Montigni, he was ſtruck in his under lip with a knife, which broke a tooth in his mouth. John Chatel, who gave him the blow, and deſigned to cut his throat, was then but eighteen or nineteen years

years old. Having failed in the attempt, he dropt his knife, and hid himself in the crowd. Every body stood amazed, being at a loss to know who the villain was; and he was likely to escape: but some one happened to cast an eye upon him, and he was taken at a venture, the wildness of his look betraying him. The king commanded the captain of the guard who had seized him, to let him go; saying that he pardoned him: but hearing that he was a disciple of the jesuits, he cried out, "Must then the jesuits be convicted from my own mouth?" This regicide, being examined by the ordinary judge of the king's houshold, declared the reasons that determined him to so desperate an attempt. Being questioned about the fact, he said he was urged to it, by the consciousness of having led a scandalous and wicked life; that he despaired of forgiveness, and that it was impossible for him to escape going to hell; but that he hoped to make his damnation more tolerable by attempting a great action. Being asked what that great action was? he answered, the murder of the king; not that even this would absolve him from damnation, but only that it would make his torments more tolerable. Being asked, whence he had this new theology? he replied from the study of philosophy. He was then questioned, whether he had studied philosophy in the college of the jesuits, and whether he was ever in the meditation-chamber, in which were shewn the pictures of several evil spirits, and a great many strange figures; and to which the jesuits introduced sinners, with a view to frighten and reclaim them from their wicked lives. He answered, that he had studied two years and a half under father Gueret, and that he had often been in the meditation-chamber. Being asked who it was that persuaded him to kill the king? his answer was, that he had heard in several places, that it was lawful to kill the king; and that they who said it, called him a tyrant. Then they asked him whether it was not customary with the jesuits to talk of killing the king? to which he replied, that he had heard them say, that it was lawful to kill the king: that he was without the pale of the church; and that no one ought to obey him, or acknowledge him for a king, till he had obtained the pope's approbation.

He was sentenced to death by a decree of the parliament December 29, 1594, and suffered the same day by the light of flambeaux. The sentence sets forth a particular account of his sufferings, in the following manner: "The court has condemned John Chatel to make honourable amends before the chief door of the church of Paris, stripped to his shirt, holding in his hand a lighted wax taper of two pounds weight, and there to say and declare on his knees, that he had wickedly and treacherously attempted to commit this most inhuman and abominable murder, and had wounded the king in the face with a knife; and that, having been taught a false and damnable doctrine, he said on his trial, that it was lawful to kill the king, and that king Henry IV. now reigning, was not a member of the church till he had obtained the pope's approbation; of which he the said John Chatel repents, and for which he begs pardon of God, of the king, and of the court. This done, he is to be drawn on a sledge to la Place de Greve, and there to have the flesh of his arms and thighs torn off with red-hot pincers; and his right hand, in which he is to hold the knife with which he endeavoured to commit the murder, cut off; afterwards his body to be drawn and quartered by four horses, pulling several ways, and his members and corpse to be thrown into the fire, and burnt to ashes, and the ashes thrown up into the air. The court has also declared, and does declare, all his goods and chattels forfeited to the king. Before this sentence be executed upon him, he shall also be put to the rack, and suffer the ordinary and extraordinary torture, to force him to declare his accomplices, and some other circumstances relating to his trial." By the same decree all the jesuits were banished out of France. Peter Chatel his father, and the jesuit Gueret, under whom Chatel was then studying philosophy, were tried January 10, following. The jesuit was banished for ever, Peter Chatel for nine years out of France, and for ever out of the city and suburbs of Paris. The jesuit's goods and chattels were forfeited to the king, and Peter Chatel was fined 2000 crowns. The court also ordered the house in which Peter Chatel lived, to be entirely demolished; the spot on which it stood to be applied to the use of the public, and that no other house should ever be built upon it; but that a high pillar of free-stone should be set up for a perpetual monument of that most wicked and abominable attempt on the king's person, and that on the said pillar be engraved an inscription, containing the reasons for which the house was demolished and the pillar erected. This sentence was executed; but the pillar has since been taken down, and a spring caused to run there instead of it.

CHATELDON', a town of France, in the department of Puy-de-Dome, and chief place of a canton, in the district of Thiers: six leagues east-north-east of Riom.

CHATELET' (Le), a town of France, in the department of the Seine and Marne, and chief place of a canton, in the district of Melun: two leagues east of Melun.

CHATELET' (the marchioness), descended of an ancient family of Picardy, and born on the 17th of December 1706. Among the women of her nation who have rendered themselves illustrious, she is certainly entitled to the first rank. Before her, many had acquired reputation by agreeable romances, and by poetical flights, in which there appeared the graces of wit, and the charms of sentiment. Several also, by applying themselves to the study of languages, by making the beauties of others to pass for their own, and by enriching their versions with valuable commentaries, had deserved well of the republic of letters. But by composing works on subjects which unfold themselves only to men of rare genius, the marchioness has classed herself with the greatest philosophers, and may be said to have rivalled Leibnitz and Newton. She wrote "Institutes of Physic," a work considered as a masterpiece of eloquence and reasoning, addressed to her son. This is a commentary on Leibnitz's philosophy, which is often unintelligible. She died 1749, aged 43.

CHA'TELLANY, *s.* [*chatelenie*, Fr.] The district under the dominion of a castle.—Here are about twenty towns and forts of great importance, with their *chatellanies* and dependencies. *Dryden.*

CHATELLERAU'LT, a town of France, and principle place of a district, in the department of the Vienne. It is situated on the Vienne, and contains about 8000 inhabitants: the principal employment is in making clocks and cutlery: five posts north-north-east of Poictiers, and forty-three and a quarter south-south-west of Paris. Lat. 46. 49. N. lon. 18. 12. E. Ferro.

CHATELLET' (Le), a town of France, in the department of the Cher, and chief place of a canton, in the district of Chateau Meillant: two leagues north-north-east of Chateau Meillant.

CHATELLU'X, a town of France, in the department of the Creuse, and chief place of a canton, in the district of Boussac: four leagues south-west of Boussac.

CHATELLU'X-LE-MARCHIEU'X, a town of France, in the department of the Creuse, and chief place of a canton, in the district of Bourganeuf: five miles north-east of Bourganeuf.

CHATENAY', a town of France, in the department of Paris: two leagues south of Paris.

CHATENOIS', a town of France, in the department of the Lower Rhine: one league west of Scheleftat.

CHATENOY', a town of France, in the department of the Vosges, and chief place of a canton, in the district of Neufchateau: two leagues south east of Neufchateau.

CHA'THAM, one of the principal dock-yards belonging to Great Britain, situate in the county of Kent, and separated by the river Medway from Rochester, to which

which it is a suburb. The dock was begun by queen Elizabeth, and has been so improved by her successors, particularly Charles II. that there is not a more complete arsenal in the world. That excellent fund for the relief of wounded seamen, called the chest at Chatham, was instituted in 1588, after the defeat of the Spanish armada, when queen Elizabeth, by advice of Sir Francis Drake, Sir John Hawkins, and others, assigned a portion of every seaman's pay to the relief of seamen who have been wounded or disabled in the navy. Here is also an hospital, founded by Sir John Hawkins, for poor decayed mariners and shipwrights; the building appropriated for their reception was finished, as appears from an inscription in the wall, in the year 1592. Queen Elizabeth, at the request of the founder, granted a charter of incorporation by the name of "the governors of the hospital of Sir John Hawkins, Knt. at Chatham." No person is eligible who has not been maimed or disabled in the service of the navy, or otherwise brought to poverty. It is remarkable that captain Hawkins, the founder of this charity, is mentioned as the first Englishman who ever engaged in the African slave trade. By queen Elizabeth's charter of incorporation, the community is always to consist of twenty-six governors, of which number only four were to be elective, and the others by virtue of their respective offices. These are, the archbishop of Canterbury, the bishop of Rochester, the lord high admiral, the lord warden of the Cinque Ports, the dean of Rochester, the treasurer, comptroller, surveyor, and clerk of the acts, of the navy, six principal masters of mariners, two principal shipwrights, the master and wardens of the Trinity-house, for the time being, and their successors. This hospital has been lately rebuilt, in a light, airy, and handsome, manner. In 1667, the Dutch fleet took and dismantled Sheerness, and, sailing up the Medway, burnt three guard-ships, and attacked Upnor Castle, which defends the arsenal; but they were repulsed, and in their return burned and damaged three men of war.

The dock-yard, including the ordnance-wharf, is about a mile in length; and the commissioner, and other principal officers, have elegant houses to reside in. Here are many spacious storehouses, one of which is 660 feet in length. The sail-loft is 209 feet long. Though an immense quantity of stores of all kinds are deposited in these magazines, yet they are arranged in so regular a manner, that, on any emergency, whatever is wanted may be procured with the greatest dispatch, and without the least confusion. In the anchor-smith's forge are twenty-one fires constantly employed; and here are made the anchors, some of which weigh near five tons. The new rope-house is 1140 feet in length, in which cables are made 120 fathoms long, and twenty-two inches round. Chatham church is situated on an eminence adjoining to the office of ordnance. It was destroyed by fire about the middle of the fourteenth century; and, in order to enable the inhabitants to rebuild it, the pope, by a bull dated 1352, granted to all who should contribute their assistance to so pious a work, a relaxation from penances for one year and forty days. In 1635, the commissioner of his majesty's navy repaired the church, rebuilt and enlarged the west end, and erected the steeple. In 1707, the gallery over the south aisle was built by commissioner St. Loo, of Chatham-yard, for the use of the navy and ordinary. But, notwithstanding these enlargements, the church was still too small; and in 1788, it was pulled down, except the steeple part, and rebuilt with brick on extended dimensions; the galleries are spacious and uniform, and the light happily disposed throughout the fabric, which is now capable of holding the parishioners without inconvenience. Chatham has two annual fairs, viz. May 15 and September 19. The market is on Saturdays. Distant from Canterbury twenty-five miles, and thirty east from London.

CHA'THAM, a maritime town of United America, in Barnstaple county, Massachusetts, situated on the exterior extremity of the elbow of Cape Cod, convenient for the fishery; in which they have usually about forty vessels employed. It has 1140 inhabitants, and lies ninety-five miles south-east of Boston.

CHA'THAM, a township in Grafton county, New-Hampshire. It was incorporated in 1767.

CHA'THAM, a flourishing township in Middlesex county, Connecticut, on the eastern bank of Connecticut river, and opposite Middleton city. It was a part of the township of Middleton till 1767.

CHA'THAM, a township in Essex county, New Jersey, situated on Passaic river: thirteen miles west of Elizabeth town, and nearly the same from Newark.

CHA'THAM, a township of Columbia county, New-York. By the state census of 1796, 380 of its inhabitants were electors.

CHA'THAM, a county of the American States, in Hillsborough district, North Carolina, about the centre of the state. It contains 9221 inhabitants; chief town, Pittsburg. The court-house is a few miles west of Raleigh, on a branch of Cape Fear river.

CHA'THAM, a town of South Carolina, in Cheraws district, situated in Chesterfield county, on the west side of Great Pedee river. Its situation, in a highly-cultivated and rich country, and at the head of a navigable river, bids fair to render it a place of great importance.

CHA'THAM, a county of the American States, in the lower district of Georgia, in the north-east corner of the state, having the Atlantic ocean east, and Savannah river north-east. It contains 10,769 inhabitants. The chief town is Savannah, the former capital of the state.

CHA'THAM, or Punjo bay, a large bay on the west side of the south end of the promontory of East Florida. It receives North and Delaware rivers.

CHA'THAM, an island of United America, on the south-east coast of the state of Massachusetts. Lat. 41. 39. N. lon. 69. 56. W. Greenwich.

CHA'THAM-HOUSE, in the territory of the Hudson's bay company. Lat. 55 23. 40. N. lon. 98. W. Greenwich.

CHATILLON', a town of France, in the department of Paris, and chief place of a canton, in the district of Bourg la Reine: one league and a half south-south-west of Paris.

CHATILLON', a town of France, in the department of the Drome, and chief place of a canton, in the district of Die: three leagues and a half north-west of Lyons.

CHATILLON', a town of Savoy, in the Genevois: three miles south-south-east of St. Julien.

CHATILLON', a town of Piedmont, in the duchy of Aosta, on the Doria Baltea: nine miles south-east of Aosta.

CHATILLON' EN BAROI'S, a town of France, in the department of the Nyevre, and chief place of a canton, in the district of Moulins-en-Gilbert: eight miles north-west of Moulins.

CHATILLON' SOUS LE COTES, a town of France, in the department of the Meuse, and chief place of a canton, in the district of Verdun: six miles east of Verdun.

CHATILLON' SUR COUR I'I'NE, a town of France, in the department of Jura, and chief place of a canton, in the district of Lons-le-Saunier: two leagues and a half east of Lons-le-Saunier.

CHATILLON' LES DOM'BES, a town of France, and principal place of a district, in the department of the Ain: four leagues south-west of Bourg-en-Bresse. Lat. 46. 7. N. lon. 22. 37. E. Ferro.

CHATILLON' SUR IN'DRE, a town of France, and principal place of a district, in the department of the Indre: twenty-three miles north-west of Chateauroux, and eleven south-south-east of Loches.

CHATILLON' SUR LOING, a town of France, in the department of the Loiret, and chief place of a canton, in the district of Montargis, containing about 1700 inhabitants: four leagues south of Montargis.

CHATILLON SUR LOIRE, a town of France, in the department of the Loiret, and chief place of a canton, in the district of Gien: three leagues south-east of Gien.

CHATILLON' SUR MARNE, a town of France, in the

the department of the Marne, and chief place of a canton, in the diſtrict of Epernay: nine miles weſt-north-weſt of Epernay.

CHATILLON' DE MICHAIL'LE, a town of France, in the department of the Ain, and chief place of a canton, in the diſtrict of Nantua: two leagues and a half eaſt of Nantua.

CHATILLON SUR SAONE, a town of France, in the department of the Voſges, and chief place of a canton, in the diſtrict of La Marche: three leagues ſouth-ſouth-eaſt of La Marche.

CHATILLON SUR SEINE, a town of France, and principal place of a diſtrict, in the department of the Cote-d Or. The town is large, though only one pariſh, and is built on both ſides of the Seine. There are ſome iron forges in the neighbourhood: thirty-eight miles north-north-weſt of Dijon, and twenty-four eaſt of Tonnere.

CHATILLON' SUR SE'VRE, a town of France, in the department of the Two Sevres, and chief place of a canton, in the diſtrict of Chatillon: twelve leagues north of Niort, and ſeven weſt of Thouars.

CHATILLON' EN VEN'DELAIS, a town of France, in the department of the Iſle and Vilaine, and chief place of a canton, in the diſtrict of Vitré: two leagues north of Vitré.

CHATONNAY', a town of France, in the department of the Iſere, and chief place of a canton, in the diſtrict of Vienne: five leagues eaſt of Vienne, and ſeven and a half ſouth-eaſt of Lyons.

CHATOYA'NT, *adj.* a term applied by the French, to denote that affection of ſemi-tranſparent ſtones by which their colours vary according to the poſition of the eye of the obſerver. We have not a correſpondent Engliſh word; for which reaſon the French term is adopted by our modern writers on mineralogy.

CHA'TRE (LA), a town of France, and principal place of a diſtrict, in the department of the Indre. Here is a woollen manufacture, and the inhabitants carry on a large trade in cattle; it has two churches: ſix leagues ſouth-ſouth-eaſt of Chateauroux, and ſeven and a half ſouth of Iſſoudun. Lat. 46. 35. N. lon. 19. 39. E. Ferro.

CHA'TTEL, *ſ.* Any moveable poſſeſſion:

Nay, look not big, nor ſtamp, nor ſtare, nor fret;
I will be maſter of what is mine own;
She is my goods, my *chattels.* *Shakeſpeare.*

CHAT'TELS, [*catalla*, Lat.] In law, all goods moveable and immoveable, except ſuch as are in nature of freehold, or parcel of it. The Normans call moveable goods only, chattels; but this word by the common law extends to all moveable and immoveable goods: and the civilians denominate not only what we call chattels, but alſo land, *bona.* But no eſtate of inheritance or freehold can be termed in our law, *goods* and *chattels*; though a leaſe for years may paſs as goods. Chattels are either perſonal or real: perſonal, as gold, ſilver, plate, jewels, houſhold ſtuff, goods and wares in a ſhop, corn ſown on the ground, carts, ploughs, coaches, ſaddles, &c. Cattle, &c. as horſes, oxen, kine, bullocks, ſheep, pigs, and all tame fowls and birds, ſwans, turkeys, geeſe, poultry, &c. and theſe are called perſonal in two reſpects, one becauſe they belong immediately to the perſon of a man; and the other, for that being any way injuriouſly with-held from us, we have no means to recover them but by perſonal action.

Chattels-real, ſaith Coke, 1 Inſt. 118. are ſuch as concern or favour of the realty; as terms for years of land, the next preſentation to a church, eſtates by a ſtatute merchant, ſtatute-ſtaple, elegit, or the like. And theſe are called real chattels, as being intereſts iſſuing out of, or annexed to, real eſtates; of which they have one quality, viz. immobility, which denominates them real; but want the other, viz. a ſufficient, legal, indeterminate, duration; and this want it is that conſtitutes them chattels. The utmoſt period for which they can laſt, is fixed and determinate, either for ſuch a ſpace of time certain, or till ſuch a particular ſum of money be raiſed out of ſuch a particular income; ſo that they are not equal in the eye of the law to the loweſt eſtate of freehold, a leaſe for another's life. 2 *Comm.* 386. But deeds relating to a freehold, obligations, &c. which are things in action, are not reckoned under goods and chattels; though, if writings are pawned, they may be chattels: and money hath been accounted not to be goods or chattels; nor are hawks or hounds, ſuch being feræ naturæ. 8 *Rep.* 33. *Terms de Ley* 103. A collar of SS. garter of gold, buttons, &c. belonging to the dreſs of a knight of the garter, are not jewels to paſs by that name in perſonal eſtate, but enſigns of honour. *Dyer* 59.

Chattels perſonal are, immediately upon the death of the teſtator, in the actual poſſeſſion of the executor, as the law will adjudge, though they are at never ſo great a diſtance from him; chattels real, as leaſes for years of houſes, lands, &c. are not in the poſſeſſion of the executor till he makes an entry, or hath recovered the ſame; except in caſe of a leaſe for years of tithes, where no entry can be made. 1 *Nelſ. Abr.* 437. Leaſes for years, though for a thouſand years, leaſes at will, eſtates of tenants by elegit, &c. are chattels, and ſhall go to the executor: all obligations, bills, ſtatutes, recogniſances, and judgments, ſhall be as a chattel in the executors, &c. *Bro. Obl.* 181. But if one be ſeiſed of land in fee on which trees and graſs grow, the heir ſhall have theſe, and not the executor; for they are not chattels till they are cut and ſevered, but parcel of the inheritance. 4 *Rep.* 63. *Dyer* 273. The game of a park with the park, fiſh in the pond, and doves in the houſe with the houſe, go to the heir, &c. and are not chattels: though if pigeons, or deer, are tame, or kept alive in a room; or if fiſh be in a trunk, &c. they go to the executors as chattels. *Noy* 124. 11 *Rep.* 50. *Keilw.* 88. An owner of chattels is ſaid to be *poſſeſſed* of them; as of freehold the term is, that a perſon is *ſeiſed* of the ſame.

To CHAT'TER, *v. n.* [*caqueter*, Fr.] To make a noiſe as a pie, or other unharmonious bird.—Nightingales ſeldom ſing, the pie ſtill *chattereth.* *Sidney.*

So doth the cuckoo, when the mavis ſings,
Begin his witleſs note apace to *chatter.* *Spenſer.*

To make a noiſe by colliſion of the teeth:

Dip but your toes into cold water,
Their correſpondent teeth will *chatter.* *Prior.*

To talk idly or careleſly.—Suffer no hour to paſs away in a lazy idleneſs, an impertinent *chattering*, or uſeleſs trifles. *Watts.*

CHAT'TER, *ſ.* Idle prate.—Noiſe like that of a pie or monkey:

The mimic ape began his *chatter*,
How evil tongues his life beſpatter. *Swift.*

CHAT'TERER, *ſ.* An idle talker; a prattler.

CHAT'TERER, in ornithology. See AMPELIS.

CHATTERPOUR', a town of Hindooſtan, in the country of Alla-Habad: 158 miles ſouth-ſouth-eaſt of Agra, and 120 eaſt-ſouth-eaſt of Alla-Habad.

CHAT'TERTON (Thomas), a very ſingular writer, and one to whom M. Baillet would certainly have given a place among his "enfans celebres," was born at Briſtol November 20, 1752; and educated at a charity-ſchool on St. Auguſtin's Back, where nothing more was taught than reading, writing, and accounts. At fourteen years of age, he was articled clerk to an attorney at Briſtol, with whom he continued about three years; yet, though his education was thus confined, he diſcovered an early turn towards poetry and Britiſh antiquities, and particularly towards heraldry. How ſoon he began to be an author is not known. In the Town and Country Magazine for March 1769 are two letters, probably from him, as they are dated from Briſtol, and ſubſcribed with his uſual ſignature, D. B. that is, Dunhelmus Briſtolienſis. The former contains ſhort extracts from two MSS. "written 300 years ago by one Rowley a monk," concerning dreſs in the age of Henry II. the latter Ethelgar, a Saxon poem, in bombaſt proſe. In the ſame magazine for May 1769, are

were three communications from Bristol, with the same signature D. B. one of them intituled "Observations upon Saxon Heraldry, with drawings of Saxon Atchievements;" and, in the subsequent months of 1769 and 1770, there are several other pieces, which are undoubtedly of his composition. In April 1770 he left Bristol, disgusted with his profession, and irreconcileable to the line of life in which he was placed; and coming to London, in hopes of advancing his fortune by his pen, he sunk at once from the sublimity of his views to an absolute dependence on the patronage of booksellers. Things however, seem soon to have brightened-up a little with him; for, May 14, he writes to his mother, in high spirits, upon the change in his situation, with the following sarcastic reflection upon his former patrons at Bristol. "As to those, they rate literary lumber so low, that an author in their estimation must be poor indeed: but here matters are otherwise. Had Rowley been a Londoner instead of a Bristowyan, I could have lived by copying his works." In a letter to his sister, May 30, he informs her that he is to be employed in writing a voluminous "History of London," to appear the beginning of next winter. Meanwhile, he had written something in praise of alderman Beckford, then lord mayor, which had procured him the honour of being presented to his lordship; and, in the letter just mentioned, he gives the following account of his reception, with certain observations upon political writing. "The lord mayor received me as politely as a citizen could: but the devil of the matter is, there is no money to be got on this side of the question. However, he is a poor author who cannot write on both sides. Essays on the patriotic side will fetch no more than what the copy is sold for. As the patriots themselves are searching for places, they have no gratuity to spare. On the other hand, unpopular essays will not even be accepted, and you must pay to have them printed; but then you seldom lose by it, as courtiers are so sensible of their deficiency in merit, that they generously reward all who know how to daub them with the appearance of it." He continued to write incessantly in various periodical publications; yet all these exertions of his genius brought in so little profit, that he was soon reduced to the extremest indigence; so that at last, oppressed with poverty, and also with disease, he put an end to his existence in a fit of despair, August, 1770, by a dose of poison. This unfortunate person, though certainly a most extraordinary genius, seems yet to have been a most ungracious character. He was violent and impetuous to a strange degree. From the first of the above-cited letters to his sister, he appears to have had a portion of ill-humour and spleen more than enough for a lad of seventeen; and the editor of his Miscellanies records, "that he possessed all the vices and irregularities of youth, and that his profligacy was at least as conspicuous as his abilities."

In 1777 were published, in one volume 8vo, "Poems, supposed to have been written at Bristol, by Thomas Rowley and others, in the fifteenth century: the greatest part now first published from the most authentic copies, with an engraved specimen of one of the manuscripts. To which are added, a preface, an introductory account of the several pieces, and a glossary." And, in 1778, were published, in one volume 8vo, "Miscellanies in prose and verse, by Thomas Chatterton, the supposed author of the poems published under the names of Rowley, &c." Concerning the authenticity of the poems under the name of Rowley, that is, whether they were really written by a person of that name, or are only, what they are now generally believed to be, the forgeries of Chatterton, let us advert to the editors of the above works. The prefacer of Rowley's poems gives this account of them, in the words of Mr. George Catcot of Bristol, to whom, he says, the public is indebted for them. "The first discovery of certain manuscripts having been deposited in Redclift church, about three centuries ago, was made in the year 1768, at the time of opening the new bridge at Bristol; and was owing to a publication in Farley's Weekly Journal, October 1, containing, 'An Account of the Ceremonies observed at the opening of the old Bridge,' taken, as it was said, from a very ancient manuscript. This excited the curiosity of some persons to enquire after the original. The printer, Mr. Farley, could give no account of it, or of the person who brought the copy; but, after much enquiry, it was discovered that this person was a youth between fifteen and sixteen years of age, whose name was Thomas Chatterton, and whose family had been sextons of Redclift church for near 150 years. His father, who was now dead, had also been master of the free-school in Pile-street. The young man was at first very unwilling to discover from whence he had the original; but, after many promises made to him, was at last prevailed on to acknowledge that he had received this, together with many other manuscripts, from his father, who had found them in a large chest, in Redclift church." It is added, that soon after this, Mr. Catcot commenced an acquaintance with Chatterton, and partly as presents, partly as purchases, procured from him copies of many of his manuscripts in prose and verse; as other copies were disposed of in like manner to others. It is concluded, however, that whatever may have been Chatterton's part in this very extraordinary transaction, whether he was the author, or only (as he constantly asserted) the copier of all these productions, he appears to have kept the secret entirely to himself, and not to have put it into any one's power to bear certain testimony either of his fraud or of his veracity.

This affair, however, has since become a subject of much controversy. The poems in question, published in 1777, were republished in 1778, with an "Appendix, containing some observations upon their language; tending to prove that they were written, not by any ancient author, but entirely by Chatterton." Mr. Warton, in the third volume of his History of English Poetry, has espoused the same side of the question. Mr. Walpole also obliged the learned world with a letter on Chatterton, from his press at Strawberry-hill. On the other hand has appeared, "Observations upon these Poems, in which their authenticity is ascertained, by Jacob Bryant, esq. 1781;" 2 vols. 8vo. and another edition of the poems, with a comment, in which their antiquity is considered and defended, by Jeremiah Milles, D. D. dean of Exeter, 1782, 4to. Then again, in answer to these two works, three pamphlets came out immediately after: 1. Cursory Observations on the Poems, and Remarks on the Commentaries of Mr. Bryant and Dr. Milles; with a salutary Proposal addressed to the Friends of those Gentlemen. 2. An Archæological Epistle to dean Milles, editor of a superb edition of Rowley's Poems, &c. 3. An Enquiry into the Authenticity of the Poems attributed to Thomas Rowley, in which the arguments of the dean of Exeter and Mr. Bryant are examined, by Thomas Warton; and other pieces in the public prints; all preparatory to the complete settlement of the business, in "A Vindication of the Appendix to the Poems called Rowley's, in reply to the answers of the dean of Exeter, Jacob Bryant, esq. and a third anonymous writer; with some further observations upon those poems, and an examination of the evidence which has been produced in support of their authenticity. By Thomas Tyrwhitt, 1782," 8vo. Upon the whole, the war between Bentley and Boyle about Phalaris, though waged with a far more hostile spirit, yet does not seem to have produced greater commotions and disturbances in its day, than the late contest about Rowley and Chatterton; which seems finally decided that he was himself the author of all those poems, and the successful imitator of the ancient style of poesy.

CHATS'WORTH, the superb seat of the noble family of Devonshire. See the article Bakewell, vol. ii.

CHATS'WORTH, a town of United America, in the state of Virginia; four miles south-east of Richmond.

CHATU'GA, a town of America, in the Tennasee government: three miles south-west of Tellico.

CHAT'WOOD, *s.* Little sticks; fuel.

CHAT'ZAN, a town of Asia, in the Moultan country, west of the Indus: ninety miles west of Moultan. Lat. 31. 8. N. lon. 69. 45. E. Greenwich.

CHAVAI'GNES, a town of France, in the department of the Mayne and Loire, and chief place of a canton, in the district of Vihiers: four leagues south of Angers.

CHAVANAY', a town of France, in the department of the Rhone and Loire: seven leagues south of Lyons.

CHAVAN'NE, a town of France, in the department of the Ain, and chief place of a canton, in the district of Bourg-en-Bresse: eight miles west-north-west of Bourg.

CHAVAN'GE, a town of France, in the department of the Aube, and chief place of a canton, in the district of Arcis: six leagues east of Arcis.

CHAU'CER (Geoffrey), one of the greatest, as well as most ancient, of the English poets, lived in the fourteenth century. It is generally agreed that he was born in London in 1328, the second of Edward III. He was educated at Cambridge, where he wrote the "Court of Love," and some other pieces. He removed from Cambridge to study at Oxford, and afterwards travelled into France, Holland, and other countries. Upon his return he entered himself of the Inner-Temple. His distinguishing accomplishments both of body and mind gained him the friendship of many persons of distinction, by whom he was drawn to court, where he was made page to the king. Not long after, he was made gentleman of the privy-chamber; and, in 1369, the king granted him a pension during life. Next year he was made shield-bearer to the king. In the number of Chaucer's patrons was John of Gaunt duke of Lancaster, by whom, and also his duchess Blanche, a lady distinguished for her wit and virtue, he was greatly esteemed. This lady had, among her attendants, Catharine Roxet, daughter of sir Payn Roxet, a native of Hainault, and Guyen king at arms for that country, who married sir Hugh Swinford, a knight of Lincoln. This gentleman dying soon after their marriage, his lady returned into the duke's family, and was appointed governess of his children. She had a sister, likewise, whose name was Philippa, a great favourite with the duke and duchess, and by them therefore recommended to Chaucer for a wife. He married her about the year 1360, when he was in the flower of his age, and, as appears from a picture taken of him at that time, was one of the handsomest persons about the court. In the forty-sixth year of this prince, Chaucer was also commissioned, in conjunction with other persons, to treat with the republic of Genoa. This negociation, it is conjectured, regarded the hiring of ships for the king's navy; for, in those times, though we made frequently great naval armaments, yet we had but very few ships of our own; and this defect was supplied by hiring them from the free states, either in Germany or Italy. Upon his return, his majesty granted him a pitcher of wine daily, in the port of London, to be delivered by the butler of England. Soon after he was made comptroller of the customs of London, for wool, wool-fells, and hides; with a proviso, that he should personally execute that office, and keep the accounts of it with his own hand. About a year after his nomination to this office, he obtained from the king a grant of the lands and body of sir Edmund Staplegate, son of sir Edmund Staplegate, of Kent, in ward. His income, at this time, amounted to 1000 l. per annum. In the last year of king Edward, he was one of the commissioners sent over to expostulate with the French, on their violation of the truce. Richard II. who succeeded to the crown in 1377, confirmed the same year his grandfather's pension to Chaucer of twenty marks a-year, and likewise the other grant of a pitcher of wine daily. In the fourth year of Richard II. he procured a confirmation of the grants that had been formerly made to himself and to Philippa his wife. Chaucer had adopted many of Wickliffe's tenets, and exerted himself to the utmost, in 1382, in supporting John Camberton, generally stiled John of Northampton, mayor of London, who attempted to reform the city, according to the advice given by Wickliffe. This was highly resented by the clergy. Camberton was taken into custody. Chaucer, who was apprised of his danger, made his escape out of the kingdom, and spent his time in Hainault, France, and Zealand, where he wrote most of his books.

His necessities forcing him to return to England, he was discovered, seized, and sent to prison. But, upon discovering all he knew of the transaction, he was discharged. This confession brought upon him a heavy load of calumny. To give vent to his sorrow at this time, he wrote his "Testament of Love," in imitation of Boethius de Consolatione Philosophiæ." His afflictions received a very considerable addition by the fall of the duke of Lancaster's credit at court. He now resolved to quit that busy scene of life which had involved him in so many troubles, and accordingly retired to Woodstock, where he employed part of his time in revising and correcting his writings. The duke of Lancaster's return to favour, and his marrying Catherine Swynford, sister to Chaucer's wife, could not influence him to quit his retirement, where he published his admirable "Treatise on the Astrolabe." The king, upon his return to France, where he espoused Isabel, the French king's daughter, who was then very young, and put under the care of the duchess of Lancaster, granted Chaucer an annuity of twenty marks per annum, in lieu of that given him by his grandfather, which poverty had forced him to dispose of for his subsistence. Upon the death of the duke of Lancaster, he retired to Dunnington castle, near Newbury, where he spent the last two years of his life. Upon the accession of Henry of Lancaster, the son of his brother-in-law, to the throne, he was reinstated in all his emoluments from the crown. He died October 25, 1400, and was buried at Westminster-abbey. By his wife Philippa he had two sons, Thomas and Louis, to the latter of whom he addressed his "Astrolabe." Thomas was speaker of the house of commons, in the reign of Henry IV. ambassador to France and Burgundy, and passed through several other public posts.

Chaucer was not only esteemed the first, but one of the best poets which these kingdoms ever produced. He was equally great in every species of poetry which he attempted: and his poems in general possess every kind of excellence, even to a modern reader, except melody and accuracy of measure; defects which are to be attributed to the imperfect state of our language, and the infancy of the art in this kingdom at the time when he wrote. "As he is the father of English poetry, (says Dryden,) so I hold him in the same degree of veneration as the Grecians held Homer, or the Romans Virgil. He is a perpetual fountain of good sense, learned in all sciences, and therefore speaks properly on all subjects. As he knew what to say, so he knew also when to leave off; a continence which is practised by few writers, and scarcely by any of the ancients, except Virgil and Horace." This character Chaucer certainly deserved. He had read a great deal; and was a man of the world, and of sound judgment. He was the first English poet who wrote poetically, as Dr. Johnson observes in the preface to his Dictionary, and (he might have added) who wrote like a gentleman. He had also the merit of improving our language considerably, by the introduction and naturalization of words from the Provençal, at that time the most polished dialect in Europe.

CHAU'CIS, in ancient geography, the country of the Chauci, a people of Germany; divided into the Minores, now East Frieseland, and the county of Oldenburg; and into the Majores, now the duchy of Bremen, and a part of Lunenburg.

CHAU'DEBURG, a village of France, in the department of the Moselle, celebrated for its medicinal waters, near Thionville.

CHAU'DES-AIGUES, a town of France, in the department of the Cantal, and chief place of a canton, in the district of St. Flour; which takes its name from a hot mineral spring. The principal commerce is in skins and glue: twelve miles south of St. Flour.

CHAUDIE'RE, a river of Canada, which runs into the river St. Lawrence, two leagues above Quebec.

CHAUDRON', a town of France, in the department of the Mayne and Loire: 15 miles south-west of Angers.

CHA'VENDER, *s.* [*chevesne*, Fr.] The chub-fish. See CYPRINUS.—These are a choice bait for the chub, or *chavender*, or indeed any great fish. *Walton.*

CHA'VES, a town of Portugal, in the province of Tra-los-Montes, near the confines of Spain, defended by a castle, walls, and bastions, situated on the Tamega, and founded by the emperor Trajan: several vestiges exist of its ancient magnificence. This town was taken by the Spaniards, under general O'Reilly, in 1762: twelve leagues west of Bragança. Lat. 41. 42. N. lon. 11. 15. E. Ferro.

CHAUFAIL'LE, a town of France, in the department of the Saone and Loire, and chief place of a canton, in the district of Marcigny: four leagues east of Marcigny.

CHAUKUN'DA, a town of Africa, near the river Gambia, in the kingdom of Jemarrow.

CHAUL, a town of Hindoostan, on the coast of Malabar, with a good port, and defended by a citadel, taken, in 1507, by the Portuguese: six leagues south-east of Bombay.

CHAU'LIEU (William Amfreye de), abbé de Amale, one of the most polite and ingenious of the French poets, was born in 1639, and died at the age of eighty-four. The most complete edition of his poems, is that printed in 2 vols. 8vo in 1733.

CHAULIODON'TA, *s.* [from χαυλιω, to emit, and οδυς, a tooth.] The tribe of animals whose teeth protrude beyond their mouths, as the boar, the elephant, &c.

CHAU'LMES, a town of France, in the department of the Seine and Loire, and chief place of a canton, in the district of Melun: seven leagues and a half east-south-east of Paris.

CHAU'LNES, a town of France, in the department of the Somme, and chief place of a canton, in the district of Peronne: seven miles south of Peronne.

CHAUMERGNY', a town of France, in the department of the Jura, and chief place of a canton, in the district of Poligny: three leagues west of Poligny.

CHAUMET'TE (Pierre Gasparin), the revolutionary recorder of Paris, was a native of the town of Nevers, in the Orleanois. Few men excited more attention in France for a time, or had a more hateful task to perform, during the tragical part of the revolution, than Chaumette. He had been bred to the sea; but not relishing that kind of life, and failing to obtain preferment, he quitted it, and lived by his pen, which he certainly knew how to manage more to his advantage than the compass. He could however, speak better, and more fluently, than he could write. He had also been employed as librarian to a dignitary of the church, in the diocese of Nivernois; but, at the commencement of the troubles in France, he was only a clerk to an attorney, and occasionally wrote for the newspapers and for the stage. He was one of the chief disciples of Camille Desmoulins, and among the first who adopted the tri-coloured cockade, just before the taking of the Bastille. He greatly out-ran his revolutionary colleagues in zeal for the new faith; for when Camille was composing the first number of his *Vieux Cordelier*, with the hope of tranquillising the over-heated imaginations of the leaders of democracy, and tempering the public rage against the real or supposed enemies of the new order of things, Chaumette was still further inflaming and directing their vengeance against particular individuals. It was Chaumette who instigated the commune of Paris to demand the trial of the queen; and he became one of the committee which prepared the charges, and regulated the evidence, against that unfortunate princess. He was a witness too against her at the revolutionary tribunal, and undertook to reprimand M. La Tour Dupin, war-minister to Louis XVI. for not exposing those parts of Antoinette's conduct, which, it was insisted on, he was privy to. The most audacious part of Chaumette's conduct on that occasion, was his accusing the queen of an incestuous connection with her son. This insinuation even shocked the savage tribunal before which she was arraigned, and immediately sunk the accuser in the popular opinion. Robespierre himself, under whose auspices he was believed to act, grew outrageous, and exclaimed, "The fool! was it not enough that he had proved her a Messalina, but he must make an Agrippina of her too?" Robespierre instantly perceived that this odious conduct of Chaumette would hurt the cause; on which account he never forgave him, though he allowed his zeal to continue to operate on inferior objects, till it overwhelmed him in ruin. Robespierre was at this time in the zenith of his power; yet Chaumette moved such a proposition in the full commune, as gave reason to suspect that he intended to set himself up as his rival in the city. The object of this motion was to unite all the heads of the forty-eight sections of Paris in one council; a measure that would have superseded the force of the legislature itself, if not its authority. This was a project conceived in common with the famous Hebert, Momoro, and Mazuel, and would have been aided in its execution by Ronsin, who at that time commanded a body of the revolutionary army. How far Robespierre was apprised of, or dreaded, the scheme, does not appear; many shrewd observers seemed satisfied that it was only a prelude "to the swelling act" which was to follow, when the hero of the piece was to have been put in full play. The majority of the convention saw through the veil which covered the plot, and anticipated their own danger, should it be carried into effect. They, therefore, without loss of time, annulled the proceedings, and declared all to be rebels who should persist therein. Chaumette put a good face on the correction. He told the commune, on its next meeting, that his proposition must be relinquished; for that the convention, with a paternal though severe voice, had stamped with nullity their former resolution, and that it became them, like dutiful children, to submit. Hebert, Momoro, and Mazuel, were soon after accused as traitors, imprisoned, tried, and executed; but Chaumette survived a short time longer, as his enemies thought it safer to wear away by degrees the remaining popular partiality for him, before he should meet his doom. He was taken up, however, on the 26th of March, 1794, under a charge of having conspired, with the foregoing men, against the government, and was guillotined on the 13th of April following, without the smallest effort, on the part of Robespierre, to save him. He confessed, at the place of execution, that the revolution had inflamed his imagination, and at times intoxicated his brain, from the too free gratification of his vengeance for the personal injuries he had received. He said, also, that three instances had come to light of his aristocratic and inveterate enemies attempting his life; and that a desire of reprisal, in which he conceived the safety of the commonwealth in some measure involved, made him seek all occasions for arrogating power; but that he never cherished an idea of possessing any permanent authority, not even of a secondary or subordinate nature.

CHAUMO'NT, a city of France, and capital of the department of the Upper Marne, situated on a mountain, near the river Marne. Here is a manufacture of coarse woollen cloth, and a considerable trade in deer and goats skins: four posts north-north-west of Langres, and twenty-nine and a quarter east-south-east of Paris. Lat. 48. 7. N. lon. 22. 48. E. Ferro.

CHAUMO'NT, a town of France, and principal place of a diſtrict, in the department of the Oiſe; it takes its name from an artificial mountain, on which a fortreſs was built, as a boulevard of France, when Normandy was in the hands of the Engliſh: thirteen miles ſouth-ſouth-weſt of Beauvais, and twenty-ſeven weſt of Senlis. Lat. 49. 15. N. lon. 19. 33. E. Ferro.

CHAUMO'NT, a town of Savoy, in the Genevois, near the frontiers of France: ſix miles north-eaſt of Seiſſel.

CHAUMO'NT, a town of the Netherlands, in the duchy of Luxemburg: ſix miles ſouth of Baſtogne.

CHAUMO'NT, a town of France, in the department of the Ardennes, and chief place of a canton, in the diſtrict of Rethel: nine miles north-north-weſt of Rethel.

CHAUMO'NT, a town of France, in the department of the Loire and Cher, and chief place of a canton, in the diſtrict of Romorantin: ſeventeen miles eaſt of Blois.

CHAUMUSSAY', a town of France, in the department of the Indre and Loire: twelve miles ſouth of Loches.

CHAUMU'ZY, a town of France, in the department of the Marne, and chief place of a canton, in the diſtrict of Reims: eight miles ſouth-weſt of Reims.

CHAUNAY', a town of France, in the department of the Vienne, and chief place of a canton, in the diſtrict of Civray: two leagues north-weſt of Civray.

CHAU'NCY (Sir Henry, knt.), author of the Hiſtorical Antiquities of Hertfordſhire, was deſcended from a family which came into England with William the Conqueror. He was admitted in Gonvil and Caius college, Cambridge; from whence he removed, in 1649, to the Middle-Temple, and in 1656 was called to the bar. In 1681 he was elected reader of the Middle-Temple; and, on the 4th of June, the ſame year, received the honour of knighthood at Windſor caſtle from Charles II. He was choſen treaſurer of the Middle-Temple in 1685. On the 11th of June, 1688, he was called to the degree of ſerjeant at law, and the ſame year advanced to be one of his majeſty's juſtices of the peace for the counties of Glamorgan, Brecknock, and Radnor, in the principality of Wales. After being thrice married, he died in the year 1700. He publiſhed the valuable antiquities of Hertfordſhire, with the original of counties, hundreds, wapentakes, boroughs, corporations, towns, pariſhes, villages, hamlets, &c.

CHAU'NY, a town of France, and principal place of a diſtrict, in the department of the Aiſne, ſituated on the Oiſe: two poſts eaſt of Noyon, and three and a half north of Soiſſons. Lat. 49. 37. N. lon. 20. 53. E. Ferro.

CHAUP (La), a town of France, in the department of the Drome, five leagues and a half eaſt of Le Buis.

CHAURIAT, a town of France, in the department of the Puy-de-Dome, and chief place of a canton, in the diſtrict of Billom: four miles north-weſt of Billom.

CHAUS, or CUST, the moſt eaſterly and moſt extenſive province of the kingdom of Fez: in general mountainous, ſtony, and unfruitful; but in ſome places fertile, and capable of feeding numerous herds of cattle.

CHAUS'SE (Michael Angelo de la), a learned antiquary of Paris in the ſeventeenth century, went early in life to Rome for the ſake of ſtudying antiquities. His Muſæum Romanum, Rome 1690, fol. and augmented to 2 vols. fol. in 1746, evinced the ſucceſs of his application. This valuable collection compriſes a numerous ſucceſſion of antique gems, which had never before been given by impreſſion to the public. It has gone through ſeveral editions. Grævius inſerted it at length in his Recueil des Antiquités Romaines. The ſame author publiſhed at Rome, in 1707, a Recueil des Pierres-gravées Antiques, in 4to. The explanations are in Italian, and the plates are executed by Bartoli. There is alſo by him, Picturæ Antiquæ Cryptarum Romanarum et Sepulchri Naſonum, 1738, fol. Theſe different works preſent a great ſtock of erudition and ſagacity; and are much valued by the curious.

CHAU'SETRAPPES, *ſ.* or CALTROPS, or CROWS-FEET. Iron inſtruments with ſpikes, about four inches long, made like a ſtar, in ſuch a manner, that whichever way they fall, one point ſtands always upwards, like a nail. They are uſually thrown and ſcattered into moats and breaches, to gall the horſes feet, and ſtop the haſty approach of the enemy.

CHAUSSIN', a town of France, in the department of the Puy-de-Dome, and chief place of a canton, in the diſtrict of Dole: three leagues ſouth of Dole.

CHAUTLAN', a town of North America, in the country of Mexico, and province of Chiapa; the inhabitants carry on a conſiderable trade in cocoa, pottery, ſalt, and dates.

CHAUVIGNY', a town of France, in the department of Vienne, and chief place of a canton, in the diſtrict of Montmorrillon, on the Vienne: 4 leagues eaſt of Poictiers.

CHAUVIN' (Stephen), a celebrated proteſtant divine, born at Niſmes, but left France at the revocation of the edict of Nantz, and retired to Rotterdam, where he began a new Journal des Sçavans; and, afterwards removing to Berlin, continued it there three years. At Berlin he was made profeſſor of philoſophy, and diſcharged that office with much honour and reputation. His principal work is a philoſophical dictionary, in Latin, which he publiſhed at Rotterdam in 1662; and gave a new edition of it, much augmented, at Lewarden, in 1713, fol. He died in 1725, aged eighty-five.

CHAUX, a town of France, in the department of the Charente: twenty miles ſouth-weſt of Angouleſme.

CHAUX DE FONDS, a beautiful town of Swiſſerland, in the principality of Neufchatel, and capital of a juriſdiction, which produces but little corn, but feeds a great number of cattle: the inhabitants are induſtrious, and annually export from ten to fixteen thouſand watches of gold and ſilver: 9 miles north-north-weſt of Neufchatel.

To CHAW, *v. a.* [*kawen*, Germ.] To champ between the teeth; to maſticate; to chew:

The man who laugh'd but once to ſee an aſs
Mumbling to make the croſs-grain'd thiſtles paſs,
Might laugh again, to ſee a jury *chaw*
The prickles of unpalatable law. *Dryden.*

CHAW, *ſ.* The chap; the upper or under part of a beaſt's mouth.—I will turn thee back, and put hooks into thy *chaws*, and will bring thee forth and all thine army. *Ezekiel.*

CHAW'DRON, *ſ.* Entrails.

Add thereto a tyger's *chawdron*,
For the ingredients of our cauldron. *Shakeſpeare.*

CHAW'STICK, *ſ.* in botany. See GOUANIA.

CHAYAU'TAS, a juriſdiction of South America, in the country of Buenos Ayres, about forty leagues in circumference, famous for its gold and ſilver mines.

CHAYO'TA, *ſ.* in botany. See SECHIUM.

CHAZELET', a town of France, in the department of the Indre, and chief place of a canton, in the diſtrict of Argenton: ſeven miles ſouth-ſouth-weſt of Argenton.

CHAZEL'LES, a town of France, in the department of the Rhone and Loire, and chief place of a canton, in the diſtrict of Montbriſon: ſeven leagues weſt-ſouth-weſt of Lyons.

CHAZEL'LES (John Matthew), a French mathematician and engineer, born at Lyons in 1657, and educated there in the college of Jeſuits, from whence he removed to Paris in 1675. He firſt became acquainted with Du Hamel, ſecretary to the academy of ſciences, and through him with Caſſina, who employed him with himſelf at the obſervatory, where Chazelles greatly improved himſelf, and alſo aſſiſted Caſſini in the meaſurement of the ſouthern part of the meridian of France. Having, in 1684, inſtructed the duke of Montemar in the mathematical ſciences, this nobleman procured him the appointment of hydrography-profeſſor to the galleys of Marſeilles. In diſcharging the duties of this department, he made

made numerous geometrical and astronomical observations, from which he drew a new map of the coast of Provence. He also performed many other services in that department, and as an engineer along with the armies and naval expeditions. To make observations in geography and astronomy, he undertook also a voyage to the Levant, and among other things he measured the pyramids of Egypt, and found the four sides of the largest of them exactly to face the four cardinal points of the compass. He made a report of his voyage, on his return, to the academy of sciences, upon which he was named a member of their body in 1695, and had many papers inserted in the volumes of their memoirs, from 1693 to 1708. Chazelles died at Marseilles the 16th of January, 1710.

CHAZINZA'RIANS, *s.* Heretics who rose in Armenia in the seventh century. The word is formed of the Armenian *chazus*, "cross." They are also called *staurolatræ*, which in Greek signifies the same as *Chazinzarians* in Armenian, viz. *adorers of the cross*; they being charged with paying adoration to the cross alone. In other respects they were Nestorians; and admitted two persons in Christ. Nicephorus ascribes other singularities to them; particularly their holding an annual feast in memory of their false prophet Sergius, which they called *artzibartzes*.

CHE, a town of China, of the third rank, in the province of Ho-nan: twelve leagues west-north-west of So.

CHE-CHEOU, a town of China, of the third rank, in the province of Hou-quang, on the river Yang-tse: eleven leagues east-north-east of Fong.

CHE-CONG, a town of China, of the third rank, in the province of Se-tchuen: ten miles south-east of Tong-tchouen.

CHE-FANG, a town of China, of the third rank, in the province of Se-tchuen: ten miles north-west of Han.

CHE-KANG, a town of China, of the third rank, in the province of Kiang-nan: eleven leagues east-south-east of Tchi-tcheou.

CHE-LEOU, a town of China, of the third rank, in the province of Chansi: fourteen leagues south-west of Fuen-tcheou.

CHE-MEN, a town of China, of the third rank, in the province of Tche-kiang: twenty miles south-south-west of Kia-hing.

CHE-PING, a city of China, of the second rank, in the province of Yun-nan: 410 leagues south-south-west of Peking. Lat. 23. 49. N. lon. 120. 10. E. Ferro.

CHE-PING, a town of China, of the third rank, in the province of Koei: five leagues west of Tchi-yuen.

CHE-SI'NEN, a town of China, of the third rank, in in the province of Chen-si: fifteen leagues north-west of Hing-ngan.

CHE-TCHEOU-OUE'I, a town of China, in the province of Hou-quang: 700 miles south-south-west of Peking. Lat. 30. 16. N. lon. 126. 40. E. Ferro.

CHE-TCHING, a town of China, in the province of Quang-tong: eight leagues west-south-west of Hoa.

CHE-TCHING, a town of China, of the third rank, in the province of Kiang-si: thirty leagues south-east of Ki-ngan.

CHE-TSI'EN, a city of China, of the first rank, in the province of Koei-tcheou: 875 miles south-south-west of Peking. Lat. 27. 30. N. lon. 125. 30. E. Ferro.

CHE-TSU'EN, a town of China, of the third rank, in the province of Se-tchuen: 30 miles north-east of Mao.

CHE-TSUNG, a city of China, of the second rank, in the province of Yun-nan: 340 leagues south-south-west of Peking. Lat. 24. 56. N. lon. 121. 24. E. Ferro.

CHE-YAM-HO'EI-HO'TUN, a town of Asia, in the kingdom of Corea: 437 miles east-north-east of Peking.

CHEA'DLE, a small town in Staffordshire, 146 miles from London, ten from Uttoxeter, twelve from Newcastle, fifteen from Stafford, seven from the Staffordshire potteries, and in the midway between Birmingham and Manchester, being forty-two miles from each place. It is pleasantly situated on the side of a hill facing the south. Here is a good market on Fridays, well supplied with all kinds of provisions, and four fairs for cattle, horses, hogs, and pedlary, viz. on Lady-day, Holy Thursday, August 21, and October 18. The town is surrounded with coal of an exceeding good quality, which, from its abundance and cheapness, has occasioned several great works to be erected in the neighbourhood; viz. brass-works, copper-works, tin-works, and brass and copper wire-works; all of which are very extensive, and employ a great number of poor. There is also a large manufactory of tape, lately set on foot. The church is an ancient structure, dedicated to St. Giles. The rectory is worth about 500l. per annum. Here is a free-school, well endowed, for twelve boys. The country round Cheadle is beautifully diversified with hill and dale, and enriched with a great number of gentlemen's seats.

CHEAP, *adj.* [ceapan, Sax. *koopen*, Dutch, to buy.] To be had at a low rate; purchased for a small price.—Where there are a great many sellers to a few buyers, there the thing to be sold will be *cheap*. On the other side, raise up a great many buyers for a few sellers, and the same thing will immediately turn dear. *Locke.*—Of small value; easy to be had; not respected.—He that is too much in any thing, so that he giveth another occasion of society, maketh himself *cheap*. *Bacon.*

CHEAP, *s.* [*cheping* is an old word for *market*; whence *Eastcheap*, *Cheapside*.] Market; purchase; bargain: as, good *cheap*, *à bon marché*, Fr.—It is many a man's case to tire himself out with hunting after that abroad, which he carries about him all the while, and may have it better *cheap* at home. *L'Estrange.*

To CHEA'PEN, *v. a.* [ceapan, Sax. to buy.] To attempt to purchase; to bid for any thing; to ask the price of any commodity:

To shops in crowds the daggled females fly,
Pretend to *cheapen* goods, but nothing buy. *Swift.*

To lessen value:

My hopes pursue a brighter diadem,
Can any brighter than the Roman be?
I find my proffer'd love has *cheapen'd* me. *Dryden.*

CHEAP'LY, *adj.* At a small price; at a low rate:

Blood, rapines, massacres, were *cheaply* bought,
So mighty recompence your beauty brought. *Dryden.*

CHEAP'NESS, *s.* Lowness of price.—The discredit which is grown upon Ireland, has been the great discouragement to other nations to transplant themselves thither, and prevailed farther than all the invitations which the *cheapness* and plenty of the country has made them. *Temple.*

CHEA'PO, a river of America, which runs into the bay of Panama: thirty miles east of Panama.

CHEAR. See CHEER.

To CHEAT, *v. a.* [of uncertain derivation; probably from *acheter*, Fr. to purchase, alluding to the tricks used in making bargains.] To defraud; to impose upon; to trick. It is used commonly of low cunning.—It is a dangerous commerce, where an honest man is sure at first of being *cheated*; and he recovers not his losses, but by learning to *cheat* others. *Dryden.*—It has *of* before the thing taken away by fraud:

I that am curtail'd of man's fair proportion,
Cheated of feature by dissembling nature,
Deform'd, unfinish'd. *Shakespeare.*

CHEAT, *s.* [from the verb. Some think abbreviated from *escheat*, because, many fraudulent measures being taken by the lords of manors in procuring escheats, *cheat*, the abridgment was brought to convey a bad meaning.] A fraud; a trick; an imposture:

When I consider life, 'tis all a *cheat*;
Yet, fool'd with hope, men favour the deceit:

Trust on, and think to-morrow will repay;
To-morrow's falser than the former day;
Lies worse; and, while it says we shall be blest
With some new joy, cuts off what we possest. *Dryden.*

A person guilty of fraud.—Dissimulation can be no further useful than it is concealed; for as much as no man will trust a known *cheat. South.*—In the eye of the law, cheats are deceitful practices, in defrauding, or endeavouring to defraud, another of his known right, by means of some artful device, contrary to the plain rules of common honesty; as by playing with false dice; or by causing an illiterate person to execute a deed to his prejudice, by reading it over to him in words different from those in which it was written; or by persuading a woman to execute writings to another as her trustee, upon an intended marriage, which in truth contained no such thing, but only a warrant of attorney to confess a judgment; or by suppressing a will, &c. 1 *Hawk. P. C.* c. 71. Changing corn by a miller, and returning bad corn in the stead, is punishable by indictment, being an offence against the public. 1 *Sess. Ca.* 217. So to run a foot-race fraudulently, and, by a previous understanding with the seeming competitor, to win money. 6 *Mod.* 42. So if an indented apprentice enters for a soldier, and, having received the bounty, is discharged on his master's demanding him, he may be indicted. 1 *Hawk. P. C.* c. 71. But selling beer short of the just and due measure, is not indictable as a cheat. 1 *Black. Rep.* 274. Nor selling gum of one denomination for that of another. *Sayer,* 205. Nor selling wrought gold, as and for gold of the true standard; the offender not being a goldsmith. *Cowp.* 323.

The distinction laid down as proper to be attended to in all cases of the kind, is this: that in such impositions or deceits, where common prudence may guard persons against their suffering from them, the offence is not indictable; but the party is left to his civil remedy for redress of the injury done him: but where false weights and measures are used, or false tokens produced, or such methods taken to cheat and deceive, as people cannot by any ordinary care or prudence be guarded against, there it is an offence indictable. *Burr.* 1125. By stat. 33 H. 8. c. 1. if any person falsely and deceitfully get into his hands or possession any money or other things of any other persons by colour of any false token, &c. being convicted, he shall have such punishment by imprisonment, setting upon the pillory, or by any corporal pain (except pains of death) as shall be adjudged by the persons before whom he shall be convict. Lord Coke observes hereupon, that for this offence the offender cannot be fined, but corporal pain only inflicted. 3 *Inst.* 133. But in 1 Hawk. P. C. c. 71. it is said, that a person has been fined 500l. for this offence. In indictments on this statute, the false token made use of must be set forth. *Stra.* 1127. A counterfeit pass has been held such. *Dalt.* 91. or a pretended power to discharge soldiers. 1 *Latch.* 202. By stat. 30 Geo. II. c. 24. persons convicted of obtaining money or goods by false pretences, or of sending threatening letters in order to extort money or goods, may be punished by fine and imprisonment or by pillory, whipping, or transportation. In indictment on this statute, it must appear what the false pretences were. 2 *Term. Rep.* 581. As there are frauds which may be relieved civilly, and not punished criminally, so there are other frauds which, in a special case, may not be helped civilly, and yet shall be punished criminally. Thus, if a minor goes about the town, and pretending to be of age, defrauds many persons, by taking credit for a considerable quantity of goods, and then insisting on his nonage, the persons injured cannot recover the value of their goods, but they may indict and punish him for a common cheat. 1 *Hawk. P. C.* c. 71.

CHEA'TER, *s.* One that practises fraud.—All sorts of injurious persons, the sacrilegious, the detainers of tithes, *cheaters* of men's inheritances, false witnesses and accusers. *Taylor.*

CHE'BIB, or TELLITZ, a mountain of Africa, in the kingdom of Fez, on which are several towns.

CHEBUC'TO, a bay and harbour on the south-south-east coast of Nova Scotia, distinguished by the loss of a French fleet in a former war between France and Great Britain. Near the head of this bay, on the west side, stands the city of Halifax, the capital of the province.

CHECHMEBAND', a town of Persia, in the province of Segestan: seventy miles north-west of Zareng.

CHECHMURAT', a town of Persia, in the province of Adirbeitzan: 200 miles north-east of Tauris.

To CHECK, *v. a.* [from the French *echecs*, chess; from whence we use, at that game, the term *checkmate*, when we stop our adversary from carrying on his play any farther.] To repress; to curb.—Fames may be sown and raised, they may be spread and multiplied, they may be *checked* and laid dead. *Bacon.*

I hate when vice can bolt her arguments,
And virtue has no tongue to *check* her pride. *Milton.*

To reprove; to chide:

Richard, with his eye brimful of tears,
Then *check'd* and rated by Northumberland,
Did speak these words, now prov'd a prophesy. *Shakes.*

To compare a bank note, or other bill, with the correspondent paper. To controul by a counter-reckoning.

To CHECK, *v. n.* To stop; to make a stop: with *at* — The mind, once jaded by an attempt above its power, either is disabled for the future, or else *checks at* any vigorous undertaking ever after. *Locke.*—To clash; to interfere.—If love *check* with business, it troubleth men's fortunes. *Bacon.*—To strike with repression:

I'll avoid his presence;
It *checks* too strong upon me. *Dryden.*

CHECK, *s.* Repressure; stop; rebuff; sudden restraint. —God hath of late years manifested himself in a very dreadful manner, as if it were on purpose to give a *check* to insolent impiety. *Tillotson.*—The great struggle with passions is in the first *check. Rogers.*—Restraint; curb; government; continued restraint:

Some free from rhyme or reason, rule or *check*,
Break Priscian's head, and Pegasus's neck. *Pope.*

A reproof; a slight:

However this may gall him with some *check*,
Cannot with safety cast him. *Shakespeare.*

A dislike; a sudden disgust; something that stops the progress:

Say I should wed her, would not my wife subjects
Take *check*, and think it strange? *Dryden.*

In falconry, when a hawk forsakes her proper game to follow rooks, pies, or other birds, that cross her flight.— A young woman is a hawk upon her wings; and, if she be handsome, she is the more subject to go out on *check. Suckling.*

When whistled from the fist
Some falcon stoops at what her eye design'd,
And with her eagerness the quarry miss'd,
Straight flies at *check*, and clips it down the wind. *Dryd.*

The person checking; the cause of restraint; a stop.—A satirical poet is the *check* of the laymen on bad priests. *Dryden.*—Any stop or interruption.—The letters have the natural production by several *checks* or stops, or, as they are usually called, articulations of the breath or voice. *Holder.*—The correspondent cipher of a bank-bill, or note, or order to pay money. A term used in the game of chess, when one party obliges the other either to move or guard his king.

CHECK,

CHECK, or CHECK-ROLL, a roll or book, wherein are contained the names of such persons as are attendants on, and in the pay of, the king, or other great personages, as their household servants. It is otherwise called the *chequer-roll*, and seems to take its etymology from the exchequer.

Clerk of the CHECK *in the royal dock-yards*, an officer who keeps a muster or register of all the men employed aboard his majesty's ships and vessels, and also of all the artificers and others in the service of the navy at the port where he is settled.

To CHECK'ER, or CHEQUER, *v. a.* [from *echecs*, chess, Fr.] To variegate or diversify, in the manner of a chess-board, with alternate colours, or with darker and brighter parts.—In the chess-board, the use of each chess-man is determined only within that *chequered* piece of wood. *Locke.*

The grey-eyed morn smiles on the frowning night,
Check'ring the eastern clouds with streaks of light. *Shakes.*

CHECK'ER, or CHECKER-WORK, *s.* Work varied alternately as to its colours or materials.—Nets of *checker-work* and wreaths of chain-work for the chapiters which were upon the top of the pillars. 1 *Kings.*

CHECK'MATE, *s.* [*echec et mat*, Fr.] The movement on the chess-board that kills the opposite men, or hinders them from moving:

Love they him call'd, that gave me the *checkmate*,
But better might they have behote him hate. *Spenser.*

CHECK'Y, in heraldry, is when the shield, or a bordure, &c. is chequered, or divided into chequers or squares, in manner of a chess-board. This is one of the most noble and most ancient figures used in armoury; and was given to none but great warriors, in token of their bravery; for the chess-board represents a field of battle; and the pawns placed on both sides represent the soldiers of the two armies, which move, attack, advance, or retire, according to the will of the gamesters, who are the generals. This figure is always composed of metal and colour. But some authors reckon it among the several sorts of furs.

CHE'CO, or KECIO, or TONG-TOW, a town of Asia, and capital of the country of Tonquin, situated on the river Songkoi, 100 miles from its mouth.

CHEDABUC'TO, or MILFORD HAVEN, a large and deep bay of North America, on the easternmost part of Nova-Scotia, at the mouth of the gut of Canso. Opposite to its mouth stands Isle Madame. Salmon river falls into this bay from the west, and is remarked as one of the greatest fisheries in the world.

CHED'DER, a village in the county of Somerset, situated under the south-west side of the Mendip hills, and celebrated for its excellent cheese: seven miles distant from Wells, two from Uxbridge; and 149 from London. Chedder is also remarkable for its wonderful rocks, of which it is almost impossible to give an adequate description. The chasm by which the cliffs are formed, does not disclose itself until we come near a mill, turned by a rapid brook that gushes out near the entrance, and soon afterwards loses itself in the river Ax. Proceeding by the side of this brook, we are suddenly struck by a division in the side of the mountain, of the extent of which we no sooner form an idea, than we find it erroneous; for the rocks project one behind another so as often to prevent the eye's further progress. We are constantly deceived, and at length discover that this stupendous chasm extends quite through the south-west ridge of Mendip, from top to bottom, the length being at least two miles, at the end of which it divides into two branches, so as to allow an easy ascent to the top of the hills. The direction is winding, but on the whole nearly from south-west to north-east. In many points the cliffs rise to the height of full 300 feet, quite perpendicularly, some terminating in bold pinnacles, others in irregular fragments like shattered battlements of vast castles, and others inclining as if about to crush the spectator as he passes under. Yews project out of several of the fissures, forming lofty canopies of a solemn shade; many rocks wear long mantles of ivy, which have the most picturesque and beautiful appearance, compared with the craggy nakedness of the others. The scenery varies continually, and to catch all its sublime effects it is necessary to travel it over backward and forward for some time. The width decreases gradually towards the termination, the bottom appearing more and more overspread with fragments of rock, which render it in some places with difficulty passable. On the right hand, the cliffs are much steeper than on the left, and for the most part inaccessable; but it may be remarked that, in general, the saliant angles on one side correspond with the recipient ones on the other. Indeed every circumstance contributes to impress a belief that the mountain must have been here violently rent asunder, either in consequence of some remote part suddenly losing its support, and subsiding, or of some subterraneous force operating immediately below this part, and elevating it above the level of the rest. The inclination of the strata, which are from one foot to three feet in thickness, is to the south-west nearly, the general direction of them being from north-west to south-east; this is the course of the hills, the height of which seems to increase northward, and particularly near the village of Loxton, where is a prodigious eminence called Crook's peak. Though the cliffs are not so wide apart as those of Dovedale, yet (excepting that the latter are more profusely adorned with wood) there is a great resemblance between these two grotesque spots. The rocks of Chedder are certainly on the grandest and boldest scale; on the other hand, they have not the advantage of a beautiful stream, like the Dove, dividing them. Stupendous as they are, there is a contiguous part of Mendip some hundred feet higher, sloping from their tops with a gradual ascent, and commanding, particularly to the west and south, a most extensive prospect.

CHE'DUBA, an island in the bay of Bengal, near the coast of Ava, thirty miles long, and nine wide. Lat. 18. 50. N. lon. 93. 45. E. Greenwich.

CHE'GO-HILLS, hills of Hindoostan, near the south coast of the country of Gutch.

CHEEK, *s.* [ceac, Sax.] The side of the face below the eye:

Daughter of the rose, whose *cheeks* unite
The diff'ring titles of the red and white;
Who heav'n's alternate beauty well display,
The blush of morning and the milky way. *Dryden.*

A general name among mechanics for almost all those pieces of their machines and instruments that are double, and perfectly alike; as the cheeks of a printing-press, of a turner's lathe, of a glazier's vice, &c.

CHEEK BY JOLE, close together, side to side.

CHEEK, *s.* in ship-building, a piece of timber, fitted on each side of the mast at the top, to strengthen it. The uppermost piece of timber in the beak of a ship is called the *cheek*. The knees which fasten in the beak-head of the ship are called *cheeks*; and the sides of any block, or the sides of a ship's carriage of a gun, are called *cheeks*.

CHEEK-BONE, *s.* I cut the tumour, and felt the slug: it lay partly under the os jugale, or *cheek-bone*. *Wiseman.*

CHEEK-TOOTH, *s.* The hinder-tooth or tusk.—He hath the *cheek-teeth* of a great lion. *Joel.*

CHEER, *s.* [*chere*, Fr. entertainment; *cara*, Sp. the countenance. It seems to have, in English, some relation to both these senses.] Entertainment; provisions served at a feast.—Better *cheer* you may have, but not with better heart. *Shakespeare.*—Invitation to gaiety:

You do not give the *cheer*; the feast is sold
That is not often vouched, while 'tis making,
'Tis given with welcome. *Shakespeare.*

Gaiety; jollity:

I have not that alacrity of ſpirit,
Nor *cheer* of mind that I was wont to have. *Shakeſpeare.*

Air of the countenance:

He ended; and his words their drooping *cheer*
Enlighten'd, and their languiſh'd hope reviv'd. *Milton.*

Perhaps temper of mind in general; for we read of heavy *cheer*.—Then were they all of good *cheer*, and they alſo took ſome meat. *Acts.*

When good CHEER *is lacking, friends will be packing.* Lat. *Cum fortuna perit, nullus amicus erit.* And ſo the Germ. *Mit dem glucke verſcwinden auch dieſ freunde,* (fortune and friends diſappear together.) Daily experience ſo ſufficiently evinces the truth of this proverb, that it needs no illuſtration.

To CHEER, *v. a.* To incite; to encourage; to inſpirit:

He *cheer'd* the dogs to follow her who fled,
And vow'd revenge on her devoted head. *Dryden.*

To comfort; to conſole:

I die ere I could lend thee aid;
But *cheer* thy heart, and be thou not diſmay'd. *Shakeſ.*

To gladden:

The ſacred ſun, above the waters rais'd,
Thro' heaven's eternal brazen portals blaz'd
And wide o'er earth diffus'd his *cheering* ray. *Pope.*

To CHEER, *v. n.* To grow gay or gladſome:

At ſight of thee my gloomy ſoul *cheers* up;
My hopes revive, and gladneſs dawns within me. *A. Phillips.*

CHEER'ER, *ſ.* Gladner; giver of gaiety.—Saffron is the ſafeſt and moſt ſimple cordial, the greateſt reviver of the heart, and *cheerer* of the ſpirits. *Temple.*

Prime *cheerer*, light,
Of all material beings firſt and beſt. *Thomſon.*

CHEER'FUL, *adj.* Gay; full of life; full of mirth:

The *cheerful* birds of ſundry kind
Do chaunt ſweet muſic to delight his mind. *Spenſer.*

Having an appearance of gaiety.—A merry heart maketh a *cheerful* countenance; but by ſorrow of the heart the ſpirit is broken. *Proverbs.*

CHEER'FULLY, *adv.* Without dejection; with willingneſs; with gaiety.—Pluck up thy ſpirits, look *cheerfully* upon me. *Shakeſpeare.*

May the man,
That *cheerfully* recounts the female's praiſe,
Find equal love, and love's untainted ſweets
Enjoy with honour. *Phillips.*

CHEER'FULNESS, *ſ.* Freedom from dejection; alacrity.—With what reſolution and *cheerfulneſs*, with what courage and patience, did vaſt numbers of all ſorts of people in the firſt ages of Chriſtianity, encounter all the rage and malice of the world, and embrace torments and death! *Tillotſon.*—Freedom from gloomineſs.—I marvelled to ſee her receive my commandments with ſighs, and yet do them with *cheerfulneſs*. *Sidney.*

CHEER'LESS, *adj.* Without gaiety, comfort, or gladneſs:

On a bank, beſide a willow,
Heav'n her cov'ring, earth her pillow,
Sad Amynta ſigh'd alone,
From the *cheerleſs* dawn of morning
Till the dews of night returning. *Dryden.*

CHEER'LY, *adj.* Gay; cheerful. Not gloomy; not dejected.—They are uſeful to mankind, in affording them convenient ſituations of houſes and villages, reflecting the benign and cheriſhing ſun-beams, and ſo rendering their habitations both more comfortable and more *cheerly* in winter. *Ray.*

CHEER'LY, *adv.* Cheerfully:

Oft liſtening how the hounds and horn
Cheerly rouſe the ſlumb'ring morn. *Milton.*

CHEER'Y, *adj.* Gay; ſprightly; having the power to make gay: a ludicrous word:

Come, let us hie, and quaff a *cheery* bowl;
Let cyder new waſh ſorrow from thy ſoul. *Gay.*

CHEESE, *ſ.* [*caſeus*, Lat. cyſe, Sax.] An univerſal food, made by preſſing the curd of coagulated milk, and ſuffering the maſs to dry.—I would rather truſt a Fleming with my butter, the Welſhman with my *cheeſe*, than my wife with herſelf. *Shakeſpeare.*—Ariſtæus a pupil of Chiron, is ſaid to have firſt diſcovered the art of making cheeſe; and it appears from Galen and Pliny, that cheeſe was known to the Greeks and Romans much earlier than butter. It is a common opinion, that old cheeſe digeſts every thing, yet is left undigeſted itſelf; but this is without foundation. New cheeſe digeſts difficultly, and, when old, it is acrid and hot. Cheeſe made from the milk of ſheep digeſts ſooner than that from cows, but it is leſs nouriſhing; and that from the milk of goats digeſts ſooner than either, but is alſo the leaſt nouriſhing. The acrimony in cheeſe is from the rennet, which is increaſed by age. As to the goodneſs of cheeſe, that is beſt taſted which diſcovers no particular quality to exceſs, and which is the ſooneſt digeſted. In general, it is a kind of food beſt adapted to the laborious, or thoſe whoſe organs of digeſtion are ſtrong. See Galen de Alim. Facult. Dr. Cullen, in his Materia Medica, ſays, the caſeous or coagulable part of milk, is certainly a great if not the greateſt part of the nouriſhment which milk affords, and is in itſelf the more nouriſhing the more it is united with the oily parts. When the coagulum has the whey taken from it, it becomes a more nutritious ſubſtance than the milk it was taken from, but will probably be of more difficult digeſtion. Cheeſe in its dried ſtate, when made from milk previouſly deprived of its cream, may be ſtill a very nutritious matter, but of very difficult digeſtion; but, made of entire milk, muſt be a more nouriſhing ſubſtance, and of much eaſier digeſtion; or made of entire milk, with a portion of cream taken from other milk added to it, will be ſtill more nouriſhing, and hardly of leſs eaſy digeſtion, as the oily parts every-where interpoſed between the parts of the gluten muſt render the adheſion of this leſs firm; and, if cheeſe be made of cream alone, that will be certainly the moſt nutritious, and of the eaſieſt digeſtion. But cheeſe is not only made of cow's milk, but alſo of the milk of ewes and goats, and often of a portion of the two latter added to cow's milk. In all theſe caſes, as the milk of ewes and cows contains a larger portion of the oily and caſeous parts, ſo, in proportion as theſe are employed, the cheeſe becomes more nutritious, but at the ſame time of more difficult digeſtion.

As cheeſe is eaten not only when recent and freſh, but alſo under the various degrees of corruption it is liable to; ſo it acquires new qualities; and, according to the degree of corruption, it becomes more acrid and ſtimulant, partly by the acrimony it has acquired from corruption, and partly by the great number of inſects that are conſtantly generated in it in that ſtate. In this corrupted condition, it can hardly be taken in ſuch a quantity, as to be conſidered as alimentary; and, as a condiment influencing the digeſtion of other food, it is a point difficult to explain, though it is commonly admitted. When toaſted, it is not ſo eaſily digeſted by weak ſtomachs, becauſe a portion of the oil is then ſeparated, and the other parts are more firmly united by that proceſs: hence for thoſe hurt by indigeſtion, and heated by a heavy ſupper, it is a very improper diet.

Before the time of Scheele, our chemical knowledge of milk consisted of little more than the common operations of the dairy, and the results of the inaccurate method of decomposition by fire. This celebrated chemist, however, relates a variety of interesting experiments on milk, which confirm all the above properties of cheese. If any vegetable or mineral acid be mixed with milk, the cheese separates, and, if assisted by heat, coagulates into a mass. The quantity of cheese is less when a mineral acid is used. Neutral salts, and all earthy and metallic salts, will separate the cheese from the whey. Sugar, and gum arabic, produce the same effect. Caustic alkalis will dissolve the curds, by the assistance of a boiling heat, and acids occasion a precipitation again. It does not appear, however, that the caseous part is dissolved in milk by means of an alkali, as was ascertained by adding an acid to milk, which ought to have produced a neutral salt, if this had been the case; but it did not. The true reason why acids cause the caseous matter to separate is, that they combine with it, and form a compound much less soluble in water than the cheese itself. Eight parts of water will dissolve one part of the curd precipitated by a mineral acid; so much of the acid having been previously mixed with the water as to give it a sour taste. Vegetable acids have very little solvent power upon curds; which accounts for a greater quantity of curd being obtained when a vegetable acid is used. Scheele thinks that neutral salts, gums, and sugar, produce a coagulation of curds by virtue of their stronger attraction for the water. He considers cheese as an animal gelatinous substance, or rather serous matter; for he would wish to confine the word jelly to such adhesive animal substances as become more fluid by heat, whereas serum coagulates at a certain temperature. He found that curds, after repeated abstractions of nitrous acid, left a white residue consisting of nitrated lime and an animal earth. This animal earth, which may be supposed to be phosphorated lime, amounted to one tenth of the whole weight. The white of egg, in the opinion of this author, is nothing else but pure cheese. When this substance is coagulated by means of heat, it may be dissolved by boiling in very dilute mineral acids, which solution is again precipitated by adding some concentrated acid; a phenomenon that likewise happens with the acid solutions of curd or cheese.

The goodness of cheese undoubtedly depends on the richness of the milk from which it is made; as does the milk on the luxuriance and sweetness of the pastures wherein the cattle feed. It is to this circumstance, and not to any peculiarity in the art of making, that we are to attribute the particular excellence of cheese of different places. Cheshire has been for ages celebrated for the superior quantity, as well as quality, of its cheese; an advantage that county derives from its rich and extensive pastures. Next to this, Gloucestershire furnishes a kind of cheese, perhaps higher and mellower in flavour; but by no means in such quantity; although a very principal part of what is called both single and double Gloucester cheeses, is made in the adjoining counties of Somerset and North Wilts; where the pastures are sweeter, but not so luxuriant, as in Cheshire. The high relish of cheeses made in some particular parishes, is perhaps attributable to the double advantage of rich pastures, and the farmers allowing little or no butter to be taken from the milk. Chedder cheese seems to have derived its celebrity from the aromatic herbage peculiar to the Mendip hills and dales, which partly surround the village; and which give also a fine flavour to the mutton bred and fatted in that particular part of Somersetshire. The Stilton cheese, however, among epicures, has obtained a decided pre-eminence over every other kind produced in this kingdom; insomuch that it is styled the *Parmesan* of England. The cause in some degree is in the excellence of the pastures; but much more in the policy of the farmer, who never deprives the milk of its cream, but takes more than the value of the butter in the high price of his cheese. The real Parmesan, so named from the province of Parma in Italy, where alone it is made, certainly derives its fine flavour from the luxuriant pastures on the banks of the Po, which is a land literally flowing with milk and honey. Here the very air is perfumed with the fragrance of the fields; and the cattle graze with unrestrained freedom; the milk is not deprived of its cream, but goes into the vat just as it comes from the cow; and hence is produced the finest cheese in the world.

CHEESE-REN'NET, *s.* See GALLIUM, and RUNNET.

CHEE'SECAKE, *s.* A cake made of soft curds, sugar, and butter:

Where many a man, at variance with his wife,
With soft'ning mead and *cheesecake* ends the strife. *King.*

CHEE'SELIP, *s.* [cẏrlib, Sax.] A bag in which rennet for cheese is made and kept; being the stomach-bag of a young sucking calf that has never tasted any other food but milk, when the curd was indigested.

CHEE'SEMONGER, *s.* One who deals in cheese.

CHEE'SEPRESS, *s.* The press in which the curds are pressed:

The cleanly *cheesepress* she could never turn,
Her aukward fist did ne'er employ the churn. *Gay.*

CHEE'SEVAT, *s.* The wooden case in which the curds are confined when they are pressed into cheese.—His sense occasions the careless rustic to judge the sun no bigger than a *cheesevat*. *Glanville.*

CHEE'SY, *adj.* Having the nature or form of cheese. Acids mixed with them precipitate a tophaceous chalky matter, but not a *cheesy* substance. *Arbuthnot.*

CHEF-BOUTON'NE, a town of France, in the department of the Two Sevres, and chief place of a canton, in the district of Melle: eight miles south of Melle.

CHEFE'TE KAN, a town of Asiatic Turkey, in the province of Caramania: 100 miles east of Cogni.

CHEF'FES, a town of France, in the department of the Mayne and Loire, and chief place of a canton, in the district of Chateauneuf: three leagues north of Angers.

CHEG'FORD, a small town, in the county of Devon: fifteen miles west of Exeter.

CHEGIASAR', a town of Persia, in the Irak Agemi: 100 miles west-south-west of Amadan.

CHE'GOE, or NIGUA, *s.* the Indian name of an insect common in Mexico, and other hot countries, where it is called pique. It is a species of the acarus, or itch insect. It fixes upon the feet, and, breaking the cuticle, nestles betwixt that and the true skin, where it multiplies with a rapidity almost incredible. The poor, by an habitual neglect of their persons, suffer these insects sometimes to multiply so far as to make large holes in their flesh, and even to occasion dangerous wounds.

CHEHAW', a town of United America, in the state of Georgia: 165 miles west-south-west of Augusta.

CHEI'LOCACE, *s.* [from χειλος, a lip, and κακον, an evil.] The lip-evil; a swelling of the lips, or canker in the mouth.

CHEIRAN'THUS, *s.* [from the Arabic *keiri*; altered by Linnæus into a name in the Greek form, from χειρ, a hand, and ανθος, a flower.] In botany, a genus of the class tetradynamia, order siliquosa, natural order siliquosæ, cruciformes, or cruciferæ. The generic characters are—Calyx: perianthium four leaved, compressed: leaflets lanceolate, concave, erect, parallel-converging, deciduous; the two outer gibbous at the base. Corolla: four-petalled, cruciform. Petals roundish, longer than the calyx, claws the length of the calyx. Stamina: filaments six, subulate, parallel, the length of the calyx: two of them within the gibbous leaflets of the calyx, a little shorter than the other four. Anthers erect, bifid at the base, acute at the tip, and reflected. A nectareous gland surrounds the base of the shorter stamens on each side. Pistillum: germ prismatic, four-cornered, the length of the stamens, marked with a tubercle

a tubercle on each side. Style very short, compressed. Stigma oblong, two-parted, reflected, thickish, permanent. Pericarpium: silique long, compressed, the two opposite angles obliterated, marked with a toothlet, two-celled, two-valved; furnished with the very short style, and the erect bifid stigma. Seeds: very many, pendulous, alternate, subovate, compressed, with a membranous edge. *Essential Character.*—Germ: with a glandulous toothlet on each side. Calyx: closed: with two leaflets gibbous at the base. Seeds flat.

Species. 1. Cheiranthus erysimoides, wild wall-flower, or stock: leaves lanceolate toothed naked, stem erect quite simple, siliques four-cornered. Root perennial: or, according to some, biennial. Stem usually one (in the wild plant) purplish at bottom, generally quite simple, in height from six to eighteen inches; on the Pyrenées not above two inches high. Leaves narrow, sharpish, sessile, dark green, either linear or oblong-lanceolate, generally quite entire, but the lower ones sometimes toothletted. The stem, leaves, and unripe silique, have some roughness. The leaves resemble those of the common wall-flower, as do also the flowers, but they have no scent, they are yellow, and in loose spikes or corymbs. Grows in Italy, Spain, France, Swisserland, Germany, Austria, Hungary, Sweden, England, in the osier-holts about Godstow near Oxford, and East-Grinstead in Sussex. It flowers in June, and ripens its seeds in autumn.

2. Cheiranthus Helveticus, Swiss wall-flower or stock: leaves lanceolate toothed naked, stem erect, siliques four-cornered, acuminated with the style. In appearance very like the foregoing, but more shrubby; flowers smaller, and the seeds twice as large. Root perennial; stem erect, somewhat angular, eighteen inches high; leaves pale green, for the most part quite entire, but sometimes having a few teeth. It flowers in May and June, and the seeds ripen in July. Native of Swisserland.

3. Cheiranthus alpinus, alpine or straw-coloured wall-flower, or stock: leaves linear entire subtomentose, stem branching. It very much resembles the first species, but differs in having hoary leaves and a branching stem. The whole plant is roughish. Root biennial. Stem stiffly erect from one to three feet in height, simple or branching, somewhat angular, slender, firm. The flowers are pale yellow or sulphur-coloured, and have little or no smell; they appear in June and July, and the seeds are perfected in August and September. Found on banks, walls, &c. in Austria, and Provence; Swisserland, and the mountains of Piedmont.

4. Cheiranthus strictus: leaves linear acute smooth, stem shrubby erect.

5. Cheiranthus callosus: leaves lanceolate entire callous, stem angular shrubby. Found at the Cape by Thunberg.

6. Cheiranthus cheiri, or common wall-flower: leaves lanceolate acute smooth, branches angular, stem shrubby. Stem woody, a foot high, ascending; on walls it is seldom more than six or eight inches high, with very tough roots and firm stalks, the leaves short and sharp-pointed, and the flowers small; but in gardens it is two feet high, and branches wide; the leaves are broader, and the flowers much larger. The principal varieties are, 1. Common dwarf yellow. 2. Large yellow. 3. Large yellow bloody. 4. True bloody. 5. Narrow-leaved straw-coloured. 6. Variegated-leaved yellow. 7. Winter. 8. White. And these are either single or double. The common wall-flower is a native of Swisserland, France, Spain, &c. and is common on old walls and buildings in many parts of England. It is one of the few flowers which have been cultivated for their fragrancy, time immemorial in our gardens.

7. Cheiranthus fruticulosus: leaves lanceolate acute smooth subserrate, stem shrubby. Resembles the foregoing very much, but is a lower plant, being only three or four inches high. Flowers one-eighth of the size of the common wall-flower, less fragrant, pale yellow: Native of Spain.

8. Cheiranthus chius: leaves obovate veinless emarginate; siliques subulate at the tip. Very nearly allied to the following species. Native of the island of Chios, and Russia.

9. Cheiranthus maritimus, or dwarf annual stock-gilliflower: leaves elliptic obtuse naked roughish; stem diffused, rough. It seldom rises more than six inches in height, unless it be preternaturally drawn up. The native place of growth is the coast of the Mediterranean; and therefore it is very improperly called Virginia stock. Annual.

10. Cheiranthus salinus: leaves lanceolate obtuse quite entire; stem erect; anthers included. Very like the next species, but only one-eighth of the size. It has the smell of the stock-gilliflower. Found in the salt-marshes of Siberia and Tartary.

11. Cheiranthus incanus, or stock-gilliflower: leaves lanceolate quite entire obtuse hoary; siliques truncate at the end and compressed; stem under-shrubby. The stock-gilliflower rises with a strong stalk, which is almost shrubby, a foot high or more, having oblong, spear-shaped, hoary, leaves, which are frequently waved on their edges, and turn downward at the extremity; from the stalk come out many lateral branches, with the same shaped leaves, but smaller; these side branches are each terminated by a loose spike of flowers, each having a woolly calyx, and four large roundish petals, indented at the end. These usually appear in May and June, but the same plants frequently continue flowering most part of the summer. The seeds ripen in autumn, and the plants generally perish soon after; but, when any of them grow in dry rubbish, they will last two or three years, and become shrubby; but those with single flowers are not worth preserving after they have perfected their seeds. The flowers of this sort vary in their colour; some are of a pale red, others of a bright red, and some are curiously variegated, but those of the bright red are generally most esteemed. If the seeds be well chosen, frequently three parts in four of the plants will be double; and as the plants divide into many branches, they make a fine appearance during their continuance in flower.

There are three principal varieties. 1. Brompton stock-gilliflower, from its having been there first cultivated in England. This rises with an upright, strong, undivided stalk, to the height of two feet or more, with long hoary leaves, which are reflected, and waved on their edges, and at the top form a large head; out of the center of these arises the flower-stalk, which, when the plants are strong, is frequently a foot and a half long, putting out two or three short branches toward the bottom; the flowers of this kind have longer petals, and are formed into a pyramidal spike; but those with single flowers are loosely disposed, because the flowers, having but few petals, do not fill the spike, as those do which are double; for these often have so many petals, as to render each flower as large and full as small roses; and, when they are of a bright red, they make a pretty appearance; but the plants of this sort produce but one spike, in which it differs from all the others. This is generally biennial, though many times the plants are preserved longer; but they are always stronger the first year of their flowering than they will be after; so that the seeds are sown every spring, to continue a succession of flowering plants. 2. White stock-gilliflower, which is of longer duration than either of the others. There are always many double flowers rise from seeds of this sort, when they are well chosen. The varieties of this are few; sometimes a few of the plants will produce pale flesh-coloured flowers, and now and then some have been purple; and, as that sort of stock-gilliflower, which is titled the *Twickenham purple*, will sometimes come with flowers variegated with white, these two may be varieties of each other; and the rather, because the plants agree with each other in their external habit; for neither of these put out their flower-stems from the centre of the plants, but always on their side. 3. Is known by the name of white wall-flower, among the gardeners and florists. This rises with a greenish stalk a foot high, dividing into many branches. Leaves

narrow,

narrow, smooth, lanceolate, of a lucid green, and of thicker consistence than those of the others; they are near three inches long, and about half an inch broad in the middle: the flowers are produced in loose spikes at the end of the branches, are of a pure white, and have a great fragrancy, especially in an evening, or in cloudy weather. There is a variety of it with double flowers. Linnæus observes, that the variety with white flowers has the leaves less tomentose and even green, but not rigid or stiff, as in the wall-flower. Native of the sea-coasts of Spain. In Italy, Greece, Candia, and the isles adjacent.

The stock-gilliflower is of very long standing in the English gardens: Johnson gives a figure of the double stock, which was not in Gerarde's original work, and observes, that many and pretty varieties of it were kept in the garden of his kind friend, master Ralph Tuggye at Westminster: we may conclude therefore the double stocks were not known in Gerarde's time. The old English name of gilliflower, which is now almost lost in the prefix stock, is corrupted from the French *giroflier*. Chaucer writes it *gylofre*; Turner *gelover* and *gelyfloure*; Gerarde and Parkinson *gilloflower*. Having got thus far from its original orthography, it was easily corrupted, by those who knew not whence it was derived, into *July-flower*. Pinks and carnations also having the name of gilliflower, from their smelling like the clove, which is called *girofle* in French, from the Latin *caryophyllum*; they were called *clove gilliflowers*, and these *stock-gilliflowers* for distinction. Gerarde says they were also called *Garnsey violet* and *castle-gilliflower*.

12. Cheiranthus fenestralis, or cluster-leaved stock-gilliflower: leaves crowded in heads recurved waved; stem undivided. Stem shrubby, from six to eight inches high, nearly the thickness of the little finger, straight, rigid, round, covered with leaves, hoary with nap, dividing at top into two or three very short, alternate branches. It continues three or four years, flowering the second; the third and fourth it puts out branches, which flower the same year. This plant is proper to stand in windows, (whence its trivial name,) on account of its smallness, and the very grateful odour it exhales, especially in the evening. The seeds were first sown in the Upsal garden in 1753; but it is not known whence they came. It was cultivated here in 1759, by Mr. Miller; and flowers from May to July.

13. Cheiranthus annuus, or annual stock-gilliflower, or ten-weeks stock: leaves lanceolate somewhat toothed obtuse hoary; siliques cylindric acute at the end; stem herbaceous. This species rises with a round smooth stalk about two feet high, dividing into several branches at top. It grows naturally on the sea-coasts in the southern countries of Europe; and was cultivated in 1731, by Mr. Miller. Of this sort there are the red, purple, white, and striped, with single flowers; and the same colours with double flowers; which are very great ornaments in the borders of the flower-garden in autumn.

14. Cheiranthus littoreus, or sea stock-gilliflower: leaves lanceolate somewhat toothed tomentose and fleshy; petals emarginate; siliques tomentose. Stem a foot high, alternately branching, hoary. The flowers are smaller than those of the common stock, of a bright red at first, but fading to a purple. The whole plant is very white; and, having woody stalks, has the appearance of a perennial plant, but it generally perishes in autumn. It grows naturally near the sea coast, in the south of France, Spain, and Italy. It was cultivated in 1683, by Mr. James Sutherland.

15. Cheiranthus tristis, or dark-flowered stock-gilliflower: leaves linear subsinuate; flowers sessile, petals waved; stem shrubby. This sort is of humble growth, seldom rising above eight or nine inches high. The whole plant is roughish, and of a hoary ash-colour. The bottom leaves have two or three pairs of teeth, and are sinuated; the branch-leaves have one or two teeth, and the upper ones are quite entire. At night it has a grateful odour, somewhat resembling that of *geranium triste*. Native of the south of Europe. Cultivated in 1768 by Mr. Miller.

16. Cheiranthus trilobus: leaves toothed obtuse; calyxes even; siliques knotted mucronate filiform even. Root annual; stems branching, spreading, seven or eight inches high, hoary. Native of Italy, on the sea shore near Terracina.

17. Cheiranthus tricuspidatus, or trifid stock-gilliflower: leaves lyrate; siliques three-toothed at the tip. This is an annual plant, which branches out from the root into many declining stalks: the lower leaves are about two inches long, and three quarters of an inch broad, very deeply sinuated on their edges, and hoary; those upon the stalks are of the same form, but much smaller: the flowers are produced from the sides of the stalks singly, and at the top in loose spikes or racemes. Native of Barbary. Cultivated in 1759, by Mr. Miller.

18. Cheiranthus sinuatus, or prickle-podded stock-gilliflower: leaves tomentose obtuse subsinuate, branch-leaves entire; siliques muricate. Stalk erect, and the whole plant covered with a white down. Flowers flesh-coloured, succeeded by long woolly pods. Brought out of the isle of Rhé near Rochelle by John Tradescant, when the duke of Buckingham was sent with supplies for Monf. Soubise; gathered by Mr. George Bowles upon the rocks at Aberdovye in Merionethshire; on the sandy coast of Anglesey about Abermeney-ferry, at Aberdaren in Caernarvonshire; on the coast of Cornwall, &c. Biennial.

19. Cheiranthus farsetia: siliques oval compressed; leaves linear-lanceolate; stem shrubby erect. Stem a foot high, hoary, stiff and straight, branching. Native of Egypt and Arabia: observed by Forskael in the kingdom of Tunis. Turra gave it the name of *farsetia*, from Farsetti, a noble Venetian. Introduced in 1788, by John Sibthorp, M. D.

20. Cheiranthus tenuifolius, or narrow-leaved shrubby stock-gilliflower: leaves filiform quite entire somewhat silky, stem frutescent branched. This is a shrub, a foot and a half in height; the branches becoming bald at bottom. It is a native of Madeira, and was found there by Masson. It was introduced in 1777; and flowers in May and June.

21. Cheiranthus mutabilis, or broad-leaved shrubby stock-gilliflower: leaves lanceolate acuminate sharply serrate, stem frutescent, siliques peduncled. This also is a shrub, growing to the height of two or three cubits. It was found by Masson in the same island, was introduced at the same time, and flowers from March to May. Its chief merit consists in its early flowering. The showy blossoms on first opening are white, sometimes inclined to yellow; in a few days they become purple; hence its trivial name *mutabilis*, or changeable.

22. Cheiranthus quadrangulus: leaves linear entire, siliques sessile oblong quadrangular. This grows a cubit in height, with an herbaceous stem, becoming a little shrubby at bottom, upright, branched, round: leaves bright green, three or four inches long, and two or three lines wide; flowers sulphur-coloured, odorous. Native of the deserts of Siberia. Introduced into the Paris garden by the famous Jean Jacques Rousseau; and since by Demidow.

Propagation and Culture. The wall-flowers that are single produce seeds in plenty; but the largest and deepest-coloured flowers should always be selected for seeds. These should be sown in April, upon poor undunged soil; and when the plants are fit to remove, they should be transplanted into nursery-beds, at about six inches distance each way, observing to water and shade them until they have taken fresh root; after which they will require no farther care, but to keep them clean from weeds all the summer; and at Michaelmas they may be transplanted into the borders of the flower-garden where they are designed to remain, that the plants may get good roots before the frost comes on. This is the method which is commonly

commonly practised with these flowers; but if the seeds are sown upon poor land, where they are designed to remain, and not transplanted, they will thrive, and endure the frost in winter much better than those which are removed; so that upon ruins or rubbish the seeds of these plants may be sown, where they will thrive and continue much longer than in good land; and in such places, if they are properly disposed, they will be very ornamental, and their flowers, having a strong odour, will perfume the air to a considerable distance.

All the varieties of stock-gilliflower flower in May and June, at which time they are the greatest ornament to the flower-garden, therefore deserve our care to cultivate them as much as any of the flowery tribe; but, in order to have many double flowers, there must be great care taken in the choice of plants for seeds, without which there can be little hopes of having these flowers in perfection. The only sure way of getting many double flowers, is to make choice of those single flowers which grow near many double ones; for those seeds which have been saved from plants growing in beds close to each other, where there happened to be many double flowers among them, are found to produce a much greater number of plants with double flowers, than those which have been saved from plants of the same kinds, which grew single in the borders of the flower-garden; so that there should be a small bed of each kind planted on purpose to save seeds in the flower-nursery; or if they are sown there, and the plants thinned properly when they are young, they need not be transplanted; for the plants which come up from scattered seeds, which have not been transplanted, endure the frost much better than those which have been removed; for as these plants send out horizontal roots from the bottom of their stems, which spread near the surface of the ground, so when they are transplanted, the roots are forced downward out of their natural direction; and, if their stalks were grown tall before removal, they are generally planted low in the ground, whereby they are apt to rot, if the ground is moist, or the winter should prove wet; therefore, where they can be left unremoved, there will be a better chance of their living through the winter; and, as these beds need not be of great extent, so, when the winter proves very severe, it will not be much trouble or expence to arch the beds over with hoops, and cover them with mats in frosty weather, by which method they may be always preserved. The ground where these seeds are sown, must not have any dung, for in rich land the plants will grow very vigorous in summer, but frost, or the heavy rains in autumn, will soon destroy them; for these plants will thrive upon rocks or old walls, as was before observed; and in such situations they will live, when all those which are planted in gardens are destroyed. The best time to sow the seeds is about the beginning of May; and, if the season should prove dry, it will be proper to shade the beds with mats every day, to prevent the earth from drying too fast; but the covering must be taken off every evening, to admit the dews of night, and they should be gently watered in the evening two or three times a-week. When the plants first appear, with their two seed-leaves, they are often attacked by flies, especially in dry hot seasons; therefore to prevent their destroying the plants, the covering should be continued over them during the heat of the day, and the plants frequently refreshed with water, which will keep them in a growing state, and the flies will not infest them; for it is always observed, they never attack any plants unless they have been stunted in their growth: when the plants have got strength, they will be secure from this danger, and the coverings may be removed; after this the plants will require no farther care but to keep them clean from weeds, and to be thinned to the distance of nine inches or a foot, that they may have proper room to grow, and not draw each other up tall and weak. The plants which are drawn out of these beds to thin them, may be planted in the borders of the flower-garden, where they are designed to remain, and the sooner they are removed, when the plants have got six or eight leaves, the more likely they will be to live through the winter. The farther care of the plants which are left in the beds, will be to cover them in winter with mats; and, when they come to flower, all those which are not of good colours, or whose flowers are small, should be drawn out as soon as they appear, that they may not impregnate those which are designed for seeds with their farina; but those with double flowers should by no means be removed, nor should their flowers be cut off, but suffered to fade among the single ones, by which the seeds will be improved; it will also be a sure method of preserving each sort in perfection, to have them separate from each other, in distinct beds; though there is very little danger of any of the species altering, by the mixture of their farina, but their colours are liable to be changed by it; so that, in order to continue those pure, they should not stand too near each other. There are some who propagate the double stock-gilliflowers by slips and cuttings, which will take root when properly managed; but the plants so raised are never so strong as those which come from seeds, their spikes of flowers are always very short, and have not half the beauty; it is not worth while therefore to practise this method, unless for those which cannot be obtained with any certainty from seed.

The annual or ten-weeks stock, if sown at three different times, may be continued in succession during several months. The first sowing should be about the middle of February, upon a very slender hot-bed, just to bring up the plants, which must be guarded against frost; and, when they are fit to remove, they should be transplanted into nursery beds, at about three or four inches distance, observing to water and shade them till they have taken root, and afterwards to keep them clean from weeds; in these beds they may remain five or six weeks to get strength, and may then be planted into the borders of the flower-garden, where they are to remain: if these are transplanted when there is rain, they will soon take root, after which they will require no farther care. From these early plants good seeds may be expected, therefore some of the finest plants of each colour should be preserved, and marked for seeds, which, when ripe, should be carefully cut before the frost pinches them, and the stalks tied up in small bundles, and hung up in a dry room till the pods are well dried, when the seeds may be rubbed out and preserved for use. To succeed these, another parcel of seeds should be sown in March; and a third parcel at the end of May. If these last be sown upon a warm border, where they may be covered, by placing glasses before them in winter, or covering them with mats, they may be continued in flower till Christmas: and if some of the plants be potted, and put under a hot-bed frame in autumn, where they may enjoy the open air in mild weather, and be screened from hard rains and frost, they will keep flowering all the winter, when the weather is not very severe. See ARABIS, HELIOPHILA, and MANULEA.

CHEIRAN'THUS LACE'RUS, *s.* in botany. See HESPERIS LACERA.

CHEI'RI, *s.* in botany, See CHEIRANTHUS.

CHEIRO'NOMY, [from χειρονομεω, Gr. *cheironomia*, Lat.] To exercise with the hands. An exercise mentioned by Hippocrates, which consisted of gesticulations with the hands, like our dumb bells.

CHEI'TO, a town of Persia, in the province of Farsistan: 120 miles south of Schiras.

CHEITO'RE, a town of Hindoostan, in the circar of Oudipour, formerly one of the principal fortresses of India, and residence of the Rana, chief of the Rajpoots, now removed to Oudipour; situated on a very high mountain, and said by some to be seven miles in circumference, by others eight, and by Persian authors represented to be ten, surrounded with towers and bastions; and, from the foot of the mountain to the top, said to be

be two miles and a half, and by some five miles; a barrier of seven gates must be passed, before the citadel could be approached; such a fortress as this, supplied with every necessary, might be supposed impregnable; but it was taken after a long siege by the king of Delhi. After some years, it came into the power of the Rana, or prince of the Rajpoots; from whom it was taken by the emperor Acbar, who laid it waste with great carnage, put the garrison to the sword, and blew up the towers with gunpowder. After the Mogul troops were driven away, the Rana began to repair it, but not in its ancient splendour, and even these repairs were destroyed by another invasion of the Moguls. It is now wholly deserted, and become a resort of tigers and other beasts of prey. Sir Thomas Roe passed through it in his way to Agimere, in 1612, and gives the following detail of its then state. "Cytor is an ancient ruined city, on a hill, but shews the footsteps of wonderful magnificence. There are still standing above a hundred churches, all of carved stone, many fair towers and lanthorns, many pillars, and innumerable houses, but not one inhabitant. There is but one steep ascent cut out of the rock, and four gates in the ascent before you come to the city gate, which is magnificent. The hill is inclosed at the top for about eight cosses, and at the south-west end is a goodly castle." It is situated forty-three miles north of Oudipour, and seventy-six south of Agimere. Lat. 25. 22. N. Lon. 74. 55. E. Greenwich.

CHEIWAN', a town of Arabia: forty miles south of Saade.

CHEKAO', *s.* an earth used by the Chinese in their porcelain manufactures. It is a species of the soap-rock. See STEATITES.

CHEKE (Sir John), a celebrated statesman, grammarian, and divine, of an ancient family in the Isle of Wight, but born at Cambridge in 1514, and educated at St. John's college in that university; where he was first chosen Greek lecturer, and in 1540, professor of that language, with a stipend of forty pounds a-year. In this station he was principally instrumental in reforming the pronunciation of the Greek language, which, having been much neglected, was imperfectly understood. About 1543, he was incorporated master of arts at Oxford, where he had likewise studied for some time. In the following year he was sent for to the court of Henry VIII. and appointed tutor, jointly with Sir Anthony Cooke, to prince Edward; about which time he was made canon of the college newly founded in Oxford, now Christ-church. On the accession of his royal pupil to the throne of England, Mr. Cheke was first rewarded with a pension of 100 marks, and afterwards obtained several considerable grants from the crown. In 1550 he was made chief gentleman of the privy-chamber, and was knighted the following year; in 1552, chamberlain of the exchequer for life; in 1553, clerk of the council; and soon after secretary of state, and privy-counsellor. But these honours were of short duration. Having concurred in the measures of the duke of Northumberland for settling the crown on the unfortunate Jane Grey, and having acted as her secretary during the nine days of her reign; on the accession of queen Mary, Sir John Cheke was sent to the tower, and stript of the greatest part of his possessions. In September 1554, he obtained his liberty, and a license from her majesty to travel abroad. He went first to Basil, thence to Italy, and afterwards returned to Strasburgh, where he was reduced to the necessity of reading Greek lectures for subsistence. In 1556 he set out in an evil hour to meet his wife at Brussels: but, before he reached that city, he was seized by order of Philip II. king of Spain, hoodwinked, and thrown into a waggon; and thus ignominiously conducted to a ship, which brought him to the tower of London. He soon found that religion was the cause of his imprisonment; for he was immediately visited by two Romish priests, who piously endeavoured to convert him, but without success. He was then visited by Fleckenham, who told him from the queen, that he must either comply or burn. This powerful argument had the desired effect; and Sir John Cheke accordingly complied in form, and his lands, upon certain conditions, were restored; but remorse, grief, and shame, soon put an end to his life; for he died in September 1557, and was buried in St. Alban's church. He left three sons, the eldest of whom, Henry, was knighted by queen Elizabeth. He wrote, 1. A Latin translation of two of St. Chrysostom's Homilies. Lond. 1543, 4to. 2. The Hurt of Sedition. Lond. 1549, 1576, 1641. 3. Latin Translation of the English Communion Service. Printed among Bucer's opuscula. 4. De pronunciatione Græcæ. Basil, 1555, 8vo. 5. Several letters published in his life by Strype; and a great number of other books.

CHEKOUTI'MES, a nation or tribe of Indians, who inhabit near the south bank of Saguenai river, in Upper Canada.

CHELIDO'NIA, an anniversary wind, blowing from the 6th of the ides of February to the 7th of the calends of March, being the time of the appearance of the swallows; otherwise the Favonius, or Zephyrus. *Pliny.*

CHELIDO'NIA, *s.* in botany. See RANUNCULUS FICARIA.

CHELIDO'NIUM, *s.* [from χελιδων, a swallow] In botany, a genus of the class polyandria, order monogynia, natural order rhoeadeæ. The generic characters are—Calyx: perianthium two-leaved, roundish: leaflets subovate, concave, obtuse, caducous. Corolla: petals four, roundish, flat, spreading, large, narrower at the base. Stamina: filaments very many (thirty), flat, broader at top, shorter than the corolla. Anthers oblong, compressed, obtuse, erect, twin. Pistillum: germ cylindric, the length of the stamens. Style none. Stigma headed, bifid. Perianthium: silique cylindric, sub-bivalve. Seeds very many, ovate, increased, shining. Receptacle linear, between the valves of a kind of circumambient suture not gaping. *Essential Character.*—Corolla four petalled; calyx two-leaved; silique one-celled, linear.

Species. 1. Chelidonium majus, common or great celandine: peduncles umbelled. Stem erect, from a foot to eighteen inches in height, cylindric, a little hairy. The juice of the whole plant is saffron-coloured. It approaches to the class tetradynamia in the cruciform shape of the corolla, and its silique; which however differs essentially, in being one-celled. It is common in hedges and other shady places, uncultivated grounds, on rubbish, walls, &c. flowering from May to July, during which time it is in the greatest perfection for use. The juice of every part of this plant is very acrimonious. It cures tetters and ringworms. Diluted with milk it consumes white opake spots on the eyes. It destroys warts, and cures the itch. There is no doubt but a medicine of such activity will one day be converted to more important purposes. The root, according to Loureiro, is extremely bitter, and greatly esteemed among the natives of Cochinchina, for a variety of uses in medicine.

2. Chelidonium glaucium, sea celandine, or yellow horned poppy. Peduncles one-flowered; leaves stem-clasping, sinuated; stem smooth. The root is perennial according to Scopoli and Allioni, but annual according to others; Miller says biennial. The whole plant is glaucous. Stem strong, near two feet high, much branched. The flowers nod till the day preceding the unfolding of the petals, which fall off on the second day after they are opened. The large and numerous flowers, which, although of short duration, succeed one another in great abundance during most part of the summer, make a fine contrast with the sea-green dew-bespangled leaves, and are a great ornament to our sandy shores. The whole plant abounds in a yellow juice, is fœtid, and of a poisonous quality. It is said to occasion madness. Found in sandy soils in Swisserland, France, Italy,

Auſtria, Carniola, Denmark, Virginia, ; and on the coaſts of Britain, frequently within reach of the ſpray of the ſea, as in Norfolk, Suffolk about Dunwich, &c. Lancaſhire, Iſle of Wight, Kent, Eſſex, Wales and Scotland. Flowers from June to Auguſt.

3. Chelidonium corniculatum, red celandine, or horned poppy: peduncles one-flowered; leaves ſeſſile, pinnatifid; ſtem hiſpid. This ſpecies grows in Hungary, Bohemia, Moravia, Auſtria, about Montpellier, Piedmont, Spain. In England, firſt obſerved by Mr. Stillingfleet, in the ſandy corn-fields of Norfolk. Annual; flowering in July and Auguſt.

4. Chelidonium hybridum, violet celandine, or horned poppy: peduncles one-flowered; leaves pinnatifid linear; ſtem gloſſy: ſiliques three valved. Stem erect, a foot high, branched, cylindric, ſmoothiſh, having a few expanded briſtles. Found in the ſouthern countries of Europe; in ſandy corn-fields between Swaffham and Burwell in Cambridgeſhire and in Norfolk. Annual, flowering in July and Auguſt.

5. Chelidonium Japonicum: peduncles one-flowered; leaves petioled, pinnated, ovate. Native of Japan.

Propagation and Culture. If the ſeeds of the four firſt ſpecies be permitted to ſcatter, the ground will be plentifully ſtored with plants. If a few of them be thrown about in rock-work, they will come up without trouble, and have a good effect. Seeds ſown in the autumn will grow with more certainty than in the ſpring, and come earlier to flower: they ſhould be ſown where the plants are to remain, and will require no care but to thin them where they are too cloſe, and to keep them clean from weeds. There is a variety of the firſt ſort with double flowers, which generally riſes the ſame from ſeeds; and may alſo be preſerved by parting the roots. See BOCCONIA.

CHELIDO'NIUM MAJUS, *ſ.* in botany. See SANGUINARIA.

CHELIDO'NIUM MINUS, *ſ.* in botany. See RANUNCULUS FICARIA.

CHELIDO'NIUS, *ſ.* [from χελιδὼν, a ſwallow.] A ſtone ſaid by the ancients to be found in the ſtomachs of young ſwallows, and greatly praiſed for its virtues in the falling ſickneſs; but it appears to be only a ſpecies of lycodontes, or bufonitæ; which ſee.

CHEL'LES, a town of France, in the department of the Seine and Marne: four leagues weſt-ſouth-weſt of Meaux.

CHELM, a town of Poland, in Red Ruſſia, and capital of a palatinate to which it gives name; the ſee of a Roman biſhop, ſuffragan of Lemburg, and a Greek biſhop, ſuffragan of Kiov. It is very much gone to decay; the palatinate is now partly ſubject to Ruſſia and partly to Auſtria. On the 8th of June, 1794, the Poles were defeated by the Pruſſians, near this town: 108 miles ſouth-eaſt of Warſaw, and 396 eaſt of Breſlaw.

CHEL'MER, a river of England, which runs into the ſea, a little below Malden.

CHEL'MER, *ſ.* [corruptly for *kill mar*, Brit.] The reflux of the ſea.

CHELMIE'Z, a town of Lithuania, in the palatinate of Minſk: fifty miles eaſt of Mozyr.

CHELMS'FORD, the county town of Eſſex, ſituated nearly in the centre of the county, with roads exceeding good, the ſoil fertile, and the air temperate. It is not, as has been deſcribed, a flat heavy country, but agreeably diverſified with lawns and eminences, and plentifully ſupplied with the pureſt water: under theſe advantages, it is naturally populous, and reſpectably inhabited.

The town ſtands at the confluence of two rivers, the Chelmer, and the Cann; from the former of which it derived its name. In ſome places, Doomſday-book has it Celmeresfort; in others, Celmeresford, and Chelmsford: however it is evidently a contraction of Chelmer's-Ford, all carriages, cattle, &c. being under the neceſſity of fording this river before bridges were thrown over it.—Chelmsford, being the capital of the county, carries on a conſiderable ſhare of buſineſs; it is diſtant from Colcheſter twenty-two miles, and twenty-nine from London. The town conſiſts of four principal ſtreets, regular, and well-built. The ſhire-hall, which has been lately erected, is a magnificent edifice: it contains two handſome roomy courts, finiſhed in the moſt convenient and elegant manner; many large and uſeful rooms for the purpoſes of tranſacting the buſineſs of the county; and in front, which is of ſtone, there is a capital public room; the length of the whole building is eighty-four feet; it is decorated with four ſtately pillars of the Ionic order, between each of which there is a handſome window, and above the windows are three emblematical figures repreſenting Juſtice, Wiſdom, and Mercy. This beautiful edifice was built by Mr. Johnſon, the county ſurveyor; the execution does great credit to his abilities as an architect; and will be a laſting monument of the taſte and ſpirit of the magiſtrates of the opulent county of Eſſex. On the left of this building is ſeen the tower, ſpire, and chief part, of the church; which venerable ſtructure terminates this elegant piece of perſpective. In an open ſpace adjoining to the ſhire-hall, ſtands a conduit. When it was firſt erected is uncertain, as it bears no date: but it was beautified by the noble family of the Fitzwalters. It is of a quadrangular form, about fifteen feet high, built with ſtone and brick; it has four pipes, one on each ſide, from which the waters are perpetually flowing. The following inſcription is on the ſide that fronts the part from whence the ſpring riſes:—"This conduit in one minute runs one hogſhead and a half and four gallons and a half; in one day, 2262 hogſheads and fifty-four gallons; in one month, 63360 hogſheads; and in one year, 825942 hogſheads and fifty-four gallons."—Lower down, in four ſmall tables, are the following inſcriptions:

"*Benignus benignis.*"—Bountiful to the bounteous.

"*Nec parcus parcis.*"—Liberal to the covetous.

"*Nec diminutus largiendo.*"—Not diminiſhed by beſtowing.

"*Sic charitas a deo fonte.*"—Thus charity from the heavenly fountain.

Two hundred pounds were given by Sir William Mildmay, bart. the intereſt whereof to be applied towards keeping this conduit in repair. The ſpring from which it is ſupplied riſes about a quarter of a mile from the town, and is called Burges's well.

This town is conſiderable in many reſpects. It is choſen for the tranſaction of all the public buſineſs of the county. The aſſizes, general quarter ſeſſions, petty ſeſſions, county courts, &c. are held here. Here likewiſe are made the elections for the knights of the ſhire, and here ſtands the county-priſon, which was rebuilt of ſtone in 1777, and is one of the fineſt gaols in the kingdom. The great road from London to Colcheſter, Harwich, Suffolk, and many parts of Norfolk, lies through this town. The church is a noble ſtructure, ſituated at the end of the town, and dedicated to St. Mary; it has three ſpacious aiſles, which run to the end of the chancel, and are leaded. A ſtately ſquare tower, built of ſtone, ſtands at the weſt end, with proper pyramids on each corner; upon it is erected a ſpire, which has a pretty effect. The body of the church is ſupported by pillars of a light conſtruction, and excellent workmanſhip; the windows are Gothic and curious. Here is a royal free grammar-ſchool, founded by Edward VI. in 1552, and liberally endowed by that monarch; alſo two charity ſchools; one founded the 17th of Auguſt, 1713, for fifty boys; the other, in April, 1714, for twenty girls; both which are incorporated, and ſupported by voluntary ſubſcription. There are many ſeats of the nobility and gentry in the neighbourhood of Chelmsford, among which ſtands the capital manſion-houſe of the ancient family of the Mildmays, diſtinguiſhed by the name of Moulſham-hall. It is delightfully placed on an eaſy aſcent, about a quarter of a mile on the eaſt ſide of the town. It was rebuilt by the

the late Benjamin earl Fitzwalter, and was planned with the nicest skill and judgment, to render it so completely elegant, and at the same time truly commodious. The pilasters, cornices, entablatures, and other decorative ornaments, are all of stone. It has a gallery on each floor, by which means an easy access is obtained to all the different apartments, without the inconveniency of making any of them a passage; the principal rooms are large, and well disposed; the grand hall at the entrance is lofty, and the ceiling curiously wrought; and the house contains a great variety of excellent paintings.

CHELMS'FORD, a town of the American States, in Middlesex county, Massachusetts, situated on the south side of Merrimack river, twenty six miles from Boston, and by the census contains 1144 inhabitants. There is an ingeniously constructed bridge over the river at Pawtucket Falls, which connects this town with Dracut.

CHELO'NE, *s.* [χελωνη, Gr.] The tortoise. In surgery it means an instrument for the purpose of making a gradual extension of a fractured limb, and so called, because in its slow motion it represents a tortoise.

CHELO'NE, *s.* [from χελωνη, Gr. a tortoise.] In botany, a genus of the class didynamia, order angiospermia, natural order personatæ. The generic characters are—Calyx: perianthium one-leafed, five-parted, very short, permanent: divisions erect, ovate. Corolla: monopetalous, ringent. Tube cylindric, very short. Throat inflated, oblong, convex above, flat beneath. Border closed, small. Upper lip obtuse, emarginate; lower almost equal to the upper, very slightly trifid. Stamina: filaments four, hid beneath the back of the corolla; the two side ones a little longer. Anthers incumbent. The rudiment of a fifth filament, like the point of a dagger, between the upper pair of stamens. Pistillum: germ ovate. Style filiform, situation and length of the stamens. Stigma obtuse. Pericarpium: capsule ovate, two-celled, longer than the calyx. Seeds very many, roundish, surrounded with a membranous rim.—*Essential Character.* Calyx: five-parted. Rudiment of a fifth filament between the upper stamens. Capsule, two-celled.

Species. 1. Chelone glabra, or white chelone: leaves petioled lanceolate serrate, the upper ones opposite. This sort grows naturally in most parts of North America; and is called by Joscelin, in his New England Rarities, the *humming-bird-tree*. It has a pretty thick jointed root, which creeps under ground to a considerable distance, sending up smooth channelled stalks, which rise about two feet high, with two leaves at each joint, standing opposite without foot-stalks; these are three inches and a half long, and about three quarters of an inch broad at their base, where they are broadest, diminishing gradually to a sharp point; they have small serratures on their edges, which scarcely appear. The flowers grow in a close spike at the end of the stalks; they are white, and have but one petal, which is tubular, and narrow at the bottom, but swells towards the top, almost like the foxglove flower; the upper side is bent over and convex, but the under is flat, and slightly indented in three parts at the end.

2. Chelone obliqua, or red chelone: leaves petioled lanceolate serrate, all opposite. Discovered in Virginia by Mr. Clayton, who sent it to England: the roots of this do not creep so far as those of the first, the stalks are stronger, the leaves much broader, and oblique; they are deeply sawed on their edges, and stand upon short foot-stalks: the corolla is of a bright purple colour, and therefore makes a finer appearance than the first sort.

3. Chelone hirsuta, or hairy chelone: stem and leaves hirsute. This approaches to the first sort, but the stalks and leaves are very hairy, and the flower is of a purer white. It flowers at the same time. Native of New England.

4. Chelone pentstemon: leaves stem-clasping; panicle dichotomous. Stem a foot and a half high, putting out several side-branches. Flowers purple. Native of North America.

5. Chelone campanulata: leaves opposite, sessile, ovate-lanceolate, extremely acuminate, deeply serrate. The whole plant smooth. Stems round, a foot and a half high, purple, wand-like. It may, perhaps, only be a variety of the foregoing. Native of Mexico. Cultivated in the gardens of Paris and Madrid.

Propagation and Culture. The three first sorts flower in August, and, when the autumn proves favourable, the seeds will sometimes ripen in England; but as the plants propagate so fast by their creeping roots, the seeds are seldom regarded. The best time to transplant the roots is in autumn, that they may be well established in the ground before the spring, otherwise they will not flower so strong, especially if the season proves dry; but, when they are removed in the spring, it should not be later than the middle of March, by which time their roots will begin to push out new fibres. They will thrive in almost any soil or situation, but their roots are apt to creep too far, if they are not confined, and sometimes intermix with those of other plants; and then their stalks stand so far distant from each other, as to make but little appearance; therefore they should be planted in pots, which will confine their roots, so that in each pot there will be eight or ten stalks growing near each other, when they will make a tolerably good appearance. This plant being very hardy, is not injured by cold; but it must have plenty of water in hot weather. As these plants flower in the autumn, when there is a scarcity of other flowers, it renders them the more valuable, especially the second sort, whose flowers make a very pretty appearance, when they are strong: and if some of them have a shady situation in the summer, they will flower later. The seeds of the fourth sort should be sown in autumn. When the plants are grown strong enough to remove, they should be transplanted into a shady border, which will prevent their flowering the same year; and, in the autumn, they may be planted in the borders of the flower-garden. The roots seldom last above two or three years.

CHELO'NE, in fabulous history, a nymph changed into a tortoise by Mercury, for not being present at the nuptials of Jupiter and Juno, and condemned to perpetual silence for having ridiculed these deities.

CHELO'NION, *s.* [χελωνιον, from χελωνη the tortoise.] A hump, or gibbosity in the back, is so called from its resemblance to the shell of a tortoise.

CHELO'NIS, a daughter of Leonidas king of Sparta, who married Cleombrotus. She accompanied her father, whom her husband had expelled; and soon after went into banishment with her husband, who had, in his turn, been expelled by Leonidas.

CHELONO'PHAGI, *s.* A people of Carmania, who feed upon turtle, and cover their habitations with the shells. *Pliny.*

CHEL'SEA [*q. d.* Shelsey, from shelves of land; it is also called Chelche-hyth, probably from cealc chalk, ea water, and hyð, Sax. *q. d.* a chalky port near the water.] A large and populous village, or rather town, in Middlesex, situated on the Thames, only two miles from London. The celebrated botanical-garden, belonging to the company of apothecaries, which is enriched with a great variety of plants, both indigenous and exotic, is on the best soil of Chelsea. It was given, in 1722, by sir Hans Sloane, bart. on condition of their paying a quit-rent of five pounds, and delivering annually to the royal society fifty specimens of different sorts of plants, of the growth of this garden, till the number should amount to 2000. In 1733, the company erected a marble statue of the donor, by Rysbrack, in the centre of the garden, the front of which is conspicuously marked, toward the river, by two noble cedars of Libanus. In a most eligible and pleasant situation, is the palace of the bishops of Winchester. Adjoining to this, sir Thomas More

More built a ſpacious manſion of brick, the greater part of which ſtill remains; but it has undergone many alterations, and has loſt much of its Gothic and venerable appearance.

In this town, (for it well deſerves to be ſo called,) ſtands that grand national aſylum, for decayed and maimed ſoldiers, known by the name of Chelſea Hoſpital, being the nobleſt building, and one of the beſt foundations, of its kind, in the world. It was begun by Charles II. carried on by James II. and completed by William III. The firſt projector of this magnificent ſtructure was ſir Stephen Fox, grandfather to the right honourable Charles James Fox. He could not bear, he ſaid, to ſee the common ſoldiers, who had ſpent their ſtrength in our ſervice, reduced to beg; and to this humane inſtitution he contributed 13,000l. It was built by ſir Chriſtopher Wren, on the ſcite of an old college, founded by Dr. Sutcliff, dean of Exeter, in the reign of James I. for the ſtudy of polemical divinity; but, the ſum left for its endowment being inadequate to the expenditure, the buildings fell to ruin, and finally became eſcheated to the crown. The north front opens into a piece of ground laid out in walks; and that facing the ſouth into a garden extending to the Thames. In the centre of this edifice is a pediment, ſupported by four Tuſcan columns, over which is a turret. On one ſide the entrance is the chapel, and on the other the hall where the penſioners dine. The altar-piece in the chapel is adorned with the Reſurrection, painted by the celebrated Ricci. The wings join the chapel and hall to the north, and are open on the Thames to the ſouth: they are three hundred and ſixty feet in length, eighty in breadth, and three ſtories high. A colonade extends along the ſide of the hall and chapel; and, in the midſt of the quadrangle, is the ſtatue of Charles II. Two other large ſquares adjoining contain apartments for the ſervants of the houſe, for old maimed officers, and the infirmary. The penſioners conſiſt of veterans, who have been at leaſt twenty years in the army; or are diſabled ſoldiers. They wear red coats lined with blue, and are provided with all other clothes, diet, waſhing, and lodging. The out-penſioners amount to upwards of eight thouſand, and have each 7l. 12s. 6d. a year. Theſe great expences are ſupported by a poundage deducted out of the pay of the army, with one day's pay once a-year from each officer and common ſoldier; and, when there is any deficiency, by a ſum voted by parliament. This hoſpital coſt 150,000l. in building; and is unqueſtionably a noble monument of national gratitude and humanity. Chelſea has alſo a good charity-ſchool for the education of poor girls, founded in 1729.

CHEL'SEA, a town of United America, in Suffolk county, Maſſachuſetts, containing 472 inhabitants. Before its incorporation, in 1738, it was a ward of the town of Boſton. It is only ſeparated from it by the ferry acroſs the harbour, called Winniſimet, by the native Indians.

CHEL'SEA, a town of the United States of America, in Orange county, Vermont, having two hundred and thirty-nine inhabitants.

CHEL'SEA, a town of the American ſtates, in Norwich county, called the Landing, ſituated at the head of the river Thames, fourteen miles north of New London, on a point of land formed by the junction of Shetucket and Norwich, or Little rivers, whoſe united waters conſtitute the American Thames. It is a buſy, commercial, thriving, romantic, place, of about 150 houſes, aſcending one above another in tiers, on artificial foundations, on the ſouth point of a high rocky hill.

CHEL'TENHAM, a conſiderable town in Glouceſter, celebrated for its mineral waters, and pleaſantly ſituated in a fine fertile vale, near the foot of the Cotſwold Hills. The town is lately much improved, and well paved and lighted; but the great beauty of the place is exhibited in the gardens behind each houſe, which being of great length, are formed into an infinite variety of pleaſant walks. The lodgings for valetudinarians are neat and commodious, and many of them truly elegant. The church is a venerable Gothic ſtructure, with ailes on each ſide, and a ſpire riſing to a conſiderable height. Here is a grammar-ſchool in high reputation. The aſſembly rooms are elegantly diſpoſed; and the theatre-royal, erected for the amuſement of their preſent majeſties, is a neat and well-conſtructed building. The walks and rides in the neighbourhood are equal to any in the kingdom, for variety, beauty, and richneſs of proſpect. Cheltenham has a good and plentiful market on Thurſdays, and three annual fairs, viz. on the ſecond Thurſday in April, Holy Thurſday, and 5th of Auguſt.

Nothing can be more convenient than the watering-place is to the town; the nobility and gentry paſs through a fine alcove of lime-trees, into a ſerpentine walk with orchards on each ſide; this leads to a beautiful meadow at the bottom, croſſes a rivulet, and then enters the grand walk, which, by a gentle acclivity, leads to the buildings. This walk has a very ſtriking effect; it is twenty feet wide, and the elm-trees on each ſide are at leaſt ſixty feet high. The pump appears under a dome, through an airy and neat archway, with two poſterns; it is ſupported by pillars. On the right is the library and offices; on the left the breakfaſt-room. The latter is occaſionally converted into a ball-room, where the band plays in wet weather. Round the buildings is a ſhrubbery, upon a gentle aſcent, from which there is a very magnificent view. The grand walk below forms a viſta, through which the ſteeple of the church appears in all the ſublimity of Gothic grandeur. The medicinal ſpring was firſt noticed in 1716; in 1721, it was leaſed out for ſixty-one pounds per annum. In 1738, Henry Skillicorne, the proprietor, firſt began the preſent buildings at the wells, and made them as commodious as moſt reſorts of the kind. In 1788, at the depth of about fifty feet, another ſpring was diſcovered, which was found to poſſeſs all the ſpecific medicinal qualities of the other, and much more copious. Cheltenham is diſtant from London ninety-four miles, Glouceſter ten, Tewkeſbury ten, and Northleach eleven. This place was honoured with the reſidence of the royal family during the autumn of the year 1788. About two miles eaſt of the town is another mineral ſpring, at a place called Hyde; two miles beyond which Cleve-hill raiſes its venerable brow. At the top of this hill there ſtill remains the veſtiges of a Roman camp.

CHELVA, or XELVA, a town of Spain, in the province of Valencia: ſix leagues ſouth-weſt of Segorba.

CHE'LUM, a river of India. See BEHAT.

CHE'LY, ſ. [*chela*, Lat.] The claw of a ſhell-fiſh.—It happeneth often that a lobſter hath the *chely*, or great claw, of one ſide longer than the other. *Brown.*

CHELY'SCION ſ. [χελυσκιον, from χελυς the breaſt.] A dry ſhort cough, in which the muſcles of the breaſt are very ſore.

CHE'MA, or CHEME, ſ. [χημη, Gr.] A meaſure among the ancients, containing two ſmall ſpoonfuls.

CHE'MACH, or KEMACH, a town of Aſiatic Turkey, in the ſouthern part of Caramania.

CHE'MAL, a town of Perſia, in the province of Chuſiſtan: 110 miles ſouth of Suſter.

CHE'MAZE, a town of France, in the department of Mayenne, and chief place of a canton, in the diſtrict of Chateau Gontier: one league and a half ſouth-weſt of Chateau Gontier.

CHEMERE', a town of France, in the department of the Mayenne, and chief place of a canton, in the diſtrict of Evron: four leagues and a half ſouth-eaſt of Laval.

CHE'MERY, a town of France, in the department of the Ardennes, and chief place of a canton in the diſtrict of Sedan: ſeven miles ſouth of Sedan.

CHE'MIC, or **CHEMICAL**, *adj.* [*chymicus*, Lat.] Made by chemistry:

I'm tir'd with waiting for this *chemic* gold,
Which fools us young, and beggars us when old. *Dryd.*

Relating to chemistry:

With *chemic* art exalts the min'ral pow'rs,
And draws the aromatic souls of flow'rs. *Pope.*

CHE'MIC, *s.* A chemist. *Obsolete.*

CHE'MICALLY, *adv.* In a chemical manner.

CHE'MICE, *s.* The art of casting figures in metals.

CHEMILLI'E, a town of France, in the department of the Mayne and Loire, and chief place of a canton, in the district of Chollet, on the Ironne: three leagues and a half north-east of Chollet.

CHE'MIN DES RONDS, in fortification, the way of the rounds, or a space between the rampart and the low parapet under it, for the rounds to go about it.

CHEMI'NON, a town of France, in the department of the Marne: ten miles east of Vitry-le-François.

CHEMI'SE, *s.* A shirt or shift, a lining, or a casing.

CHEMI'SE, in fortification, the wall with which a bastion, or any other bulwark, is lined, for its greater support and strength: or it is the solidity of the wall from the talus to the stone-row. Fire-chemise is a piece of linen cloth, steeped in a composition of oil of petro., camphor, and other combustible matters, used at sea to set fire to an enemy's vessel.

CHE'MIST, *s.* A professor of chemistry; a philosopher by fire:

The starving *chemist*, in his golden views
Supremely blest. *Pope.*

CHEMIS'TRY', *s.* [*chemia*, Lat. from χυμια, ο r χημια, Gr. חמיה, *chemiah*, from חמה, *chemah*, to burn, Arabic; because, in ancient chemistry, the examination of all substances was by means of fire. Others make *chemia* synonimous with *occultare*; whence it would denote an investigation of *hidden* or *secret* things. In the epocha, when magic and alchemy occupied the attention of mankind, the term *chemia* was made use of to signify the *Science of Nature*, or rather *Magic* (διδασκαλιαι παντων των της φυσεως εργων) according to Zosimus Panopolita, quoted by Borrichius (De Ortu et Progr. Chemiæ), and especially the art of making gold and silver (χημεια η του αργυρου, και χρυσου κατασκευη, according to Suidas). Before the New-Platonics, this word is never mentioned under such signification, neither by the Greeks, nor by the Romans. Julius Maternus Firmicus, who lived in the age of Constantine the Great, is the first author by whom the term appears to have been used.] It was anciently written *chymistry*; but the derivation more strictly favouring the usage of those who write *chemistry*, this orthography is now universally adopted. Authors are not completely agreed on the most proper definition of the word. It is very evident, that originally, chemistry was considered as a mere art; at present, however, it is justly regarded as one of the most sublime and important of the sciences. In its object it embraces the whole of natural phenomena, there being few changes, comparatively speaking, which are not attended with some effect that comes under the cognizance of chemistry. We might define it negatively, by affirming that every effect which is not purely mechanical, is chemical; and in pursuance of this view of the subject, we should say that chemistry, as a science, teaches the methods of estimating and accounting for the changes produced in bodies, by motions of their parts amongst each other, which are too minute to affect the senses individually; and as an art we should affirm that it consists in the application of bodies to each other, in such situations as are best calculated to produce those changes.

For the purpose of exhibiting in a concise and methodical manner, the progress of the human mind in the study of chemistry, and the several advances made therein from the earliest times to the present, we shall divide its history into six principal epochs or ages. The FIRST EPOCHA comprehends the origin of chemistry among the Egyptians, and its progress among the Greeks. Its origin, however, is not less obscure than that of the other sciences and arts in general. The patriarch Tubal Cain, who lived before the deluge, is said to be the first chemist; but his knowledge is not affirmed to have extended beyond the working of metals. This man seems to have been the same, who is spoken of in fabulous history under the name of Vulcan. It is certainly among the Egyptians that we ought to place the true origin of this science. The first of this nation, of whom mention is made as a chemist, is, according to Lenglet du Fresnoy, Thoth or Athotis, surnamed Hermes or Mercury. He was the son of Mezraim, or Osiris, and grandson of Cham. He became king of Thebes. The second king of Egypt, who was likewise a philosopher, was named Sephoas. He lived 800 years after Athotis, and 1900 before Christ. The Greeks have given him the surname of Hermes, or Hermes Trismegistus. He is the second Mercury, and is esteemed as the inventor of natural philosophy. Several historians have transmitted to us the titles of his works on philosophy, which consisted of forty-two books. It does not appear that any of them treated expressly of chemistry, although the science has been called after him, the Hermetic Philosophy.

Our information respecting the cultivation of chemistry in Egypt, is very uncertain. It seems, however, that this science made great progress in that country, since the Egyptians were in possession of a great number of chemical arts; and in particular, that of imitating precious stones; of casting and working metals; of painting on glass, &c. but the chemistry, as well as the other arts and sciences of this ancient people, are lost. Their priests concealed them from the vulgar as mysteries, and only recorded them under the veil of hieroglyphics. The Alchemists have persuaded themselves that some traces of their pretended art is to be found among these; and that the temple, which the Egyptians consecrated to Vulcan, was in honour of Alchemy. The Israelites learned chemistry from the Egyptians. Moses is placed in the number of chemists, because of the knowledge by which he was enabled to dissolve the idol of gold that people adored. It has been thought, and Stahl has written a dissertation to prove it, that this solution of gold in water was performed by the help of liver of sulphur; a process which supposes a knowledge of chemistry of considerable extent.

Democritus of Abdera, who lived about 500 years before Christ, travelled into Egypt, Chaldea, Persia, &c.; and it is affirmed, that he became acquainted with chemists in the first of these countries. Though the son of a man sufficiently rich to receive and entertain Xerxes and all his attendants, he returned very poor to his own country, where he was received by his brother Damassus. In his retirement in a garden, near the walls of Abdera, he employed himself in researches into the nature of plants and precious stones. Cicero affirms, that in order that he might not be disturbed from his speculations by external objects, he destroyed his sight, by keeping his eyes for a time fixed on the bright reflection of the solar rays, from a vessel of polished copper; a fact which, however, is denied by Plutarch. Pliny had so great a degree of esteem and veneration for the knowledge of Democritus, that he even thought it miraculous. There are some authors who reckon Cleopatra among the chemists, because she knew how to dissolve pearls. They affirm, that the art of chemistry, well known to all the Egyptian priests, was constantly practised by that people, till the time of Dioclesian, who, according to Suidas, thought fit to cause their books to be burned, that he might subdue them with more facility.

The SECOND EPOCHA, comprehends the cultivation and growth of chemistry among the Arabians; who, after a long series of ages, and through the revolutions of empires, preserved this science, and cultivated it with success. During the dynasty of the Achemides or Abassides, the sciences, which had been long abandoned, were restored to their vigour. Almanzor, the second caliph, devoted himself to astronomy. Harum Raschid, the fifth caliph, cotemporary with Charlemagne, caused several books relating to chemistry to be translated from the Greek. In the ninth century, Geber of Thus, in Chorazan, a province of Persia, wrote three works on chemistry, in which we find some very good things. His best treatise is intituled, *Summa perfectionis Magisterii*. He has written with considerable perspicuity on distillation, calcination, and the reduction and solution of metals. In the tenth century, Rhases, a physician of the hospital at Bagdat, first applied chemistry to medicine. Some of his pharmaceutic prescriptions are still in esteem. In the eleventh century, Avicen, a physician, likewise applied chemistry to medicine. His merit and knowledge raised him to the office of grand vizier; but the debauched life he led was the cause of his being degraded from that office; and under such a despotic government, it is no wonder the liberal arts soon began to droop.

The THIRD EPOCHA marks the transition of chemistry from the east to the western parts of the world, during the Crusades; and which era is not unaptly termed, the reign of Alchemy. The art of making gold appears to have been in request for a long time, according to the authors who have written concerning it; but the folly which gave birth to it was at its height during the interval between the eleventh and sixteenth centuries. The chemical facts discovered by the Egyptians, collected by the Greeks, and applied to medicine by the Arabians, came to the knowledge of the four nations who travelled into the east during the crusades; namely, the English, French, Germans, and Italians; and each of these infatuated nations became immediately filled with searchers after the philosopher's stone. And, as the immense labours to which they devoted themselves have contributed greatly to the advancement of chemistry, it seems necessary to be acquainted with such of these extraordinary men as have most distinguished themselves. During the thirteenth century, Albert the Great, a Dominican of Cologn, and afterwards of Ratisbon, acquired the reputation of being a magician, and has left a work full of alchemical processes. Roger Bacon, an Englishman, first studied at Oxford. He repaired to Paris to improve himself in the mathematics and medicine. Many inventions are attributed to him; any one alone of which would have been sufficient to have rendered his name immortal. Among these are the camera obscura, the telescope, gun-powder; he is affirmed to have made a self-moving chariot, a speaking head, a flying machine, &c. He was a cordelier, and was surnamed the Admirable Doctor. He retired to a house near Oxford, where it is said he worked in alchemy. Arnold of Villeneuve, born in Languedoc in 1245, studied medicine at Paris during thirty years. He wrote a commentary on the Epistle of the Schola Salernitana. The alchemists esteem him as one of their greatest masters.

The fourteenth century. Raymond Lullius, born at Majorca in 1235, went to Paris in 1281, and he became the disciple of Arnold de Villeneuve. Robert Constantin affirms to have himself seen one of the rose-nobles that were struck in the tower of London, out of the gold made by him, during the reign of Edward the fifth, in the years 1312 and 1313. He wrote several books on alchemy, in which are to be found some facts concerning the preparation of acids, or aqua fortis, and on the properties of metals.

The fifteenth century. Basilius Valentinus, a benedictine of Erfort in Germany, was well acquainted with medicine and natural history. He composed a book on antimony, to which he gave the pompous title of "Currus Triumphalis Antimonii," which was commented on by Kirkringius. In this book we find a great number of antimonial preparations that have since been offered to the world under different new names, and have been administered in the cure of disorders with great success. Isaac Hollandus the father, and his son of the same name, have written books praised by Boerhaave, from which it appears, that they were acquainted with the properties of aqua fortis, and aqua regia. All these authors have in general written in the most obscure and confused manner on the chemical art; and though they were acquainted with some processes of dissolution, extraction, purification, &c. their pretensions were greatly beyond their knowledge, and scarcely any advantage can be derived from their mystic labours.

The FOURTH EPOCHA, includes the age of the universal medicine; of pharmaceutic chemistry; and of alchemy opposed, from the sixteenth to the middle of the seventeenth century; and it may be here remarked, that the bad success of the alchemists, and the ruin of their fortunes and reputation, were so far from discouraging chemical enterprises, that we find a prodigious number of persons during the sixteenth century, encouraged and supported by the enthusiasm of that celebrated Swiss physician, named Paracelsus. This impetuous man pretended that there existed an universal remedy. He substituted chemical medicaments in the stead of those of the Galenical pharmacy then in use, and cured many disorders by mercurial preparation, which were then deemed scarcely curable, more especially those of the venereal kind. His miraculous cures seemed prodigious; but transported by success far beyond the bounds within which he ought to have confined himself, he publicly burned the books of the Greek physicians. He died in the midst of his triumphs, at the age of only forty-eight years, after having promised himself immortality by the use of his secrets. This folly, highly extravagant as it was, revived the ardour of the alchemists. Some among them, who vainly imagined they had succeeded in the discovery of the universal medicine, dignified themselves by assuming the new title of adepts. Such were, at the commencement of the seventeenth century, 1. The Rosicrucians, a kind of society formed in Germany, of which nothing more was ever known but the title, and whose numbers continued unknown. These pretended brothers affirmed, that they were in possession of the secrets of transmutation, of the universal science, and medicine; with the science of occult things, &c. 2. A cosmopolite, named Alexander Sethon, or Sidon, who performed the work of transmutation before a person of the name of Haussen. This last related the fact to Vander Linden, grandfather of the physician of that name, who collected a medical library. 3. Another named Thomas de Vagan, born in England in 1612. He travelled into America, where Starkey received gold from him. He corresponded with Boyle. This is the same adept, who in France gave his powder of projection to Helvetius. The latter, after this pretended miracle, which was nothing more than an artful trick, wrote a dissertation "De vitulo aureo," &c.

The success that attended the administration of chemical medicines by Paracelsus, was productive, however, of some permanently good effects; for it induced several men of abilities to enter into the inquiry, and to write useful works on the preparation of chemical medicines. Such are the writings of Crollius, Schroder, Zweifer, Glaser, Tachenius, Lemery, &c. and the Pharmacopeiæ, published by several faculties of medicine. Glauber, a German chemist, about this time rendered an essential service to chemistry, in examining the residues of operations, which former operators had always thrown aside as useless, and distinguished by the names of caput mortuum, or terra damnata. By this means he discovered the salt named after him, and the vitriolic ammoniac; and

and threw great light on the chemical processes for preparing mineral acids, &c. Some of the promoters of chemical science subsequent to Paracelsus, were not entirely cleared of the ideas his ungoverned imagination gave birth to. Such were Cassius, known by his precipitate of gold; Sir Kenelm Digby, who believed in the sympathetic action of medicaments. Libavius, whose name is affixed to a preparation of tin. Van Helmont, famous for his opinions in medicine, and the chemical notions he has propagated. And lastly, Borrichius, a Danish physician and chemist, who first discovered and published the method of inflaming oils by the nitrous acid, and is entitled to the respect and gratitude of the world, for having bequeathed his library and chemical laboratory to the use of indigent students of medicine. Alchemy, at that time, was in great danger from two celebrated men, who successfully combated its tenets. The one was the famous Kircher, a jesuit, to whom we are indebted for a grand and sublime work intituled, Mundus Subterraneus; the other was the learned physician Conringius.

The FIFTH EPOCHA, comprehends the origin and progress of philosophical chemistry from the middle of the seventeenth to the middle of the eighteenth century; for until this time, chemistry had never been treated philosophically. The chemical arts had been described, medical formulæ had been given and the nature of metals had been laboriously inquired into with a view to the making of gold, or of the universal medicine, (delusive views which still mislead the ignorant and enthusiastic,) but nothing more had been done. The facts ascertained were many, but no one had yet collected them, and, as the celebrated Macquer happily observes, there were many branches of chemistry in being, though the science itself was not yet in existence. Towards the middle of the seventeeth century, James Barnet, physician to the king of Poland, arranged the principal known facts in a methodical manner, and added observations in his philosophical chemistry. The book of this learned man is the more valuable on account of his being the first person who attempted to form a complete body of chemistry, and ranked it among the sciences. Bohnius, professor at Leipsic, likewise composed a book of scientific chemistry, which had great success, and was for a long time the only elementary book on this subject.

Joachim Becher of Spires a man of the most extensive genius, physician to the electors of Mentz and Bavaria, went far beyond the two authors last mentioned, and caused even their names to be forgotten. In his sublime work, intituled, "Physica Subterranea," he united all the known facts of chemistry, and described them with astonishing sagacity. He has even pointed out by conjecture, a great part of the discoveries made to this day; such as the aeriform substances; the possibility of reducing animal bones into a transparent glass, &c. This work was commented on by a celebrated physician, whose name fixes a most brilliant epocha of chemistry. J. Ernest Stahl, born with a strong passion for chemistry, undertook to comment and improve the doctrine of Becher. His attention was more particularly directed to ascertain the existence of the inflammable earth, which he and his followers called phlogiston. Equal to Becher in genius, but superior in accuracy of operation and order of research, he composed a treatise on sulphur, a work on salts, and another intituled Trecenta Experimenta, which have gained him immortal glory, and placed his name among the first of his age. Boerhaave, in the midst of numberless occupations, also cultivated chemistry, and composed a celebrated and truly profound work on this science. His treatises on the four elements, and especially that on fire, are masterpieces to which at that time it was scarcely possible to have made any addition. He was likewise the first who attempted the analysis of vegetables, and discovered the spiritus rector, &c.

The theory of Stahl was long followed by the whole chemical world, and received a new accession of strength from the discoveries and improvements of Dr. Priestley in England; and by the two celebrated brothers MM. Rouelle, whose too early loss is severely felt by the science, and to whom chemistry owes its origin in France. The illustrious Macquer, who will be long lamented by every lover of science, contributed in a most eminent degree to the advancement of this science by his most excellent works, which are with the greatest justice esteemed in every part of Europe, as the surest guides to chemistry. Besides the great obligations the world is under to him for his Elements and Chemical Dictionary, his own particular labours and discoveries on arsenic, Prussian blue, dying silk, on clays for pottery, &c. are sufficient to immortalize his name, and entitle him to the gratitude of posterity.

The SIXTH EPOCHA, commences with the discovery of the *pneumatic* chemistry, being that which is called the *antiphlogistic*, introduced by Lavoisier, and followed at the present day. Stahl, entirely busied in demonstrating the existence of phlogiston, and following it through all its combinations, seems to have overlooked the influence of the air in the greatest part of the phenomena in which he attributes so great an energy to the inflammable principle. Boyle and Hales had nevertheless already proved the great necessity of attending to this fluid, in the operations of chemistry. The former had observed the difference between the chemical events that happened in like circumstances in the air and in vacuo The latter had obtained from a great number of bodies a fluid which he supposed to be air, but in which however he had observed several peculiar properties, such as odour, inflammability, &c. according to the various substances they proceeded from. He thought the air was the cementing principle, or cause of solidity in bodies. Dr. Priestley also, in repeating a great part of the experiments of Hales, discovered many fluids, which though he thought resembled air, yet differ from it in all their essential properties. And in particular, he obtained from metallic oxyds or calces, a kind of air, much purer than that of the atmosphere. M. Bayen, a chemist justly celebrated for the exactness of his operations and experiments, examined the oxyds of mercury, and discovered that they were reducible without phlogiston, and that during reduction they emitted an aeriform fluid in great abundance.

The ingenious and much-lamented Lavoisier first proved, by a great number of valuable experiments, that a portion of the air becomes combined with such bodies as are calcined or burnt. In consequence of this, he established a sect or class of chemists, who began to doubt the presence of phlogiston, and attributed to the fixation of air, or its disengagement, all the phenomena that Stahl and Priestly readily supposed to depend on the separation or combination of phlogiston. It must be granted, that this doctrine has the advantage over that of Stahl in its proofs, being more strict, and is so much the more seducing, as it agrees better with the accurate and rigorous manner of proceeding, which is at present adopted in the study and cultivation of natural philosophy. This seemed to be the case in the opinion of the late M. Buquet, who, in his two or three last courses, appeared to give it a decided preference. The wisest and doubtless the only proper conduct to be pursued on this occasion, is to wait till a great number of facts shall have completely demonstrated, that all the phenomena of chemistry are explicable according to the pneumatic theory, without admitting phlogiston. M. Macquer, though well aware of the great revolution these new discoveries could not but occasion in chemistry, did not admit the opinion, that every fact is explicable without supposing the existence of an inflammable principle; and instead of phlogiston, whose existence has never been fairly proved, he has substituted light, the action and influence of which in chemical appearances cannot be called in question. Upon the whole, much is due to the ability and indefatigable industry of Lavoisier, in bringing forward the pneumatic

matic ſyſtem; and the hiſtory of ſcience, on recording his too early death, will never fail to ſtigmatize thoſe revolutionary miſcreants, who cauſed the head of this innocent man to drop on the 7th of May, 1794, under the axe of the guillotine.

Although the preſent Treatiſe is principally made up from the valuable writings of Lavoiſier, Fourcroy, and La Grange; yet have we occaſionally conſulted and improved from the following liſt of authors, whoſe names we here ſet down, as well to acknowledge our own obligations on the ſcore of information, as to put it in the power of thoſe who wiſh to read more deeply in chemiſtry, what authors they might conſult with advantage and pleaſure. We ſhall place them in the order of the alphabet, viz. Achard, Adet, Alyon, Arvidſſon. Bailleau, Bancroft, Baumé, Bayen, Beccher, Bénédict Prevoit, Bérard, Bergman, Bergniard, Berthollet, Black, Blagden, Boërhaave, Bognes, Bohnius, Born, Boſc, Bowles, Boulduc, Brandt, Briſſon, Brongniart (Alexander), Brongniart (Ant.-Louis), Brugnatelli, Bucquet. Cartheuſer, Cavallo, Cavendiſh, Chaptal, Charlard, Chauſſier, Clouet, Conté, Coulomb, Craffort, Cramer, Crawford, Crell, Croharé, Cronſtedt, Curaudeau. Darcet, Daubenton, Deborn, Delluyard, Demachy, Dengeſtroeme, Déyeux, Dizé, Dupont, Dutroſne. Elhuyar, Erhman, Erxleben. Ferber, Fontana. Gahn, Gaſſendi, Geller, Geoffroy, Gerhard, Glaſer, Glauber, Gmelin, Goettling, Gouiard, Gren, Guyton. Hagen, Hallé, Haſſenfratz, Hauy, Hetcht, Hellot, Henkel, Hermſtaedt, Higgins, Hoffman, Homberg, Humboldt. Jacquin, Jar, Jeanetti, Ilſeman, Ingenhouſs, Joſſe. Keyſer, Kirwan, Klaproth, Koſegarten, Kunkel. Lagaraye, Landriani, Laplace, Laplanche, Lartigue, Lehmann, Lelievre, Lemere, Lewis, Libes, Linnæus, Lowitz, Ludovic. Macquer, Magellan, Malouin, Margraff, Meunier, Meyer, Model, Monceau, Monge, Mongés, Monnet, Morveau, Muſſembroek. Navier, Neumann, Newton, Nicholſon, Nollet, Nooth. Parker, Parmentier, Pearſon, Pelletier, Pérès, Picot-la-Peyrouſe, Poli, Pott, Poulletier, Prieſtley, Prouſt. Rabel, Reaumur, Richard, Richter, Rinmann, Rouelle ſenior, Rouelle junior. Sage, Save (de St. Plamard), Scheele, Scheffer, Scherer, Sedillot jeune, Seguin, Sickengen, Sigault-Lafond, Spielman, Stalh, Starkey, Succow, Sylvius. Tancoigue, Taſſaert, Thouret, Torricelli, Tromſdorf. Van-helmont, Van-Marum, Van-Mons, Vauquelin, Veau-Delaunay, Venturi, Vilke, Vincenzo-Catciarolo. Wallerius, Wedgwood, Weigel, Welter, Wenzel, Weitrum, Wiegleb, Withering, Wolf. Zwelſer.

The Nomenclature, or words forming the language of chemiſtry, ſeems to be the next object that ſhould claim the attention of a learner. Without a due knowledge of this, and a frequent exerciſe of the terms made uſe of, the progreſs will be ſlow, and the embarraſſment great, in purſuing an enquiry into the different branches of this ſcience. To aſſiſt the learner, and render a reference to all the terms more eaſy and familiar, we ſhall here ſet down the various ſynonims, or words uſed in the ancient ſyſtem, with thoſe of the new oppoſite to them. This will be found extremely convenient on many occaſions; for even among druggiſts, and medical men, the old names of chemical ſubſtances and *præparata*, will, for a time, continue better known than the new ones; beſides that, a common reader may gradually, and without trouble, become acquainted with both nomenclatures. A ſimilar advantage will alſo, by this means, be derived to thoſe who, at preſent, acquainted only with the new ſtyle, may, after ſome time, wiſh to read the works of former chemiſts, written in the old language; ſeveral of which are ſtill valuable on many accounts.

ANCIENT NAMES.	NEW NAMES.
Acetous ammoniac	Acetit ammoniacal ——— of ammoniac
Acetous ſalt of clay	Acetit aluminous ——— of alumin
Acetous ſalt of copper	Acetit of copper
Acetous ſalt of iron	Acetit of iron
Acetous ſalt of lead	Acetit of lead
Acetous ſalt of lime	Acetit of lime
Acetous ſalt of magneſia	Acetit of magneſia
Acetous ſalt of mercury	Acetit of mercury
Acetous ſalt of ſoda	Acetit of ſoda
Acetous ſalt of tartar	Acetit of potaſh
Acetous ſalt of zinc	Acetit of zink
Acid acetous	Acetous acid
Acid aerial	Carbonic acid
Acid of alum	Sulphuric acid
Acid of amber	Succinic acid
Acid of ants	Formic acid
Acid of apples	Malic acid
Acid arſenical	Arſenic acid
Acid of benzoin	Benzoic acid
Acid boracic	Boracic acid
Acid of borax	Boracic acid
Acid of chalk	Carbonic acid
Acid of charcoal	Carbonic acid
Acid cretaceous	Carbonic acid
Acid of fat	Sebacic acid
Acid of galls	Gallic acid
Acid of galls alcoholized	Gallic alcohol
Acid of lemons	Citric acid
Acid lignic, or of box	Pyroligneous acid
Acid maluſian	Malic acid
Acid marine	Muriatic acid
Acid marine dephlogiſticated	Oxygenated muriatic acid
Acid mephitic	Carbonic acid
Acid of molybdena	Molybdic acid
Acid of muria	Muriatic acid
Acid of nitre	Nitric acid
Acid of nitre pale or colourleſs	Nitric acid
Acid of nitre deprived of its gas	Nitric acid
Acid of nitre dephlogiſticated	Nitric acid
Acid of nitre phlogiſticated	Nitrous acid
Acid perlate	Superſaturated phoſphat of ſoda
Acid of phoſphorus dephlogiſticated	Phoſphoric acid
Acid of phoſphorus phlogiſticated	Phoſphoreous acid
Acid of ſea-ſalt	Muriatic acid
Acid of ſilk-worms	Bombic acid
Acid of ſpar or fluor	Fluoric acid
Acid of ſugar	Oxalic acid
Acid of ſulphur	Sulphuric acid
Acid of tungſtein or tungſten	Tungſtic acid
Acid of wolfram of Meſſrs. Delhuyar	Tungſtic acid
Acid ſaccharine	Oxalic acid
Acid ſaccholactic, or acid of the ſugar of milk	Saccholactic acid
Acid ſebaceous, or of fat	Sebacic acid
Acid ſedative	Boracic acid
Acid ſulphureous	Sulphureous acid
Acid ſyrupous	Pyromucous acid
Acid tartareous	Tartareous acid
Acid vitriolic	Sulphuric acid
Acid phlogiſticated vitriolic	Sulphureous acid
Acidum pingue	The hypothetical principle of Meyer
Affinities	Chemical affinities or attractions
Aggregation	Aggregation
Air alkaline	Ammoniacal gas
Air atmoſpherical, or common air	Atmoſpherical, or common air

Air,

ANCIENT NAMES.	NEW NAMES.
Air, dephlogisticated of Dr. Priestley	Oxygenous gas, or vital air
Air, dephlogisticated marine acid	Oxygenated muriatic acid gas
Air factitious	Carbonic acid gas
Air, fœtid, of sulphur	Sulphurated hydrogenous gas
Air, fire, of Scheele	Oxygenous gas
Air, fire, of Dr. Black	Carbonic acid gas
Air impure	Azotic gas
Air inflammable	Hydrogenous gas
Air, marine acid	Muriatic acid gas
Air nitrous	Nitrous gas
Air phlogisticated	Azotic gas
Air pure	Oxygenous gas, or vital air
Air, solid, of Hales	Carbonic acid gas
Air vitiated	Azotic gas
Air vital	Oxygenous gas
Air, vitriolic acid, of Dr. Priestley	Sulphureous acid gas
Alkahest	The universal solvent of the alchemists
Alkahest of Respour	Potash mixed with oxyd of zink
Alkahest of Van Helmont	Carbonat of potash
Alkalis in general	Alkalis
Alkalis aerated	Alkaline carbonats
Alkalis caustic	Alkalis
Alkalis effervescent	Alkaline carbonats
Alkali fixed, of tartar, caustic	Potash
Alkali fixed, of tartar, not caustic	Carbonat of potash
Alkali, fixed vegetable	Carbonat of potash
Alkali marine, caustic	Soda
Alkali marine, not caustic	Carbonat of soda
Alkali mineral acetated	Acetit of soda
Alali mineral aerated	Carbonat of soda
Alkali phlogisticated	Ferruginous prussiat of potash, not saturated
Alkali Prussian	Ferruginousprussiatofpotash
Alkali urinous	Carbonat of ammoniac Ammoniacal carbonat
Alkali vegetable aerated	Carbonat of potash
Alkali volatile acetated	Ammoniacal acetit Acetit of ammoniac
Alkali volatile mild	Ammoniacal carbonat Carbonat of ammoniac
Alkali volatile fluor	Ammoniac
Alkali volatile caustic	Ammoniac
Alkali volatile concrete	Ammoniacal carbonat
Alkali volatile mephitized	Carbonat of ammoniac
Allay or alloy of metals	Alloy
Alum	Sulphat of alumine Aluminous sulphat
Alum marine	Muriat of alumine Aluminous muriat
Alum nitrous	Nitrit of alumine Aluminous nitrit
Amalgam of bismuth	Amalgam of bismuth
Amalgam of copper	Amalgam of copper
Amalgam of gold	Amalgam of gold
Amalgam of lead	Amalgam of lead
Amalgam of silver	Amalgam of silver
Amalgam of tin	Amalgam of tin
Amalgam of zinc	Amalgam of zink
Amber yellow	Amber of succinum
Antimony crude	Sulphure of antimony
Antimony diaphoretic	White oxyd of antimony by nitre
Aqua fortis	Nitric acid of commerce
Aqua regia	Nitro-muriatic acid
Aqua stygia	Nitro-muriatic acid, by the ammoniacal muriat
Aquila alba	Mild sublimated mercurial muriat
Arbor Dianæ	Crystallized amalgam of silver
Arcanum corallinum	Red oxyd of mercury, by the nitric
Arcanum duplicatum	Sulphat of potash
Argil pure, or argillaceous earth	Alumine
Argil cretaceous	Aluminous carbonat
Argil sparry	Aluminous fluat Fluat of alumine
Arsenic, regulus of	Arsenic
Arsenic, white calx of	Oxyd of arsenic
Arsenic red	Red sulphurated oxyd of arsenic
Arseniat of potash	Arseniat of potash
Attractions elective	Elective attractions
Azure of cobalt, or of the four fibres	Vitreous oxyd of cobalt and silex
Balsams of bucquet	Balsams
Balsam of sulphur	Sulphure of volatile oil
Barilla	Carbonat of soda
Barytes	Barytes
Barytes effervescent	Carbonat of barytes
Base of vital air	Oxygen
Base of marine salt	Soda
Benzoin or benjamin	Benkoih
Benzoic salts	Benzoats
Bezoar mineral	Oxyd of antimony
Bismuth	Bismuth
Bismuth muriated	Muriat of bismuth
Bitumen	Bitumen
Black lead	Carbure of iron
Blue, Berlin	Prussiat of iron
Blue, Prussic	Prussiat of iron
Borax	Borax of soda, or borat supersaturated with soda
Borax ammoniacal	Ammonical borat
Borax of zinc	Borat of zink
Borax argillaceous	Aluminous borat
Borax barytic or ponderous	Borat of barytes
Borax calcareous	Borat of lime Calcareous borat
Borax magnesian	Magnesian borat Borat of magnesia
Borax martial	Borat of iron
Borax mercurial	Borat of mercury
Borax vegetable	Borat of potash
Borax of antimony	Borat of antimony
Butter of antimony	Sublimated muriat of antimony
Butter of arsenic	Sublimated muriat of arsenic
Butter of bismuth	Sublimated muriat of bismuth
Butter of cobalt	Sublimated muriat of cobalt
Butter of copper	Sublimated muriat of copper
Butter of tin	Sublimated muriat of tin
Butter of tin, solid, of Baumé	Concrete muriat of tin
Butter of zinc	Sublimated muriat of zink
Brass	Brass; alloy of copper and zink
Calces metallic	Metallic oxyds
Calx of antimony vitrified	Vitreous oxyd of antimony
Cameleon mineral	Oxyd of manganese & potash
Camphor	Camphor
Camphoric salts	Camphorats
Causticum	Meyer's hypothetical principle
Causticum lunare	Fused nitrat of silver
Ceruse	White oxyd of lead by the acetous acid, mixed with carbonat of lime
Ceruse of antimony	White oxyd of antimony by precipitation

ANCIENT NAMES.	NEW NAMES.
Chalk	Chalk, carbonat of lime; Calcareous carbonat
Charcoal pure	Carbon
Cinnabar	Sulphurated red oxyd of mercury
Clay	Clay; a mixture of alumine and ſilice
Cobalt	Cobalt
Colcothar	Red oxyd of iron by the ſulphuric acid
Copper	Copper
Copper acetated	Acetat of copper
Copperas green	Sulphat of iron
Copperas blue	Sulphat of copper
Copperas white	Sulphat of zink
Cream of tartar	Acidulous tartrit of potaſh
Diamond	Diamond
Earth, acetated calcareous	Calcareous acetit
Earth, aerated ponderous	Carbonat of barytes
Earth animal	Calcareous phoſphat
Earthy baſe of ponderous ſpar	Barytes
Earth calcareous	Lime, or calcareous earth
Earth of alum	Alumine
Earth animal	Phoſphat of lime
Earth calcareous	Lime, or calcareous earth
Earth magneſian	Carbonat of magneſia
Earth muriatic, of Kirwan	Magneſia
Earth ponderous	Barytes
Earth ſilicious	Siliceous earth, or ſilex
Emetic tartar	Antimoniated tartrit of potaſh
Empyreal air	Oxygenous gas
Eſſences	Volatile oils
Ether acetous	Acetic ether
Ether marine	Muriatic ether
Ether nitrous	Nitric ether
Ether vitriolic	Sulphuric ether
Ethiops martial	Black oxyd of iron
Ethiops mineral	Black ſulphurated oxyd of mercury
Ethiops per ſe	Blackiſh mercurial oxyd
Extract	Extract
Fecula of vegetables	Fecula
Flowers, ammoniacal cupreous	Sublimated ammoniacal muriat of copper
Flowers argentine, of regulus of antimony	Sublimated oxyd of antimony
Flowers metallic	Sublimated metallic oxyds
Flowers of arſenic	Sublimated oxyd of arſenic
Flowers of benzoin	Sublimated benzoic acid
Flowers of biſmuth	Sublimated oxyd of biſmuth
Flowers of ſulphur	Sublimated ſulphur
Flowers of tin	Sublimated oxyd of tin
Flowers of zinc	Sublimated oxyd of zink
Fluids aeriform	Gas
Fluids elaſtic	Gaſes
Fluor ammoniacal	Fluat of ammoniac; Ammoniacal fluat
Fluor argillaceous	Aluminous fluat; Fluat of alumine
Fluor of magneſia	Fluat of magneſia
Fluor of potaſh	Fluat of potaſh
Fluor of ſoda	Fluat of ſoda
Fluor ponderous	Barytic fluat
Gas	Gas
Gas, acetous acid	Acetous acid gas
Gas, aerial muriatic acid	Oxygenated muriatic acid gas
Gas, alkaline	Ammoniacal gas
Gas, cretaceous acid	Carbonic acid gas
Gas, hepatic	Sulphurated hydrogenous gas
Gas inflammable	Hydrogenous gas
Gas, inflammable carbonated	Carbonated hydrogenous gas
Gas, inflammable of marſhes	Marſh hydrogenous gas (mixture of carbonated hydrogenous gas and azotic gas)
Gas mephitic	Carbonic acid gas
Gas, marine acid	Muriatic acid gas
Gas, nitrous	Nitrous gas
Gas, phlogiſticated	Azotic gas
Gas phoſphoric, of Mr. Gengembre	Phoſphorated hydrogenous gas
Gas of Pruſſian blue	Pruſſic acid gas
Gas, ſparry acid	Fluoric acid gas
Gas, ſulphureous	Sulphureous acid gas
Gas ſylveſtre, of Helmont	Carbonic acid gas
Gilla vitrioli	Sulphat of zink
Glutinous matter of wheat	Gluten
Gold	Gold
Gold muriated	Muriat of gold
Gold fulminating	Ammoniacal oxyd of gold
Hepars	Sulphures
Heat latent	Caloric
Ink ſympathetic by cobalt	Muriat of cobalt
Iron, or mars	Iron
Iron aerated	Carbonat of iron
Iron acetated	Acetit of iron
Jupiter	Tin
Kermes mineral	Red ſulphurated oxyd of antimony
Lapis infernalis	Fuſed nitrat of ſilver
Lead, or ſaturn	Lead
Lead muriated	Muriat of lead
Lead ſparry	Carbonat of lead
Lead ſubacetated	White oxyd of lead by the acetous acid
Lead ſuperacetated	Acetit of lead
Lemon-juice	Citric acid
Ley of ſoap	Solution of ſoda
Lignic ſalts	Pyro-lignites
Lilium Paracelſi	Alcohol of potaſh
Lime-water	Lime-water
Lime-water, Pruſſian	Pruſſiat of lime
Liquor, Boyles fuming	Ammoniacal ſulphure
Liquor ſilicum	Siliciated potaſh, in ſolution
Liquor, Libavius's fuming	Fuming muriat of tin
Liquor ſaturated with the colouring matter of Pruſſian blue	Pruſſiat of potaſh
Litharge	Semi-vitreous oxyd of lead, or litharge
Light	Light
Liver of antimony	Sulphurated oxyd of antimony
Liver of arſenic	Arſenical oxyd of potaſh
Livers of ſulphur	Alkaline ſulphures
Livers of ſulphur, earthy	Earthy ſulphures
Liver of ſulphur, antimoniated	Antimoniated alkaline ſulphure
Liver of ſulphur, calcareous	Calcareous ſulphure; Sulphure of lime
Liver of ſulphur, barytic	Barytic ſulphure; Sulphure of barytes
Liver of ſulphur, magneſian	Sulphure of magneſia; Magneſian ſulphure
Liver of ſulphur, volatile alkaline	Ammoniacal ſulphure; Sulphure of ammoniac
Luna cornea	Muriat of ſilver
Magiſtery of biſmuth	Oxyd of biſmuth by the nitric acid
Magiſtery of lead	Precipitated oxyd of lead
Magiſtery of ſulphur	Precipitated ſulphur
Magneſia alba	Carbonat of magneſia

ANCIENT NAMES.	NEW NAMES.
Magnesia aerated, of Bergman	Carbonat of magnesia
Magnesia black	Black oxyd of manganese
Magnesia caustic	Magnesia
Magnesia cretaceous	Carbonat of magnesia
Magnesia effervescent	Carbonat of magnesia
Magnesia fluorated	Fluat of magnesia
Magnesia sparry	Fluat of magnesia
Malusit salts	Malits of potash, of soda, &c.
Manganese	Manganese
Massicot	Yellow oxyd of lead
Matter of heat	Caloric
Matter of fire	This term has been used to signify light, caloric, and phlogiston
Matter pearly of Kerkringius	White oxyd of antimony by precipitation
Matter colouring of Prussian blue	Prussic acid
Metaphitized metals, earths	Carbonats of metals, &c.
Mephitis atmospherical	Azotic gas
Mercury	Mercury
Mercury acetated	Acetit of mercury
Mercurius dulcis	Mild mercurial muriat
Mercury, white precipitate of	Mercurial muriat by precipitation
Mercury of metals	Beccher's hypothetical principle
Minium	Red oxyd of lead, or minium
Molybdena	Molybdena
Molybdena, saline compounds of	Molybdats
Mother water	Deliquescent saline residue
Mucilage	Mucus
Muriated metals	Muriats of different metals
Muriated gold, or reguline salt of gold	Muriat of gold
Natron, or natrum	Carbonat of soda
Nitre	Nitrat of potash, or nitre
Nitre ammoniacal	Ammoniacal nitrat
Nitre argillaceous	Nitrat of alumine
Nitre calcareous	Nitrat of lime Calcareous nitrat
Nitre cubic	Nitrat of soda
Nitre fixed	Carbonat of potash
Nitre lunar	Nitrat of silver
Nitre of arsenic	Nitrat of arsenic
Nitre of bismuth	Nitrat of bismuth
Nitre of cobalt	Nitrat of cobalt
Nitre of copper	Nitrat of copper
Nitre of iron	Nitrat of iron
Nitre of lead	Nitrat of lead
Nitre of magnesia	Nitrat of magnesia
Nitre of manganese	Nitrat of manganese
Nitre of nickel	Nitrat of nickel
Nitre of ponderous earth	Barytic nitrat Nitrat of barytes
Nitre of silver	Nitrat of silver
Nitre of tin	Nitrat of tin
Nitre of zinc	Nitrat of zink
Nitre prismatic	Nitrat of potash
Nitre quadrangular	Nitrat of soda
Nitre rhomboidal	Nitrat of soda
Nitre saturnine	Nitrat of lead
Ochre	Yellow oxyd of iron
Oil of lime	Calcareous muriat
Oil of tartar per deliquium	Potash in deliquescence mixed with carbonat of potash
Oil of vitriol	Sulphuric acid
Oils ethereal	Volatile oils
Oils animal	Volatile animal oils
Oils empyreumatic	Empyreumatic oils
Oils essential	Volatile oils

ANCIENT NAMES.	NEW NAMES.
Oils by expression	Fixed oils
Oils fat	Fixed oils
Oils unctuous	Fixed oils
Oleum philosophorum	Fixed empyreumatic oils
Ore of antimony	Native sulphure of antimony
Ore of iron of marshes	Iron ore, containing phosphat of iron
Pewter	Alloy of copper and tin; pewter
Phlogiston	Stahl's hypothetical principle
Phosphoric sal ammoniac	Ammoniacal phosphat Phosphat of ammoniac
Phosphoric salt of barytes	Phosphat barytic Barytic phosphat
Phosphoric salt of magnesia	Magnesian phosphat
Phosphoric salt of potash	Phosphat of potash
Phosphoric salt of soda	Phosphat of soda
Phosphorus of Baldwin	Dry calcareous nitrit
Phosphorus of Kunckel	Phosphorus
Phosphorus of Homberg	Dry calcareous muriat
Platina	Platina
Plumbago	Carbure of iron
Pompholix	Sublimated oxyd of zink
Potash	Impure carbonat of potash
Powder of algaroth	Oxyd of antimony by the muriatic acid
Powder of Count de Palma	Carbonat of magnesia
Powder of Sentinelly	Carbonat of magnesia
Precipitate golden, or purple, of Cassius	Oxyd of gold precipitated by tin
Precipitate red	Red oxyd of mercury by the nitric acid
Precipitate per se	Red oxyd of mercury by fire
Precipitate yellow	Yellow oxyd of mercury by the sulphuric acid
Precipitate white by the muriatic acid	Muriat of mercury by precipitation
Principle acidifying	Oxygen
Principle astringent	Gallic acid
Principle inflammable. See *Phlogiston*.	
Principle mercurial	Beccher's hypothetical principle
Principle of charcoal	Carbon
Principle sorbile of Ludbock	Oxygen
Prussit calcareous	Calcareous prussiat Prussiat of lime
Prussit of soda	Prussiat of soda
Pyrites of copper	Sulphure of copper
Pyrites martial	Sulphure of iron
Pyrophorus of Homberg	Carbonated sulphure of alumine Pyrophorus of Homberg
Realgar	Red sulphurated oxyd of arsenic
Realgites, salts formed with aqua regia	Nitro-muriats
Regulus	A word used to signify the metallic state
Regulus of antimony	Antimony
Regulus of arsenic	Arsenic
Regulus of cobalt	Cobalt
Regulus of manganese	Manganese
Regulus of molybdena	Molybdena
Regulus of syderit	Phosphure of iron
Resins	Resins
Rust of copper	Green oxyd of copper
Rust of iron	Carbonat of iron
Ruby of antimony	Vitreous brown sulphurated oxyd of antimony
Saffron of mars	Oxyd of iron
Saffron of mars, aperitive	Carbonat of iron

ANCIENT NAMES.	NEW NAMES.
Saffron of mars, astringent	Brown oxyd of iron
Saffron of metals	Semi-vitreous sulphurated oxyd of antimony
Sal ammoniac	Ammoniacal muriat Muriat of ammoniac
Sal ammoniac fixed	Calcareous muriat Muriat of lime
Sal de duobus	Sulphat of potash
Sal polychrest of Glaser	Sulphat of potash
Sal polychrest of Rochelle	Tartrit of soda
Sal sodæ. See *Soda*.	
Salt acetous ammoniacal	Ammoniacal acetit Acetit of ammoniac
Salt acetous calcareous	Calcareous acetit Acetit of lime
Salt acetous magnesian	Magnesian acetit Acetit of magnesia
Salt acetous martial	Acetit of iron
Salt acetous mineral	Acetit of soda
Salt acetous argillaceous	Aluminous acetit
Salt acetous of zinc	Acetit of zink
Salt ammoniacal cretaceous	Ammoniacal carbonat
Salt ammoniacal fixed	Calcareous muriat Muriat of lime
Salt ammoniacal nitrous	Nitrat of ammoniac
Salt ammoniacal (secret of Glauber)	Sulphat of ammoniac
Salt ammoniacal sedative	Ammoniacal borat
Salt ammoniacal sparry	Fluat of ammoniac
Salt ammoniacal vitriolic	Ammoniacal sulphat
Salt bitter purging	Magnesian sulphat Sulphat of magnesia
Salt common	Muriat of soda
Salt febrifuge of Sylvius	Muriat of potash
Salt fusible of urine	Phosphat of soda and ammoniac
Salt, Glauber's	Sulphat of soda
Salt marine argillaceous	Aluminous muriat Muriat of alumine
Salt marine calcareous	Calcareous muriat Muriat of lime
Salt marine magnesian	Magnesian muriat Muriat of magnesia
Salt marine of iron	Muriat of iron
Salt marine of zinc	Muriat of zink
Salt native of urine	Phosphat of soda and ammoniac
Salt, neutral arsenical, of Macquer	Acidulous arseniat of potash
Salt of alembroth	Ammoniaco-mercurial muriat
Salt of amber, obtained by crystallization	Crystallized succinic acid
Salt of calcothar	Sulphat of iron, in a state little known
Salt of Epsom	Sulphat of magnesia
Salt of Jupiter	Muriat of tin
Salt of milk	Sugar of milk
Salt of Scheidschutz	Magnesian sulphat
Salt of Sedlitz	Sulphat of magnesia
Salt of Segner	Sebat of potash
Salt of Seignette	Tartrit of soda
Salt of sorrel	Acidulous oxalat of potash
Salt of wisdom	Ammoniaco-mercurial muriat
Salt of wormwood, common	Carbonat of potash
Saltpetre	Nitrat of potash, or nitre
Salt reguline of gold	Muriat of gold
Salt sedative	Boracic acid
Salt sedative mercurial	Borat of mercury
Salt sedative sublimated	Sublimated boracic acid
Salt stanno-nitrous	Nitrat of tin
Salt sulphureous of Stahl	Sulphit of potash
Salt vegetable	Tartrit of potash
Salt volatile of amber	Sublimated succinic acid
Salt, wonderful pearly	Supersaturated phosphat of soda
Saturn	Lead
Selenit	Sulphat of lime
Silver	Silver
Silver muriated	Muriat of silver
Silver supernitrated	Fused nitrat of silver
Snow of antimony	White sublimated oxyd of antimony
Soaps acid	Acid soaps
Soaps alkaline	Alkaline soaps
Soaps earthy of Berthollet	Earthy soaps
Soaps metallic, of Berthollet	Metallic soaps
Soap of Starkey	Saponull of potash
Soda caustic	Soda
Soda cretaceous	Carbonat of soda
Spanish white	White oxyd of lead by the acetous acid
Spar ammoniacal	Ammoniacal fluat
Spar calcareous	Carbonat of lime
Spar fluor	Calcareous fluat
Spar ponderous	Sulphat of barytes
Spirits acid	Acids diluted with water
Spirit acid of wood	Pyroligneous acid
Spirit alkaline volatile	Ammoniacal gas
Spirit ardent	Alcohol
Spirit of Mindererus	Ammoniacal acetit
Spirit of nitre	Nitric acid diluted with water
Spirit of nitre dulcified	Nitric alcohol
Spirit of nitre fuming	Nitrous acid
Spirit of salt	Muriatic acid
Spirit of sal ammoniac	Ammoniac
Spirit of Venus	Acetic acid
Spirit of vitriol	Sulphuric acid diluted with water
Spirit of wine	Alcohol
Spiritus rector	Aroma
Spirit volatile of sal ammoniac	Ammoniac diluted with water
Spiritus sylvestris of Helmont	Carbonic acid
Stone of the bladder	Lithic acid
Sublimat corrosive	Corrosive muriat of mercury
Sugar	Sugar
Sugar candied	Crystallized sugar
Sugar of lead	Acetit of lead
Sugar or salt of milk	Sugar of milk
Sulphur	Sulphur
Sulphur golden of antimony	Orange-coloured sulphurated oxyd of antimony
Syderit	Phosphat of iron
Syderotet of Morveau	Phosphure of iron
Tartar	Acidulous tartrit of potash
Tartar ammoniacal	Ammoniacal tartrit
Tartar antimoniated	Antimoniated tartrit of potash
Tartar calcareous	Tartrit of lime
Tartar chalybeated	Ferruginous tartrit of potash
Tartar cretaceous	Carbonat of potash
Tartar crude	Tartar
Tartar cupreous	Tartrit of copper
Tartar emetic	Antimoniated tartrit of potash
Tartar of magnesia	Tartrit of magnesia
Tartar of potash	Tartrit of potash
Tartar of soda	Tartrit of soda
Tartar martial soluble	Ferruginous tartrit of potash
Tartar mephitized	Carbonat of potash
Tartar mercurial	Mercurial tartrit
Tartar saturnine	Tartrit of lead

ANCIENT NAMES.	NEW NAMES.
Tartar ſparry, or of ſpar	Fluat of potaſh
Tartar ſoluble	Tartrit of potaſh
Tartar ſtibiated	Antimoniated tartrit of potaſh
Tartar tartarized, or terra foliata tartari	Tartrit of potaſh
Tartar tartarized, holding antimony in ſolution	Tartrit of potaſh ſupercompounded with antimony
Tartar vitriolated	Sulphat of potaſh
Tincture acrid of tartar	Alcohol of potaſh
Tinctures ſpirituous	Reſinous alcohols
Tin	Tin
Tin muriated	Muriat of tin
Tungſtein	Tungſtein, or tungſten
Turbith mineral	Yellow oxyd of mercury by the ſulphuric acid
Turbith nitrous	Yellow oxyd of mercury by the nitric acid
Verdegris	Green oxyd of copper
Verdegris of the ſhops	Acetit of copper, with exceſs of oxyd
Verdegris diſtilled	Cryſtallized acetit of copper
Venus	Copper
Vinegar diſtilled	Acetous acid
Vinegar of ſaturn	Acetit of lead
Vinegar radical	Acetic acid
Vitriol ammoniacal	Ammoniacal ſulphat
Vitriol blue, or Roman vitriol	Sulphat of copper
Vitriol green, or copperas	Sulphat of iron
Vitriol magneſian	Sulphat of magneſia
Vitriol martial	Sulphat of iron
Vitriol of antimony	Sulphat of antimony
Vitriol of clay, or argil	Sulphat of alumine
Vitriol of biſmuth	Sulphat of biſmuth
Vitriol of cobalt	Sulphat of cobalt
Vitriol of copper	Sulphat of copper
Vitriol of cyprus	Sulphat of copper
Vitriol of lead	Sulphat of lead
Vitriol of mangaueſe	Sulphat of mangaueſe
Vitriol of mercury	Sulphat of mercury
Vitriol of nickel	Sulphat of nickel
Vitriol of platina	Sulphat of platina
Vitriol of potaſh	Sulphat of potaſh
Vitriol of ſilver	Sulphat of ſilver
Vitriol of ſoda	Sulphat of ſoda
Vitriol of tin	Sulphat of tin
Vitriol of zinc	Sulphat of zink
Vitriol white	Sulphat of zink
Water	Water
Waters aerated, or acidulated	Water impregnated with carbonic acid
Water mercurial	Solution of nitrat of mercury
Water hepatic	Sulphurated, or ſulphureous waters
Wolfram of Meſſ. d'Elhuyar	Tungſten
Wood philoſophical	Sublimed oxyd of zink
Zinc	Zink

GENERAL OUTLINE of MODERN CHEMISTRY.

All the facts and experiments of chemiſtry, may be referred to the twelve following eſtabliſhed phenomena: 1. The action of light. 2. The action of caloric. 3. The action of air in combuſtion. 4. The nature and action of water. 5. The nature and action of earths, and the formation of alkalis, with the parts they perform in combinations. 6. The nature and properties of combuſtible bodies. 7. The formation and decompoſition of acids. 8. The union of acids with earths and alkalis. 9. The oxydation and diſſolution of metals. 10. The nature and formation of vegetable ſubſtances. 11. The tranſition of vegetables to the ſtate of animal matter, and the nature thereof. 12. Finally, the ſpontaneous decompoſition of vegetable and animal ſubſtances. Theſe twelve heads may be conſidered as the titles or data of ſo many diſtinct parts; which, taken together, include the whole of the doctrine of chemiſtry; the outline of which we ſhall trace as follows:

THE ACTION OF LIGHT.

Light, whether it come from the ſun and fixed ſtars, or be diffuſed throughout ſpace, is modified in four different ways with regard to the bodies with which it comes into contact: either it is reflected entirely from their ſurfaces to our eyes, and excites the ſenſation of whiteneſs; or it is decompoſed, and ſome of its parts only are reflected, whence ariſe different colours; or it is more or leſs completely abſorbed, and produces blackneſs; or, laſtly, it paſſes through bodies, deviating more or leſs from its courſe, by approaching the perpendicular, and this conſtitutes tranſparency. In its paſſage through tranſparent bodies, it experiences a refraction, the degree of which is in a direct ratio to the denſity of the body, if incombuſtible; but increaſing in proportion to the combuſtibility of the body through which it paſſes. Hence Newton divined the combuſtibility of the diamond, and the exiſtence of a combuſtible principle in water.

Light, in refracting, is decompoſed into ſeven rays; red, orange, yellow, green, blue, indigo, and violet. It has been ſuppoſed, that three of theſe colours, the red, yellow, and blue, were ſimple; and that the other four were formed each of the two contiguous to them; that is, the orange from the red and yellow, the green from the yellow and blue, the indigo from the blue and violet, and the violet from the red and indigo. But this ſuppoſition has never been proved. The decompoſition effected by means of the priſm, is a ſort of analyſis of light. Light alſo acts chemically on ſubſtances, occaſioning decompoſitions and combinations. This we infer from the difference exhibited by bodies immerſed in light, from the ſame deprived of this element. The former become in general coloured, volatile, and inflammable; the latter have the oppoſite qualities. And thus, by the contact of light, ſome acids are decompoſed; many ſalts change their nature; the oxyds of metals in general re-approach the metallic ſtate: and vegetables acquire colour, and become ſapid and inflammable; deprived of light, they remain pale and inſipid, and are what we call etiolated. Theſe general effects are almoſt always owing to this circumſtance, that light deprives burnt bodies of the principle they abſorbed in burning, ſo that from incombuſtible, which they had become, they return to the combuſtible ſtate. It may be ſaid, that light generally unburns burnt ſubſtances. Theſe data enable us to inveſtigate the colours of bodies: tranſparency: opacity: brilliancy: ſimple and double refraction: metallic luſtre: the decompoſition of acids, and of metallic oxyds: decombuſtion: the alteration of the colours of minerals: vegetation: the decompoſition of water by the leaves of plants: the renovation of the vital air of the atmoſphere: the formation of oils: the difference between the vegetables of hot climates, and thoſe of temperate ones, &c.

THE ACTION OF CALORIC.

What we call heat, is a ſenſation produced by a ſubſtance to which modern chemiſts have given the appellation of caloric. When caloric is applied to our ſyſtem in a greater proportion than it already contains, the ſyſtem is warmed, and the ſenſation of heat produced. When, on the contrary, a ſubſtance of a lower temperature than our ſyſtem is applied to it, we feel the ſenſation of cold, becauſe we then loſe caloric. The action of caloric is of ſuch a nature as to penetrate all bodies; it ſeparates their particles by lodging between them, and diminiſhes their attraction; it dilates bodies, it liquifies ſolids, and rarifies liquids to ſuch a degree as to render them inviſible, to give them the form of air, and convert them into elaſtic, compreſſible, aeriform, fluids. Hence it follows, that liquids are combinations of ſolids with caloric, and that gaſes are ſolutions of different bodies in

in caloric, which of itself is the most attenuate, subtile, light, and elastic, of all natural substances; accordingly its weight cannot be estimated.

While caloric separates the particles of bodies, and diminishes their attraction for each other, it proportionally augments their attraction for the particles of adjacent bodies. For this reason it is successfully employed to produce combinations, and facilitate reciprocal unions. Hence the axiom, *corpora non agunt, nisi soluta*, bodies do not act, unless they be dissolved. Every particular body differing from others both in the form of its particles and their separation from each other, requires a different quantity of caloric to raise it to the same temperature; this is what is called the capacity of bodies for caloric. From this it follows, that different bodies, at the same temperature, or indicating the same degree of the thermometer, really contain different quantities of caloric. This different quantity of caloric contained in bodies raised to the same temperature, which is with propriety termed specific caloric, being incapable of being measured by the thermometer, a mode of ascertaining it has been invented, by means of the quantity of ice which bodies at an equal temperature will dissolve in descending to the same degree. The difference of the quantity dissolved, gives the proportion of caloric contained in the several bodies, and the instrument employed to ascertain this difference, is called a calorimeter.

All the experiments made by the modern philosophers, who have investigated the theory of caloric, prove, that bodies, in changing their state, change also their capacity. We call change of state in bodies, their becoming solid, liquid, or elastic fluid. Hence it follows, that by mixing two solid bodies at different temperatures, incapable of combining together, a mean of the two temperatures will be obtained, if their capacities be equal; but, if their capacities be unequal, the temperature of the mixture will deviate more or less from the mean, and the difference will indicate the reciprocal capacities of the two bodies. These phenomena show, that caloric has different attractions, or different degrees of affinity, for different bodies. In all combinations, therefore, this varying attraction of caloric should be attentively calculated.

When bodies unite, either they lose caloric, which indicates, that the new compound contains less than its component parts; and in this case the operation renders heat perceptible to our organs, and the temperature of the mixture is increased, which commonly takes place in our experiments: or the bodies which combine absorb caloric, and the new compound contains more heat than its component parts did separately; and then, when the combination takes place, the mixture grows cold, the caloric, which was at liberty between its particles, unites with them more closely, and they even take some from contiguous bodies. Sometimes caloric adheres so forcibly to bodies, that it prevents their combining with others. Thus many dissolved into gas, or elastic fluid, unite neither with other bodies, nor with one another, as long as they retain this state of invisible solution in caloric; so that recourse must be had to double attractions to effect their combination.

The attraction of caloric for some substances, is so great, that it is very frequently employed with advantage for separating these substances from the compounds into which they enter, and for analysing or decomposing compound bodies. This is what we do in distillation, and in all the decompositions effected by means of fire alone, or caloric, applied to very compound substances. The different elements of these compounds are gradually dissolved in the order of their solubility in caloric, and separated in the state of vapour or gas. Light, applied at the same time with caloric, frequently assists its action, or has its action assisted by it. Hence, transparent vessels employed in furnaces are extremely useful to chemists, by transmitting light and caloric at the same time. A similar effect is produced, by penetrating opake vessels so thoroughly with caloric, as to make them red-hot, or render them permeable to light.

There are bodies which absorb caloric much more speedily than others; this is called the property of conducting caloric. In general those bodies which are most coloured are the best conductors. The cause of this phenomenon is unknown. All these facts prove, that caloric is a particular substance, and not a modification of all substances, as some natural philosophers have imagined; and it is far from having been shown to be the same thing with light; for the farther we advance in the science of physics, the greater differences appear in the action of these two substances. These facts point out to us the principles and nature of the dilatation of solids and the rarefaction of fluids: thermometers: fusion: sublimation and volatilization: the calorimeter, and tables of the specific heat of bodies: the changes of temperature in different mixtures: artificial refrigeration; the production of gases, and their fixation: distillation at different temperatures: incandescence: the different conductors of caloric; and attractions of the same.

THE ACTION OF THE AIR.

The air acts in a collective mass on all natural bodies, by its weight, moisture or dryness, temperature, &c. Accordingly experiments of synthesis or analysis, made in contact with the air, differ considerably from those which are performed in a vacuum; and it is always necessary to ascertain the state of the barometer, thermometer, and hygrometer, in chemical experiments. The atmosphere itself is a vast laboratory, in which nature operates immense analyses, solutions, precipitations, and combinations: it is a grand receiver, in which all the attenuated and volatilized productions of terrestrial bodies are received, mingled, agitated, combined, and separated. Considered in this view, the atmospheric air is a chaos, an indeterminate mixture of mineral vapours, vegetable and animal molecules, seeds, and eggs, which the luminous, caloric, and electric, fluids, are pervading and traversing continually. The grand changes it experiences, and of which we are sensible in extensive spaces by the appearance of water, light, free caloric, or noise, are called meteors. Yet notwithstanding this mixture, of which it seems impossible for us to ascertain the nature, the atmospheric air is sensibly the same with regard to its intimate qualities, wherever we examine it; and it is decidedly marked by its two properties of supporting respiration and combustion, the closest analogy subsisting between these two grand phenomena. From a careful study of what passes in combustion, we may readily acquire a knowledge of the air.

A combustible body cannot burn without the contact of atmospheric air, or a certain matter extracted from it; and hence combustion cannot take place in a vacuum. A combustible body cannot burn in a given quantity of atmospheric air, beyond a certain period. A hundred parts of this air contain only twenty-seven capable of supporting combustion; when these twenty-seven parts have been absorbed by the combustible body, the combustion ceases, as the other seventy-three parts cannot at all contribute to its support. Hence it appears, that atmospheric air is a compound of two different substances, setting aside a few matters foreign to it, which are mingled with it, but amount not to more than a hundredth part of its bulk. Of these two substances, one supports respiration and combustion: this is termed vital air; the other is the reverse of it in both these respects, and is called azotic gas. Thus a body burning in the air effects a real analysis of this fluid. It separates from it, and absorbs, the vital air, which augments the weight and changes the nature of the burning body. The azotic gas which remains is lighter than the atmospheric air, extinguishes bodies in combustion and kills animals. It is also one of the constituent principles of several compounds, as we shall hereafter see, particularly of ammoniac,

niac, or volatile alkali, the acid of nitre, and animal ſubſtances.

A combuſtible body which has burnt in atmoſpheric air, and abſorbed all the vital air to which it is capable of uniting, can burn no longer in a freſh quantity of air: it has become incombuſtible, and frequently ſaline. A body burning in atmoſpheric air never abſorbs completely the twenty-ſeven hundredth part of vital air it contains. To make a perfect analyſis of the atmoſpheric air, and diveſt it entirely of this fluid, combuſtible bodies muſt be burnt in it repeated times. The portion of air thus abſorbed by combuſtible bodies, called above vital air, is alſo named oxygen gas. The former name is derived from its being the only elaſtic fluid capable of ſupporting life: the latter is given it, becauſe many bodies on abſorbing it are rendered acid.

Combuſtion, then, conſiſts in the fixation and abſorption of vital air by combuſtible bodies, and the decompoſition of the atmoſpheric air by theſe bodies. As the vital air only ſerves to ſupport combuſtion, it is eaſy to conceive, that a very combuſtible body, capable of abſorbing the whole of the vital air, may be employed to determine the proportion of the two atmoſpheric fluids: thus phoſphorus is now uſed for the purpoſe of eudiometry, or to diſcover the purity of the atmoſphere, that is to ſay, the proportion of this vital air which it contains. As vital air is a gas, and many combuſtible bodies, when they abſorb it, render it fixed, and cauſe it to aſſume the ſolid form, the vital air, when it is thus precipitated, loſes the caloric, which held it in a ſtate of ſolution, and gave it the elaſtic fluid form: hence the origin of the caloric diſengaged, or of the heat produced, during combuſtion.

Combuſtible bodies differ from each other, firſt, In the rapidity with which they abſorb oxygen; 2dly, In the quantity of it they abſorb; 3dly, In the proportion of caloric which they diſengage from the oxygen abſorbed; and, by conſequence, 4thly, In the greater or leſs degree of ſolidity of the oxygen they contain after being burnt. Burnt bodies, then, may be defined to be bodies combined with oxygen: accordingly they are termed oxygenated or oxydated ſubſtances: and as the greater number of known bodies are either combuſtible, or already burnt, we may be allowed to ſuſpect, that many incombuſtible natural bodies, with the compoſition of which we are unacquainted, are incombuſtible ſolely from being ſaturated with oxygen. With regard to ſome in this predicament, this conjecture has already been verified.

From ſeveral of the preceding axioms, it follows, that, when we burn a combuſtible body in order to procure heat, as we do to mitigate the rigours of winter, we obtain at leaſt the greater part of the caloric from the air itſelf, with which it was combined. We may even aſſert that the colder the air, the more heat is derived from it; becauſe, when the atmoſphere is extremely cold, more air paſſes into the fire in a given bulk. Indeed, it is well known, that the fire in our grates is much more ſcorching, and burns much more briſkly, when the air ſuddenly becomes cold; and the art of increaſing combuſtion by means of condenſed air thrown from a pair of bellows on wood already heated, is founded on this principle. Combuſtion, therefore is not confined to the decompoſition of atmoſpheric air by abſorbing one of its principles; for it alſo decompoſes the vital air, by abſorbing, fixing, and rendering more or leſs ſolid, in the combuſtible body, the oxygen, or baſe of the vital air, and diſengaging the ſolvent of this baſe, caloric, in greater or leſs quantity.

There is another intereſting phenomenon in combuſtion, which modern chemiſtry is able to explain: that of the diſengagement of light, or the production of flame. It is demonſtrated, that the greater part of the light which conſtitutes flame, is contained in the vital air, of which it is one of the principles: for, 1ſt, Combuſtible bodies afford much more flame when they burn in vital air alone, than in atmoſpheric air: 2dly, There are combuſtible bodies which do not burn with flame except in vital air: 3dly, To diſengage the oxygen from bodies which contain it, and convert it into vital air, it is not ſufficient to diſſolve it in a greater or leſs quantity of caloric, but it is neceſſary at the ſame time to add light: 4thly, There are burnt bodies which loſe their oxygen on the contact of light alone: in this ſenſe we muſt underſtand the property of unburning and decombuſtion, mentioned above, as a characteriſtic of light. Vital air, therefore, is to be conſidered as a compound of a ſolidifiable, ponderous, acidifying, baſe, oxygen, diſſolved in two menſtrua, caloric, and light, which of themſelves are extremely attenuate, highly elaſtic, and deſtitute of aſſignable weight. Combuſtion conſiſts in a more or leſs complete precipitation of the oxygen of theſe two menſtrua. Thus, a combuſtible body, in burning, diſengages from vital air, not only caloric, but alſo light; and every combuſtible body diſengages a different quantity of light from the vital air, as it does of caloric. It is probable that there are combuſtible bodies which ſeparate from vital air more light than caloric, while others diſengage from it more caloric than light. The oxygen fixed in burnt combuſtible bodies remains more or leſs deprived of light and caloric; and the denſity or ſolidity it acquires in the proceſs, is one of the cauſes to which is owing the greater or leſs facility experienced in ſeparating the oxygen from burnt bodies in the form of vital air. For this, ſome require more caloric than light; others more light than caloric. It is eaſy to perceive, after what has been ſaid, that to ſeparate the oxygen from a burnt body, is to perform an operation the reverſe of combuſtion. We have no word in our language to expreſs this operation. It would not be improper to ſay, that we unburn, that we diſoxydate, the body: hence the terms of unburning and diſoxydation.

Beſide the greater or leſs force with which oxygen is retained in combuſtible bodies, according to its being combined with them in a ſtate of greater or leſs ſolidity, and its having loſt a greater or leſs portion of its ſolvents, caloric and light; it adheres to them by its attraction, its particular affinity to each. A conſiderable number of theſe affinities of oxygen for different ſubſtances are already known, and the degrees of ſome of them have been aſcertained. It is from the degrees of theſe affinities, that we are frequently enabled to transfer oxygen from a burnt body to a combuſtible one. In this proceſs a combuſtion takes place, ſo much the more imperceptibly, or tacitly, as it were, according as the oxygen is more ſolid in the burnt body, and more ſimilar in denſity to the body which abſorbs it, or into which it paſſes. But this kind of combuſtion ſometimes takes place with a vivid heat and flame: which phenomena occur, whenever the body which is to receive the oxygen muſt contain it in a more ſolid form than that from which it is extracted. Thus iron, zink, antimony, arſenic, &c. burn with flame, when heated with oxyd of mercury, from which they attract the oxygen, to contain it in a more ſolid form. From theſe conſiderations we may deduce the nature and cauſes of the obſtacle which air oppoſes to evaporation, the ebullition of liquids, ſublimation, &c. the ſolution of water in air, and the hygrometrical ſtate of the atmoſphere: the efflоreſcence and deliqueſcence of ſaline bodies: aqueous meteors: experiments made at different heights of the atmoſphere, and in a vacuum: the comparative nature of combuſtible bodies: the increaſe of weight and change of nature in theſe bodies after combuſtion: artificial heat and flame; the theory of furnaces: the different eudiometrical proceſſes: the reſpiration of different animals: the mephitiſm occaſioned by combuſtion and reſpiration: the diminution, increaſe, and ſupport, of animal heat: tranſpiration from the ſkin and lungs, &c.

THE NATURE AND ACTION OF WATER.

Water exiſts in three different ſtates: that of a ſolid, which is ice; that of a liquid, its moſt common form, and

and that of vapour, or gas. Ice is a cryſtallization more or leſs regular, tranſparent, very ſapid, elaſtic, fuſible at a temperature above 32° of Fahrenheit's thermometer, and which ſuffers the eſcape of much caloric from its interior, in ſeveral combinations. Ice at 32° abſorbs 112° of heat in melting, or ſuch a quantity of caloric as would raiſe a body of water of equal bulk with itſelf to 144°. Its capacity, therefore, is not the ſame with that of liquid water, which is owing to the difference of its ſtate, as has been ſaid above, under the action of caloric.

Whenever liquid water loſes much caloric on entering into any combination, it ought to be conſidered as ſolid in it; frequently it is even much more ſo than ice at 32°; whence ariſes the ſolidity of mortars, or cements, of which ſlaked lime forms a part. Water remains eternally ſolid on mountains, cooled for ages by the preſence of ice, and underneath the poles. In theſe places it forms ſolid rocks, or white concretions almoſt ſimilar to ſtones.

Liquid water is pure, inſipid, deſtitute of ſmell, and 850 times heavier than air. It forms rivers, brooks, ponds, ſprings, rivulets, &c. It occupies the cavities, furrows, and generally ſpeaking all the loweſt parts, of the globe. It is very ſeldom pure; for it diſſolves, in the earth, and on its ſurface, air, ſaline gaſes, and terreſtrious ſalts: it acts even on the moſt ſolid ſtones, which it diſſolves, carries along in its courſe, depoſits, and criſtallizes. Hence it has been named the grand ſolvent of nature. By it are produced various phenomena, and it is one of the moſt powerful agents, by which the ſurface of the globe is inceſſantly modified. Its motions, its currents, its action, have gradually changed the nature of minerals, and created a kind of new world on the face of the old. Accordingly all the waters of the earth contain ſome ſubſtance or other, foreign to the nature of water; the preſence of which is diſcernable from the increaſe of their ſpecific gravity, their taſte, more or leſs flat, earthy, and crude, and the difficulty with which they boil, dreſs pulſe, or diſſolve ſoap. The more free any water is from theſe properties, which are repugnant to its eſſential character, the greater is its purity. Water flowing in a ſandy channel, and expoſed to the open air, is ſufficiently pure for the purpoſes of life, and moſt of the uſes of the arts. On the contrary, that which traverſes chalk, gypſum, and marbles, or ſtagnates on turf, bitumen, and ores of metals, or in ſubterranean cavities far from the contact of the atmoſphere, is more or leſs impure. The art of correcting hard or impure water by chemiſtry, conſiſts in expoſing it to the atmoſphere, agitating it in contact with the air, boiling it, diſtilling it, and afterwards combining it with air. Frequently the addition of aſhes, alkalis, or weak acids, ſerves to diminiſh the bad qualities of water; and ſometimes even completely removes them. Moſt adventitious ſubſtances, which diminiſh the purity of water, being either much more volatile or much more fixed than it, diſtillation is the moſt certain method of obtaining pure water. For this reaſon chemiſts always employ diſtilled water in their experiments.

Liquid water, being a combination of ice at 32°, and ſuch a quantity of caloric as would have been ſufficient to raiſe the water to 144°, on the addition of caloric becomes rarefied: when it is raiſed to a temperature of 184°, it aſſumes the form of gas; it is vapour: in this ſtate, it is far lighter than liquid water, it occupies a much more extenſive ſpace, it eaſily penetrates all bodies, it readily diſſolves in air, and its expanſive force, from the increaſe of its temperature, renders it capable of moving enormous weights, driving the ſteam-engine, &c. As liquid water abſorbs air, which renders it light, air alſo abſorbs and diſſolves water. This is the cauſe of water's evaporating. The ſolution of water in air, is dry and inviſible as air itſelf: it is proportionate to the temperature of the atmoſphere. The hygrometer does not indicate with preciſion this water, for it is not effected by a complete ſolution of water in air, but moves according to the quantity of water which is juſt going to be diſſolved, and more eſpecially of that which is precipitating from it.

Water is not a ſimple ſubſtance, as had long been ſuppoſed. By burning with rapidity a number of combuſtible bodies, more or leſs heated, as charcoal and pit-coal already on fire, red-hot iron, zink, melted and red-hot, oil, &c. water is decompoſed, yielding to theſe combuſtible bodies the oxygen it contained. In proportion as the oxygen of the water becomes fixed in the combuſtible bodies which it burns, its other principle capable of diſſolving in caloric forms the inflammable gas which is evolved. As this ſecond principle is one of the elements of water, it has been called *hydrogen*, and its elaſtic fluid ſolution in light and caloric, *hydrogen gas*. The diſengagement of this principle in the form of gas, which takes place wherever water is decompoſed by a combuſtible body, is the cauſe of a great number of detonations and fulminations. The hydrogen gas produced in various experiments always originates from water, either in conſequence of a preceding decompoſition, in which it had been combined in the ſtate of fixed hydrogen with one of the ſubſtances employed, or from a decompoſition of water actually taking place in the experiments themſelves. All the inflammable gas, therefore, proceeds from water. Reiterated experiments have proved, that water contains about eighty-five hundredth parts of oxygen and fifteen of hydrogen. The recompoſition of water, one of the grandeſt diſcoveries of modern chemiſtry, confirms the analyſis of this body; for, on uniting by combuſtion eighty-five parts of oxygen with fifteen of hydrogen, a hundred parts of pure water are obtained.

When water is decompoſed by a combuſtible body, this is effected by means of a double affinity; that of the oxygen of the water for the combuſtible body, and that of its hydrogen for caloric. For this reaſon, the more caloric matter is employed in the experiment of decompoſing water by means of iron, charcoal, or the like, the ſooner is the water decompoſed. From this neceſſity for an extreme abundance of caloric in the operation, it is eaſy to conceive how the hydrogen, one of the elements of the water, acquires a levity ſo far beyond that of the fluid from which it is derived: in fact, while a cubic foot of water weighs ſeventy pounds, a cubic foot of pure hydrogen gas weighs only ſixty-one grains. Hydrogen gas, though always produced by the decompoſition of water, carries along with it various ſubſtances, either ſuſpended or diſſolved in it, according as the bodies from which it is extricated are more or leſs ſimple. Thus it is mingled with azotic gas, carbonic acid gas, or vital air; or it holds in ſolution, water, carbon, ſulphur, phoſphorus, arſenic, oil, alcohol, ether, &c. From the difference of theſe adventitious ſubſtances which it contains, it varies in ſmell, weight, and inflammability, the colour of the flame it yields, its action on different bodies, and alſo in the products diſtinct from pure water which it affords in burning. Hence are derived the ſeveral ſpecies and denominations of inflammable gas admitted by authors, of which hydrogen gas always conſtitutes the general baſis.

Hydrogen gas being one of thoſe natural ſubſtances that contain moſt caloric, it is among the number of combuſtible bodies, which give out moſt, and conſequently afford moſt heat in burning. Hence all compound combuſtible bodies of which hydrogen conſtitutes the baſis, ſuch as oils, fats, and in general all that originate from organized bodies, yield, during the proceſs of burning, a conſiderable quantity of heat. Wood, oil, pit-coal, bitumen, alcohol, ether, &c. are of this kind. It follows, alſo, from what has been ſaid, that thoſe compound combuſtible bodies, which contain much hydrogen in their compoſition, neceſſarily require a large portion of oxygen in burning, and afford water as a product of their combuſtion, in proportion to the quantity of hydrogen they contain. Thus a pound of alcohol, on being burnt, yields more than a pound of water. The combuſtible

bustible bodies, generally speaking, which decompose water, are those which have a greater affinity, or stronger attraction, for oxygen, than hydrogen has: but this attraction is greatly assisted by the presence of caloric, which has a tendency to unite with the hydrogen. A large quantity of caloric can even occasion the decomposition of water by bodies which would be incapable of decomposing it cold. To this *light* equally contributes. The combustible bodies which will not decompose water at any temperature, in consequence of their feeble attraction for oxygen, which in this case always remains inferior to that which subsists between oxygen and hydrogen, must, on the contrary, when they have been burnt by other means, be decomposed, or suffer their oxygen to be taken from them, by hydrogen. This happens to the oxyds of lead, bismuth, &c.

Hitherto the art of chemistry has arrived at the knowledge of no means of decomposing water, but by combustible substances, which take from it its oxygen. We are unacquainted with any capable of attracting its hydrogen, and setting its oxygen free. It would seem, however, that nature has instruments for effecting this inverse manner of decomposing water: the leaves of vegetables struck by the rays of the sun appear to decompose water by absorbing its hydrogen, and disengaging its oxygen in the form of vital air. This we may presume to be in part the mechanism of vegetation, of the formation of oils, and of the renovation of the atmosphere. While hydrogen and oxygen, each dissolved into gas by caloric and light, remain in contact with each other cold, they do not combine; no inflammation occurs, no water is formed. But if the mixture be exposed to an ignited body, strongly compressed, or affected by any violent and forcible concussion, a combination of the two commences, combustion takes place, and water is produced. A similar phenomenon appears to take place in the atmosphere. Atmospheric detonations, claps of thunder, seem to be nothing more than a combustion of hydrogen gas and vital air; and accordingly they are often succeeded by a torrent of rain. Some storms of rain also appear to be in like manner owing to a sudden formation of water in the atmosphere, from the rapid combustion of hydrogen gas and vital air, occasioned by an electric spark, arising from the necessary re-establishment of an equilibrium of electricity between different clouds, or between the clouds and the earth. A multitude of chemical phenomena of nature and art, formerly inexplicable and ranked as miraculous, are now esteemed the necessary consequences of the decomposition of water well understood. Of the truths thus exhibited the influence on the general theory of chemistry is immense, as will appear in our experiments hereafter to succeed. From these data we deduce our knowledge of artificial refrigerations: the theory of the permanent ice covering the tops of mountains, and the neighbourhood of the poles: the varieties of atmospheric and terrestrial waters: the art of correcting the bad qualities of waters: the theory of the ebullition of water: the difference between boiled water and water pregnant with air: the distillation of water in the great, and that of salt water: the theory of fogs and dew: the theory of the hygrometer, and hygrometrical phenomena: the burning of combustible substances by means of water: the gases disengaged from stagnant waters: the variety of inflammable gases: the colouring of substances by inflammable gases: the oxydation of metals, or rust, produced by damp air: the theory of detonations: some phenomena of metallic solutions: some fundamental principles of the theory of vegetation, the formation of oils, &c.

THE NATURE AND ACTION OF EARTHS AND ALKALIS.

What was formerly called earth by way of eminence, and considered as an element, and the cause of solidity, dryness, insipidity, indissolubility, &c. is now consigned to that class of vague and indeterminate ideas, which the imagination, unsatisfied with the success of experience, invented to supply the place of facts. At present no elementary earth is acknowledged; and instead of one earthy substance, we have at least five, all of which have an equal claim to be denominated elements; for each enters into the composition of various bodies. Of the five earthy substances that have been discovered, two are in some measure more earthy, dry, susceptible of hardness, insipid, &c. while the other three possess saline properties, which render them somewhat akin to the substances denominated alkalis. These three, which have in consequence been termed salino-earthy, saline earths, alkaline earths, and earthy alkalis, are baryt, magnesia, and lime. The other two are silex and alumin. The generical characters common to all these are dryness, unalterableness in the fire, infusibility, and the quality of being insusceptible of decomposition, and acting as simple and indestructible substances in combination. Besides these, each has specific characters by which it is distinguished.

Silex, which has been named siliceous earth, quartzose earth, and vitrifiable earth, is rough to the touch; it scratches and wears away metals; it is infusible, incombustible, insoluble in water and most acids, soluble by alkalis in a strong fire, and forming glass with these salts. It is found in abundance in sand, quartz, flint, agate, jasper, sandstone, and all stones that strike fire, of which it constitutes the basis. It has neither been analysed, nor imitated by synthesis. Some have considered it as the most simple of the earths, the terreous element, the origin of all the other earths; but experience has not supported their assertions. It is employed for various purposes, particularly for mill-stones, and making glass, cements, earthen-ware, &c.

Alumin, so named because it constitutes the basis of alum, the same which some authors have called argil, is soft to the touch, and adhesive to the tongue; it hardens in the fire, makes a paste with water, unites with most acids, dries in flakes, acquires great hardness when mixed with water and silex, and is contained in a large proportion in clays, schists, steatites, &c. It is employed for various purposes of art, from its aptitude for moulding into different forms, and retaining them, and its qualities of hardening in the fire, and holding water. By some it has been erroneously considered as silex changed, attenuated, and rotted, by the action of air and water; but with its intimate nature, or principles, we are totally unacquainted.

Baryt, or *heavy earth*, is remarkable for its extreme ponderosity. This is never found alone in nature, but always united with the sulphuric or carbonic acid. In the fire, and in contact with the silex or alumin of the crucible, it assumes a blue or green colour: it is soluble in nine hundred times its weight of water, changes syrup of violets green, has a stronger affinity even than alkalis for most acids, and will any where detect the presence of sulphuric acid, and indicate its quantity. Its principles are unknown, though it is suspected of being a metallic oxyd.

Magnesia, is very fine, very white, unalterable in the fire, soft, and light. It resembles vegetable feculæ, requires near two thousand parts of water to dissolve it, very slightly greens the tincture of violets and mallow flowers, forms with acids extremely soluble salts, and is less retentive of acids than lime, which attracts them from it, having nearly the same affinity for them as ammoniac, with which and acids it forms salts with two bases, or a class of triple salts. It exists in considerable quantity in serpentines, mica, slates, and amianthus; is equally incapable of analysis with the preceding earths; and, like theirs, its composition is unknown.

Lime is the most alkaline of earths, and the only one that possesses an acrid, burning, almost caustic, disagreeable, and urinous, taste. It is very powerful in converting the syrup of violets to a green colour; attracts water from the atmosphere when slacked in it; heats greatly with water, and becomes solid with it; gives out a large quantity of caloric when slacked dry; dissolves in less than

than seven hundred parts of water; attracts carbonic acid from the atmosphere, and forms on the surface of its solution a pellicle of chalk, improperly called *cream of lime*; is unalterable alone, but melts with silex and alumin; and is formed of principles with which we are yet unacquainted, though it is evidently a compound.

The pretended conversion of earths, each into other, admitted by natural philosophers, is nothing more than a chimera: so far is it from being proved, that silex becomes alumin in consequence of exposure to the air, that flints are changed into chalk, and that chalk is converted into magnesia, as some have supposed on much too feeble grounds. The three alkaline earths are to appearance more manifestly compound than the other two. There is reason to presume, that azot is one of their principles, and gives them their alkaline properties: however, experience has yet afforded no proof in support of this opinion; though their origin, ascribed with considerable propability to marine animals, which contain a large portion of azot in their composition, renders it not destitute of foundation. As to the metallic nature of the five earths, which some supposed they had demonstrated by an imaginary reduction of them into metals, by exposing them to a violent heat in contact with charcoal; the very small and few metallic globules obtained, evidently came from the charcoal and the earth of the cupels, and has been discovered to be nothing more than phosphure of iron, in the treatment of each of the different earths; whence it is sufficiently proved, that they afford no metallic substance. Several natural philosophers continue of opinion, that earths are species of burnt bodies, to which the oxygen is strongly adherent, and incapable of being decomposed on account of their powerful attraction for this principle; but in this they are not supported by experience.

Earths combine by twos, threes, and even greater numbers, by processes unknown to us, which nature employs on a very extensive scale, to produce stones differing in hardness, texture, transparency, opacity, colour, form, &c. If art has failed to imitate these compounds, the reason is, time, space, and quantity, are wanting. Something similar to the natural earthy compounds, however, may be produced, by leaving a long time in contact, earths, intimately mingled, and moistened at first with a little water. The three alkaline earths form a kind of intermediate link between earths and alkalis. The latter are distinguishable by their acrid, burning, and urinous, taste; their causticity, their singular action on the skin, and all animal substances, the quality of changing the blue colour of violets to a green, and even a greenish yellow, and deliquescency. We are acquainted with three species, potash, soda, and ammoniac. The first and second have been called *fixed alkalis*, because they melt and grow red in the fire before they become volatile, the third has been named *volatile alkali*, from possessing the opposite property.

Potash is known by the following characters:—It is dry, solid, white, chrystalized in rhomboidal plates, fusible at a temperature of 203°, and very deliquescent, absorbs water with heat and a peculiar faint smell, combines with silex by fusion, and forms with it a transparent compound. It is frequently found native with lime, and combined with different acids; but is chiefly obtained from vegetables, in the ashes of which it remains after combustion. It is supposed that it bears some analogy to lime, and may perhaps be formed of azot combined with it: experience, however, gives no support to this opinion.

Soda is procured from marine plants by incineration, and constitutes the basis of sea-salt. It strikingly resembles potash in form, causticity, fusibility, deliquescency, combination with silex by means of fusion, action on animal substances, &c. so that it was long confounded with it, and might have continued to be so, if it did not form very different salts with acids, and yield these acids to potash. It has been imagined, that soda was a compound of magnesia and azot, because salts with soda for their base have been as frequently found with salts having for their base magnesia, as calcareous salts with those having potash for their basis: but both these opinions remain hitherto equally devoid of proof.

Ammoniac, or *volatile alkali*, differs greatly from the two preceding species in its form of gas when dissolved in caloric, in its liquid form when dissolved in water, in its pungent and suffocating smell, its solubility in air, and its known and easy decomposition by the electric spark, metallic oxyds, and the nitric and oxygenated muriatic acid. This decomposition evinces, that ammoniac is a compound of hydrogen and azot; and for this reason it frequently exhibits the phenomena of a combustible substance. Hence also it is easy to conceive, how animal matters furnish ammoniac in consequence of putrefaction. If azot should at some future period appear to be the principle that forms alkalis, the atmosphere will be found to consist of a mixture of oxygen and alkaligen, each separately dissolved in caloric; and it will exhibit an immense reservoir, from which the philosopher will perceive nature drawing the materials of two classes of compounds, the most active and useful in a great number of her operations. From a consideration of the facts laid down under this head, we are directed to a comprehensive view of the extraction, preparation, and purification, of earths: the theory of the arts of the potter, brickmaker, &c. the theory of cements and mortars: the reciprocal combinations of earths by means of fire: the natural history of stones: the compound nature of earths and stones: the alteration of colours by means of alkalis: vitrification, and the art of making glass: the extraction and purification of potash and soda: the theory of alkaline caustics: some points regarding putrefaction, &c. See the article MINERALOGY.

THE NATURE OF COMBUSTIBLE BODIES.

Combustible bodies are too various, too numerous, and important in the phenomena they exhibit, and the combinations they are incessantly entering into with each other, and with the air, not to excite us to examine them with care, and endeavour accurately to ascertain their properties and specific characters. In comprehending under this name all substances capable of combining more or less rapidly with oxygen, and disengaging from it caloric and light, we should arrange them in two classes; simple or indecomposed combustibles, or such as cannot be decomposed, and combustibles more or less compound. We call those combustibles simple, which we are hitherto unable either to decompose, or to compose by the union of different substances. With their intimate nature we are unacquainted. Sometimes they occur singly in the mineral kingdom, or in one of the others; but they are found most usually combined two and two together. Such are the diamond, hydrogen, sulphur, phosphorus, carbon, and the metals. Each of these six genera must be considered separately.

The DIAMOND, is the hardest of all the bodies that we know. It is very remarkable for the power with which it refracts and decomposes light, from which Newton discovered that it was very combustible. It is found native, crystallized in octaedra, dodecaedra, &c. exhibits some varieties differing in texture, density, and colour; burns with a perceptible flame, and is converted into vapour by burning. Its combination with oxygen is unknown. Few substances act upon it; and, if it were not combustible, it might be considered as insusceptible of alteration. We know no compound into which it enters as a constituent part; and it seems of all bodies the least obedient to chemical attraction.

HYDROGEN, as before noted, is one of the principles of water. With caloric and light it forms hydrogen gas, sixteen times as light as air, insoluble in most substances, capable on the other hand of dissolving sulphur, phosphorus, carbon, arsenic, oils, &c. and thus forming the different

different species of inflammable gas, formerly called sulphurated, phosphorated, carbonated, arseniated, oleaginous, &c. hydrogen gas. It decomposes several metallic oxyds, and acids with simple and known radicals; imparts to all the compounds into which it enters, whether they be combustible or not, a considerable refringent power, which property led Newton to conjecture, that a combustible substance was contained in water; becomes fixed in organized bodies, and forms one of the principles of the mixed combustibles they contain.

SULPHUR is a yellowish substance, odorate, electric, transparent and octaedral, opake and prismatic, and fusible. It is susceptible of two kinds of combustion; the one slow, with a blue flame, and the formation of sulphurous acid; the other rapid, with a white flame, during which sulphuric acid is produced. It combines with earths and alkalis; becomes soluble when thus combined; unites with metals, and forms sulphurous ores; and exists in the earth in very large quantity, either alone, or combined with metal.

PHOSPHORUS is a white, transparent, chrystallized, lamellated, and extremely fusible, substance. It burns in two modes; slowly, in every temperature with which we are acquainted, emitting a white flame and acrid odour, and forming phosphorous acid; rapidly, in a temperature of 147°, with a vivid and very brilliant flame, without any perceptible odour, and forming phosphoric acid. It is never to be found pure in a native state, on account of its extreme combustibility; unites with sulphur, and with metals; is soluble in hydrogen gas; takes away oxygen from several metals, and separates them from acids, restoring their proper form and metallic lustre; and exists more abundantly in the mineral kingdom than in the animal, to which it was once exclusively attributed.

CARBON is the combustible matter of coals, supposed pure and isolated from earths, alkalis, salts, &c. It is combustible in a great degree of heat; forms carbonic acid when united with oxygen; has the strongest attraction for oxygen of any known substance, and deprives all other burnt bodies of this principle; exists in abundance in animals and vegetables, constituting almost wholly the solid basis of the latter, and on that account remaining, and preserving their form, after they are decomposed, either spontaneously, or by the action of caloric; is soluble in alkalis, and hydrogen gas; unites with metals, forming with iron, in particular, steel; and carbure of iron, improperly called *plumbago*, *lead ore*, or *black lead*; and is found in each of the natural kingdoms.

METALS are well known for their great ponderosity and lustre: they are fusible, crystallizable, and combustible; decompose water and several acids; unite with sulphur, phosphorus, carbon, and each other, at different temperatures; and in their state of oxyds, perform a double function, that of acids with earths and alkalis, and that of salifiable bases with acids. This genus differs from all that precede, particularly in the number of its species. To give a just idea of these, of which there are seventeen with which we are well acquainted, and this number will probably be still farther increased by new researches, we shall divide this genus into five sections: the first comprises brittle and acidifiable metals; of which there are three, arsenic, tungsten, and molybdæna. The second includes those which are brittle, and simply capable of oxydation, of which we reckon five species; cobalt, bismuth, nickle, manganese, and antimony. The third section contains the semi-ductile and oxydable metals, of which there are two; zinc and mercury. The fourth section comprehends such metals as are perfectly ductile, and easily oxydable, which are tin, lead, iron, and copper: and the fifth, includes all those that are perfectly ductile, but oxydable with difficulty, which are silver, gold, and platina. As a distinct head is reserved for the most important chemical properties of metals, it will be sufficient here to exhibit briefly some specific difference of each of these bodies; observing, that the appellations of *semi metals*, *imperfect metals*, and *perfect metals*, manifestly originating from the erroneous ideas of alchemy, ought to be discarded from the language of a science that has any pretension to accuracy.

1. Arsenic is lamellated, of a bluish grey colour, brilliant and fragile; and burns with a blue flame, and a smell resembling that of garlic. 2. Tungsten is of a grey white colour, granulated, friable, almost infusible, and scarcely soluble in acids, though extremely oxydable and acidifiable by the operation of air and caloric. 3. Molybdæna is in the state of powder, or grains, blackish, shining, agglutinated, fragile, very little fusible, and by burning becomes a white, volatile, prismatic, and acidifiable oxyd. 4. Cobalt is granulous, fine, of a rosy white colour, fragile, pulverable, difficult of fusion, and becomes blue when melted with glass. 5. Bismuth is in large laminæ, of a yellowish white, brittle, easily fusible, very crystallizable, and extremely oxydable. 6. Nickel is grey, granulous, hard, a little fragile, extremely difficult to fuse, and affords a green oxyd by means of caloric and air. 7. Manganese is of a grey white colour, and fine grain, brittle, very difficult to fuse, and of all metals the most combustible in the air alone, so that it changes colour immediately on exposure to it, and is reduced to a black dust in the course of a few days. It should be kept underneath alcohol, or oil, to prevent it from burning. 8. Antimony is of a pure white, in large laminæ, brittle, hard, to fuse, and sublimes on combustion in the air into a white, crystallized oxyd, which almost acts the part of an acid in uniting with alkalis. 9. Zink is of a blue white colour, in large laminæ, semi-fragile, in some degree malleable, easy to fuse, the most inflammable of metals, burning, when red hot, with a beautiful yellowish white flame, and powerfully decomposing water. 10. Mercury is fusible at 30 below o of Reaumur's thermometer, and congeals at 31°; becomes a black oxyd (*æthiops per se*) by mere division, or is extinguished by this simple process in every viscous or consistent matter with which it is triturated. 11. Tin is of a brilliant white colour, soft, light, little, sonorous, capable of being scratched by the nail, very fusible, very combustible, and affords a white oxyd, which destroys the transparency of glass, and converts it into enamel. 12. Lead is of a dull bluish colour, heavy, soft, extremely fusible, and affords an oxyd the most vitrifiable of all we know, and a glass of a yellow hue, resembling that of a topaz. 13. Iron is white, fibrous, the most tenacious of metals, very difficult to fuse, very combustible, and the metal most attracted by the magnet. It readily decomposes water, changes to a powder in the air, unites with a carbon, which converts it into steel, and is the only metal any way abundant in the two organic kingdoms. 14. Copper is of a fine shining red, very soft and ductile, odorate, and poisonous. It burns with a green flame, and affords brown, blue, and green, oxyds, the last of which is formed in damp air. 15. Silver is of a pure and brilliant white, destitute of smell and taste, very ductile, not oxydable by caloric and air, burning with a greenish flame by the electric shock, growing black from the fumes of sulphur, unalterable by the air alone. 16. Gold is of a fine brilliant yellow, extremely ductile, less combustible and less oxydable than silver, and even still less alterable than it by the contact of air. It is convertable into a fine purple oxyd by the electric shock. 17. Platina is the heaviest, most infusible, least combustible, and least alterable of all metals. It is of a grey white colour, possesses little brilliancy, and may at some future period become one of the most valuable instruments of the arts.

Compound combustible bodies are all such as result from a combination of some of the preceding ones: thus the solutions of sulphur, carbon, phosphorus, and arsenic, in hydrogen gas, are compound inflammable gases: and the combinations of sulphur with phosphorus, of carbon with iron, of different metals with sulphur, phosphorus, and

and each other, are compound bodies. Such are almost all the combustibles we meet with in nature: it is the province of art to separate them from each other, and exhibit them pure and isolated. When we compare the properties of compound combustible bodies with those of simple combustibles, we perceive, that the former sometimes absorb oxygen with more avidity than if they were alone, as many metallic sulphures, and alloys; at other times, on the contrary, we find them less ready to burn, on account of the strong attraction they possess for each other, which is the case in general with phosphorated metals. There are even some that are long unalterable in the air, appearing to have lost by their intimate combination the property of being combustible, which they exert only when strongly heated; as the carbure of iron, which is even employed with some success to prevent iron from contracting rust.

Hydrogen and carbon, very intimately united together in the capillary tubes of vegetables, and frequently containing small portions of earths, alkalis, acids, and especially oxygen, form bitumens, oils, and resins, which, though they have a tendency to burn and separate, preserve some time the equilibrium, of their combination, till a rapid increase of temperature, accompanied with the contact of air or water, puts an end to this equilibrium, by isolating their elements, and uniting them separately with oxygen. Accordingly the products of these compound combustibles are universally water and carbonic acid. It is the same with alcohol, and with ether, formed by modifications of the principles of vegetable matter, which, in their ultimate analysis, are nothing else than combinations of hydrogen and carbon with more or less oxygen and water.

This exhibition of the different species of combustible bodies, and their principal characteristic properties, shows the part they act in the phenomena of the globe. It authorises us to divide almost all the productions of nature into two grand classes, one of combustible bodies, the other of bodies already burnt. In the masses and action of the former we discern the causes of inflammable meteors, partial heat, volcanoes, the perpetual alterations of the surface of the earth, &c. in the existence of the latter, we perceive the source of the number and diversity of acids, saline compounds, oxyds, and metallic salts, which vary in a thousand ways the appearance of ores, their reciprocal decomposition, and their alterations by the action of water, air, and light; in fine, we discover in vegetables machines which nature has organized for the purpose of intimately combining several of these substances with each other, in order to form compounds more subservient to its grand designs, as they are less durable and permanent. And hence we deduce the circumstantial history of the combustion of each combustible substance in particular: the history of soils impregnated with sulphur, and of native sulphuric acid: the phenomena of natural inflammable gases in quarries, mines, the atmosphere, &c. the properties of earthy, alkaline, and metallic, sulphures: the conversion of sulphures into sulphits and sulphats by the action of air and water: the properties, extraction, and combinations of phosphorus; also metallic phosphures: the existence of native metallic carbures: the phenomena depending on the density, weight, ductility, and fusibility, of metals: the properties and uses of alloys: the formation of secondary ores from native metallic salts: volcanoes, and sulphurous and thermal waters: bitumens; the comparison of sulphur, carbon and simple combustible bodies, with oils, &c.

THE FORMATION AND DECOMPOSITION OF ACIDS.

Since all acids resemble each other in their taste, their manner of giving a red colour to vegetable substances, their tendency to combine with earths, alkalis, and metallic oxyds, and their property of attracting, and being attracted powerfully, it was natural to presume, as Newton observed, that they likewise resembled each other in their intimate nature, and possessed some homogeneal principle: and chemical analysis, by the help of the new means it has in its power to employ, has established this as a truth beyond the possibility of doubt.

As every acid contains oxygen, and loses its acidity exactly in proportion as it is deprived of this principle, we ought to consider acids as burnt or oxygenated substances, which are akin to each other from the presence of the acidifying principle. There are two methods of acquiring a knowledge of the nature of acids: one by forming them, by composing them from their constituent parts, in uniting with oxygen such substances as are capable of becoming acid by an union with it: the other by decomposing them, by *unburning* them, in depriving them of their oxygen by the aid of substances with which this principle has great affinity. Considered in the last-mentioned view, all known acids may be divided into three classes, namely, 1st, Those which may be both composed and decomposed, of which our knowledge is most complete: 2dly, Those which we can only compose, being incapable of decomposing them; and with these also we are well acquainted: 3dly, Those which have never yet been either composed, or decomposed; the nature of which remains altogether unknown. Since then, out of thirty known species of acids, as there are but three, strictly speaking, which are in the last predicament, or which we can neither compose nor decompose, so that we are necessarily ignorant of their nature, there is no reason why we should not regard substances of this kind as accurately discriminated, and contemplate their general properties and composition.

All acids being compounds of oxygen with different substances, the former principle is the cause of their resemblance and common properties; the latter, being different in each, may serve to characterize each in particular. For this reason, those matters which are variable in acids are termed their *radicals*, or *acidifiable* principles. Thus all acids are combinations of radicals, or acidifiable substances, different in each species, with oxygen, which is the same in all: whence it follows, that their common properties, their characters as acids, depend on oxygen; their particular properties, their specific characters, arise from their radicals. The word *acid*, indicating the general and identical nature of these substances, forms their generical name, while the particular name of the radical contained in each may with propriety designate each particular acid. Thus sulphur is the radical of the acid we name *sulphuric*, phosphorus that of the *phosphoric*, carbon that of the *carbonic*, and so on. But, though this nomenclature enjoys the advantage of expressing the nature of each acid, we are unable to employ it for all, because the radicals of some are unknown, and those of others are themselves compounded of several principles, and would consequently require too complicated appellations.

Acidifiable radicals may contain different quantities of oxygen, and under this point of view they possess two states of acidity. The first is that, in which they contain the least possible quantity of oxygen to render them acid. In this their acidity is commonly weak, and they adhere but feebly to the bases with which they are capable of forming salts. The modern methodical nomenclature designates this state of combination and acidity, by giving the names of these weak acids the termination *ous*: Thus we say the sulphurous, nitrous, phosphorous, or acetous, acid. The second state of acids is that, in which they contain more oxygen, and in general are completely saturated with it. In this they have all the strength and attraction they are capaple of possessing as acids, and the modern nomenclature expresses it by the termination *ic*. Thus we say the sulphuric, nitric, phosphoric, or acetic, acid. With regard to the proportion of oxygen united to acidifiable radicals, still greater latitude may be given to the considerations presented above. Each radical may be contemplated in four states: 1st, Containing very

very little oxygen, not sufficient to impart to it the nature of an acid, and in this it is nothing more than an oxyd: such is sulphur coloured red or brown, by exposure to the air, and a degree of heat inadequate to produce inflammation; when it is oxyd of sulphur: 2dly, Containing more oxygen than in the preceding case, and enough to become an acid, though weak; as in the sulphurous acid: 3dly, Possessing still more oxygen than in the second instance, and having acquired powerful acid properties; such is the sulphuric acid: 4thly, Conjoined with a larger dose of oxygen than is necessary to constitute a powerful acid, an acid in *ic*; when it is termed an oxygenated acid, or even superoxygenated.

From the considerations above enumerated, it follows, that we have two modes of forming at will acids with different proportions of oxygen. One is, to combine the radicals with such determinate quantities of oxygen as are necessary to convert them into the state required, as is done with sulphur, phosphorus, or arsenic: the other, to extract from acids containing the greatest possible quantity of oxygen, different proportions of this principle, by means of combustible substances which absorb it with great avidity. The latter method, founded on the affinity of oxygen for different combustible substances, is frequently employed with success for the complete decomposition of acids, by depriving them of all the oxygen they contain. It is in this way, that acids inflame combustible substances. To produce this effect it is sufficient that the acids employed do not contain oxygen in a state of solidity, and that the inflammable matter brought into contact with it will absorb it in a more solid state than that in which it subsists in the acid. But these conditions being requisite, inflammation by no means takes place in all decompositions of acids by combustible substances. Hot charcoal is successfully used to decompose all acids susceptible of decomposition; but it is not the only combustible substance that will answer the purpose; for most metals, phosphorus, sulphur, and hydrogen in a dry and solid state, as it exists in vegetable compounds, possess the same property.

All the acids, the specific nature of which is owing to their particular radicals, as has been already said, may be divided into four classes, according to the nature of their bases being known or unknown, simple or compound. The first class includes acids with known and simple radicals, or such as are formed by the union of indecomposable combustible substances with oxygen. Its species are the following: Sulphuric acid, nitric acid, carbonic acid, phosphoric acid, arsenic acid, tungstenic acid, and molybdenic acid. The second class comprises acids with radicals that are unknown, but strongly suspected of being simple. In it may be reckoned the muriatic acid, fluoric acid, and boracic acid. In the third class may be ranked acids with binary compound radicals. Such are all the vegetable acids, the common radical of which is a compound of hydrogen and carbon. In this class the succinic acid should also be placed. To the fourth class belong all acids of which the radicals are at least triple compounds. In this are comprehended the animal acids, the radicals of which are combinations of carbon, hydrogen, and azot.

Not only is each of the classes in the preceding section distinguishable by general characters inherent in it, but each individual acid also possesses properties by which it is characterized, and which prevent its being confounded with any other. And these properties may even be denoted by simple and easy expressions, by phrases similar to those which naturalists have learnt from Linnæus to employ. A sketch of this method we shall presently exhibit.

All acids with simple and known radicals are capable of being decomposed by combustible bodies, which they burn with more or less rapidity, and are thus reduced to their radicals. It is by means of this decomposition, that the nature of their radicals becomes known. We can also form them from their constituent principles, by uniting their radicals with oxygen. Acids with unknown radicals, which are suspected of being simple substances from strong analogy, have no other classic character than those of being insusceptible of decomposition by means of combustible substances, and incapable of being formed by art. Acids with binary radicals, or vegetable acids, are distinguishable by the following characters. 1. They are all decomposable by a strong fire and a sufficient addition of oxygen. 2. In this decomposition they afford water and carbonic acid, formed by the disjunction of their hydrogen and carbon, each of which unites separately with a portion of the oxygen. 3. They are decomposed spontaneously and slowly in a temperature above 53°, if dissolved in water. 4. They cannot be decomposed by any known combustible body, their radical being compounded of two substances which have the strongest attraction for oxygen of any with which we are acquainted. 5. They are convertible into each other; which is owing to the difference between them consisting solely in the proportion of their three constituent principles.

Acids with ternary radicals, and those which are still more compound, or animal acids, though the least known of all, possess some properties which may be deemed classic characters. Such are those of affording ammoniac when decomposed by fire, and furnishing prussic acid on the proportion of their principles being changed. To these classic characters their specific characters may be added, thus attempting a language analogous to that of the botanist and zoographer.

Acids of the first class, or with simple and known radicals.—1. Sulphuric acid, formed of sulphur and oxygen by the combustion of sulphur, inodorous, twice as heavy as water, very caustic, less volatile than water, affording sulphurous acid gas and sulphur, on being decomposed by red-hot charcoal, metals, &c. and forming sulphats with earths, alkalis, and metallic oxyds.

2. Sulphurous acid, having a powerful smell, very volatile, gaseous, destructive of blue vegetable colours, and removing stains produced by these colours on white, gradually attracting oxygen from the air, and several acids or oxyds, and forming sulphits with earthy and alkaline bases.

3. Nitric acid, liquid, white, caustic, of a strong and nauseous smell, formed of azot and oxygen, inflaming sulphur, charcoal, zink, tin, and oils, yielding to combustible bodies various portions of oxygen, and thus giving birth to nitrous acid, nitrous gas, or nitrous oxyd, destroying colours, burning and turning yellow vegetable and animal substances, converting them into acids, decomposing ammoniac, produced by putrifying animal matter, forming nitrats with earths and alkalis, remaining slightly united with metallic oxyds, and tending to acidify them.

4. Nitrous acid, the same as nitric acid, except in having a smaller portion of oxygen, red or orange coloured in the state of gas, very volatile, depriving vegetables of colour, becoming blue and green on the addition of water, turning yellow nitric acid, to which it is united in different proportions, yielding nitrous gas on the contact of combustible substances, and forming nitrits with earths and alkalis.

5. Carbonic acid, formed of twenty-eight parts of carbon with seventy-two of oxygen, a gas heavier than air and displacing it, filling subterraneous cavities, disengaging itself from liquors in a state of vinous fermentation, extinguishing lighted candles, killing animals, reddening only light vegetable blues, precipitating chalk from lime-water, re-dissolving the chalk in the water, mineralizing acidulous waters, baryt, lime, copper, iron, and lead, in quarries and mines, forming carbonats with earths, alkalis, and metallic oxyds, decomposable by phosphorus alone, and when it is united to alkaline bases, particularly soda in the state of carbonat.

6. Phosphoric acid, composed of phosphorus and oxygen united by rapid and complete combustion, liquid, dense, or solid, vitrifiable by means of fire, dissolving silex in the act of vitrification, decomposable by carbon which restores it to the state of phosphorus, and forming phosphats with earths, alkalis, and metallic oxyds.

7. Phosphorous acid, differing from the phosphoric only in containing less oxygen, volatile, odorous, eliciting oxygen from various bodies, and forming phosphits with earthy, alkaline, and metallic bases.

8. Arsenic acid, formed of the metal called arsenic and oxygen, fixed, fusible into a glass, decomposable by means of a large quantity of light and caloric, as well as by several combustible substances, and forming arseniats with earths, alkalis, and metallic oxyds. Oxyd of arsenic, being also capable of uniting with these bases, may be considered as a sort of arsenious acid.

9. Tungstenic acid, composed of the metal called tungsten and oxygen, a white or yellowish powder, fixed, infusible, difficultly soluble, reducible to tungsten by means of hydrogen, carbon, &c. forming the native tungstat of lime called *lapis ponderosus*, and the native tungstat of iron, or wolfram of mineralogists.

10. Molybdenic acid, composed of the metal named molybdena and oxygen, of a rough taste, metallic like the two preceding species, in a white powder, becoming blue on the contact of such substances as reduce it, and in consequence of the loss of oxygen returning to the state of molybdena.

Acids of the second class, or with unknown radicals.—There are three acids, the radicals of which are unknown, though suspected to be simple: the muriatic, fluoric, and boracic.

1. Muriatic acid, gaseous or fluid, of a pungent smell, unalterable by any known combustible substance, on the contrary attracting oxygen from several burnt bodies, particularly from metallic oxyds, and thus becoming *oxygenated muriatic acid*. The oxygenated muriatic acid is remarkable for its greenish yellow colour, its action on the organs of animals, which it thickens and contracts, its properties of divesting vegetable substances of colour, burning and inflaming most combustible substances, and forming with potash a salt, which rapidly sets fire to heated inflammable substances, and affords the purest vital air known.

2. Fluoric acid, gaseous, forming a very thick white vapour in the air, corroding glass, dissolving silicious earth, and forming with this earth a permanent gas, from which water separates a part of the silex.

3. Boracic acid, dry, crystalized in hexædral laminæ, fusible into a glass, possessing little taste, difficultly soluble, melting with silex, having very feeble affinities, and resigning earthy or alkaline bases to almost all other acids.

Acids of the third class, or with binary radicals.—Acids with binary, mixed, or compound, radicals, belong particularly to the vegetable kingdom, and are formed by the union of carbonated hydrogen, or hydrogenated carbon with oxygen in different proportions; which accounts, as has already been said, for their reciprocal conversion into each other. These acids being pretty numerous, and capable of becoming still more so by daily discoveries, we have divided them into five genera, in which regard is had to their nature and formation. The first genus includes the pure acids formed in vegetables, reckoning amongst these the succinic acid, which is manifestly of vegetable origin. In this there are five species: the succinic, citric, gallic, malic, and benzoic, acids. The second comprises vegetable acids perfectly formed, but partly saturated with potash. Of these, which are termed acidules, there are two species, the tartarous, and oxalic. In the third genus, we class the particular acids formed by the agency of the nitric acid, and the precipitation of its oxygen upon vegetable substances. We have yet but one distinct species in this genius, the camphoric acid; though the oxalic and malic acids are frequently formed by treating vegetable substances with the nitric acid. In the fourth genus, we place the acids formed in vegetables treated with fire. Such are the pyromucous, pyroligenous, and pyrotartarous acids. The fifth genus comprehends vegetable acids produced by fermentation, of which we are acquainted with only one, the acetous. The following are the specific characters of the twelve acids here enumerated.

1. Succinic acid, disengaged and sublimed from heated amber, of a strong bituminous smell, oleaginous and inflammable, volatile, crystallizable in the shape of needles, forming permanent crystallizable salts, particularly with metallic oxyds, and adhering more forcibly to the three alkaline earths than to alkalis.

2. Citric acid, crystallizable in rhomboidal laminæ, not convertible into oxalic acid by means of the nitric, having more affinity to earths than to alkalis, and spontaneously decomposable in water, and by the action of fire.

3. Gallic acid, abounding in galls, crystallized in little gray or yellowish needles, styptic, precipitating iron black from its solutions, reducing metallic oxyds united to other acids, and convertable into oxalic acid by means of the nitric.

4. Malic acid, abounding in apples, not crystallizable, convertible into oxalic acid by means of the nitric, and forming at the same time with the malic acid, and even before it, in vegetables treated by the nitric acid.

5. Benzoic acid, obtained from benzoin, storax, balsam of Peru, vanilla, and cinnamon, by means of heat, crystallizable into compressed prisms, of an aromatic smell when warmed, fusible by a gentle fire, volatile, inflammable, little soluble in water, soluble in the nitric acid, but not decomposable by it.

6. Tartarous acidule, formed of tartarous acid partly saturated with potash, existing in wine, crystallizable, decomposable by fire, affording a considerable quantity of carbonic acid and oil, and leaving behind much carbonat of potash, yielding also on distillation pyrotartarous acid, little soluble, decomposable in water, forming triple salts with alkalis and metallic oxyds, and becoming very soluble by the addition of borax or boracic acid. The tartarous acid, obtained from the acidule, is crystallizable in needles interwoven amongst each other, unalterable in the air, very soluble, forming anew the acidule by the addition of a little potash, decomposing the sulphats, nitrats, and muriats of potash and soda, till they reciprocally form acidules, and convertible into oxalic acid by means of the nitric.

7. Oxalic acidule, formed of oxalic acid partly saturated with potash, extracted from the juice of sorrel, crystallized in parallelopipeds, little decomposable by fire, affording no oil, little soluble, and forming triple salts with earths and alkalis. The oxalic acid extracted from it is very soluble, and very crystallizable, attracts lime from all other acids, perfectly resembles that which is formed from all vegetable substances by the contact of nitric acid, and is the least decomposable and most oxygenated of the vegetable acids.

8. Camphoric acid, produced by distilling camphor with nitric acid, crystallizable in parallelopipeds, forming perfectly crystallizable salts with earths and alkalis, and not attracting lime from all the other acids as oxalic acid does. This acid is very little known.

9. Pyrotartarous acid, a modification of the tartarous acid produced by fire, of an empyreumatic smell, and burnt colour, very rarefiable and swelling up greatly with caloric, not crystallizable, and forming with earthy and alkaline bases, salts different from those afforded by the tartarous acid. With this acid we are but little acquainted.

10. Pyromucous acid, formed by the distillation of gums, sugar, or feculæ, possessing very powerfully the agreeable smell of a lozenge, volatile, colouring vegetable and animal substances red, and decomposable by a strong fire. This also is little known.

11. Pyroligneous acid, extracted from wood by distillation, of a pungent fetid smell, not crystallizable, decomposable by a strong fire, volatile, forming peculiar salts with earths, alkalis, and metallic oxyds, and having particular attractions for these bases, but in other respects we are as little acquainted with it as with the two preceding acids.

12. Acetous acid, formed by the fermentation of wine, on which account it is called vinegar, of an agreeable smell and taste, volatile and liquid, decomposable by a strong fire, capable of being surcharged with oxygen when distilled with metallic oxyds, and thus becoming acetic acid, or radical vinegar, which is more acrid and odorous than the acetous acid, inflammable, and mixed with alkohol.

Acids of the fourth class, or with ternary radicals.—Acids with ternary compound radicals, which were spoken of above as formed in general of carbon, hydrogen, and azot, united with oxygen, appertain more especially to animal substances. With these we are still less acquainted than with the preceding acids: but recalling here to the reader's mind, that they all furnish ammoniac on being decomposed by the action of fire, and prussic acid on a change in the proportion of their principles, we shall remark that the prussic acid seems to be to these acids in general what the oxalic is to vegetable acids, and add, that, on converting animal substances into oxalic acid by the agency of nitric acid, prussic acid is constantly formed during the operation, and evolved in the state of vapour. There are seven animal acids known, all of which appear to belong to this class of compounds, namely, the lactic, saccholactic, sebacic, lithic, formic, bombic, and prussic, acids. In each let us seek for a few characteristic properties.

1. Lactic acid, formed, with a little acetous acid, in milk spontaneously soured, not crystallizable, soluble in alcohol, affording on distillation an acid analogous to the pyrotartarous, forming deliquescent salts with earthy and alkaline bases, and decomposing alkaline acetits.

2. Saccholactic acid, precipitating as a white powder from oxalic acid formed by sugar of milk and nitric acid, little sapid, scarcely at all soluble, decomposable by fire, when a salt resembling benzoin in smell sublimes from it, and forming crystallizable salts with alkalis. This is very little known.

3. Sebacic acid, obtained from fat by the action of fire, separated from it also by alkalis and lime with the assistance of a strong heat, liquid, white, smoking, very acrid in taste and smell, forming crystallizable and fixed salts with earth and the alkalis, decomposing muriat of mercury, and decomposable by a strong heat.

4. Lithic acid, existing in human urine, forming the stone in the bladder, dry, crystallized in flat needles, almost insipid and insoluble, in part volatile, decomposable by a strong heat, affording ammoniacal carbonat and prussic acid by the agency of fire, forming a beautiful red solution with nitric acid, soluble in caustic alkalis, and precipitating of a gridelin or reddish colour from the urine of persons labouring under fever.

5. Formic acid, obtained from ants by distillation or expression with water, reddening blue flowers while in the living insect, flying off in a very highly odorous vapour, in smell analogous to musk, killing animals in this form of gas capable of being employed for the same domestic purposes as vinegar, decomposable by a strong fire, taking oxygen from oxygenated muriatic acid, frequently stronger than sulphuric acid, and forming crystallizable and not deliquescent salts with earth and alkalis.

6. Bombic acid, contained in a reservoir near the anus of the crysalis of the silk-worm, extracted from this reservoir either by expression or by means of alcohol, mingled with a brown oil and a gum while in the worm, liquid, of an amber yellow colour, decomposable spontaneously, and affording prussic acid by means of distillation and nitric acid. In its combinations it is unknown.

7. Prussic acid, saturating iron and colouring it in Prussian blue, obtained at present by the distillation of blood, or the action of nitric acid on albumen, gluten, animal fibre, &c. and disengaged in proportion as oxalic acid is formed, remarkable for a noxious fetid smell, analogous to that of bitter almonds, very decomposable by a strong fire, and then affording ammoniac, susceptible of the form of gas, taking metallic oxyds from a great number of other acids, capable of being artificially formed by the union of hydrogen, carbon, azot, and oxygen, little acid in its taste, and containing, as far as appears, very little oxygen.

It follows, from what has been advanced in the preceding sections, that if acids be divided into two classes, distinguished by having simple or compound radicals, they will be found to differ principally in this circumstance, that those with simple radicals are not convertible into each other, because the properties of one simple radical, sulphur for example, vary much from those of another, such as phosphorus, whence it would be necessary to begin with converting these radicals into each other, which is far beyond the power of art. The acids of the other class, on the contrary, being formed in general of a base composed of hydrogen, carbon, and azot, united with oxygen, appear to differ from each other only in the proportions of the two or three principles which enter into the composition of their radicals, and of the oxygen united with these, have a tendency to undergo incessant changes in their composition, especially from variation of temperature, humidity, &c. and spontaneously pass into different states. Thus, from the mere efforts of vegetation, plants contain different acids at different periods of their growth: and thus solutions of vegetable acids in water change, alter their nature, and ultimately yield a certain quantity of carbonic acid and water, as they arrive at the last stage of decomposition.

If we attend to these facts, it is easy to perceive that there still remain to be discovered, not only the nature of several acids, with the composition of which we are unacquainted, but also, perhaps, a considerable number of new acids, in plants and animals. For among the productions of these organized beings, the principles of which we have only begun to investigate, we are far from having exhausted all the possible combinations of carbon, hydrogen, azote, and oxygen, as the most superficial calculation will demonstrate. To this order of investigation and discovery, we must refer the examination of the acids indicated in cork, grey-pease, and several other vegetable matters, as well as those of the gastric juice, the coagulum of the blood, cruoric acid, &c. It will be perceived too, from the succeeding section, that most burnt metals seem to enter into the class of acids, and comport themselves as these salts, in a great number of combinations; so that acids appear to be the most numerous of all bodies, and perform the principal parts in the chemical alterations, which both simple and compound substances are destined incessantly to undergo. From the foregoing considerations we are naturally led to the artificial formation of sulphuric acid, by the combustion of sulphur in the great: the discharging of colour from white linens and stuffs, by means of the sulphureous acid: the new art of bleaching, by means of the oxygenated muriatic acid: the theory of the aqua regia of the ancient chemists: the art of engraving on glass, by the fluoric acid: one part of the theory of the formation of artificial nitre-pits: the existence and formation of the known native acids: the influence of acids in mineralization: the extraction and purification of vegetable acids and acidules: the spontaneous formation and destruction of vegetable acids: their reciprocal conversion into each other, by vegetation, fermentation, &c.

THE UNION OF ACIDS WITH EARTHS AND ALKALIS.

All acids unite with alkalis and the alkaline earths, without being decomposed. The combinations thus formed,

ed, have been called neutral, middle, compound, or secondary, salts. To the first two of these names they have no claim, unless when they are neither acid nor alkaline: the other two are more accurate, and of greater utility. All these salts are readily made by art; and nature exhibits a considerable number of them, particularly of those the radicals of which are simple. Mineralogy is continually making new acquisitions in this branch of knowledge, by the analysis of minerals, which alone is capable of unfolding to us their intimate nature. Every compound salt ought to have a double name, one branch of which should indicate its acid, the other its earthy or alkaline base. The former has two different terminations announcing the state of the acid. Words ending in *at* are employed when the salt contains an acid saturated with oxygen, which is denoted by the termination *ic*: thus nitrats are formed by the nitric acid: and words ending in *it*, imply feeble acids, not saturated with oxygen; for which, as has been already observed, we use the termination *ous*: thus the compound of the nitrous acid are nitrits.

As there are thirty-four kinds of acids known, and seven earthy or alkaline bases, which may be united to form compound salts, the number of these salts might be estimated at two hundred and thirty-eight; but such a calculation would be far from exact; for, 1st, There are only few acids capable of combining with silex; 2dly, There are others which cannot unite with certain earthy bases, on account of their weakness, or with ammoniac without decomposing it; 3dly, There are several acids which may be united to the same bases in three ways, or remain at three different points of saturation with these bases; namely, with excess of acid, with excess of base, and exactly neutralized. Thus we are far from being able to determine with accuracy the number of earthy and alkaline compound salts; because we are far from having sufficiently examined all these combinations, to attain a perfect knowledge of them, and assure ourselves whether they be not susceptible of several degrees of saturation, &c. All the acids possessing different elective attractions or affinities for each alkaline or earthy base, it is necessary to be fully acquainted with the whole of these respective affinities, before we can have a complete knowledge of compound salts; and, as a very few only of these affinities have yet been determined with accuracy, we are far from possessing the general mass of facts that relate to this order of bodies. Indeed, one-tenth of these combinations has not yet been duly investigated.

To begin the history of compound salts methodically, we should divide them into genera and species, and fix their generic and specific characters. As this branch of the subject has not yet much occupied the attention of chemists, a slight sketch of it is all that can be given; though, in the present state of science, it may be essential to the enunciation of chemical properties. There are two methods of dividing compound salts, to which recourse might be had; the one founded on their acids, the other on their bases: at present, however, it is from the acids only we can establish genera comprehending the whole of the salts, for they alone are capable of furnishing generic characters; the influence of the bases on the properties of these compounds, not being sufficiently known, to enable us to consider these earthy and alkaline substances, as the heads of the generical divisions. Thus we may reckon thirty-five genera of compound salts, according to the number and name of the acids. But each of these genera should be considered with respect to its discriminative characters, or those qualities which are sufficient to distinguish it, and give an accurate idea of its difference from all others. For this purpose, out of the properties displayed by it, one, if possible, or at most two or three, should be selected, of prominent features, to constitute an essential character of each genus. Fourcroy has assumed the following classification of these thirty-five genera:

Genus I. Sulphats: Decomposable by charcoal, &c. into sulphures.

Genus II. Sulphits: Yielding the smell of burning sulphur on the contact of almost all acids, with effervescence.

Genus III. Nitrats: Ascending combustible bodies at different temperatures, and almost all of them reducible to their bases by the action of fire.

Genus IV. Nitrits: Decomposable by weak acids, which separate from it red nitrous vapour.

Genus V. Carbonats: Leaving the characters of their bases more or less prominent; and producing with all acids a brisk and sensible effervescence, till their carbonic acid is completely evolved.

Genus VI. Phosphats: Decomposable mediately, or immediately, by charcoal, which separates from them the phosporus.

Genus VII. Phosphits: All decomposable immediately by charcoal, which separates from them the phosphorus; and emitting vapours on the contact of sulphuric acid, &c.

Genus VIII. Arseniats: Affording, on the contact of red hot charcoal, the smell and white vapour of arsenic; and not decomposable by acids alone, unassisted by a double affinity.

Genus IX. Arsenits: The arsenious acid is separated and precipitated from their solutions by the contact of all the acids, even of the arsenic acid.

Genus X. Tungstats: Turning yellow on the addition of nitric or muriatic acid.

Genus XI. Molybdats: Not yet distinguishable till the molybdenic acid is separated from them by other acids, and in consequence of the characters exhibited by the molybdenic acid.

Genus XII. Muriats: Affording muriatic acid by means of concentrated sulphuric acid, and oxygenated muriatic acid when acted upon by the nitric.

Genus XIII. Oxygenated Muriats: Accending all combustible bodies at a lower temperature than they are kindled by nitrats, with a more vivid flame, and remaining in the state of muriats after the combustion is ended.

Genus XIV. Fluats: Yielding a vapour that corrodes glass, on the contact of concentrated sulphuric acid.

Genus XV. Borats: Fusible, with or without separation of their bases; and affording, when another acid is united with their solution, boracic acid in foliated crystals.

Genus XVI. Succinats: These are not to be known or characterized but by decomposing them, and observing their acid: most of them retain the smell of burnt amber.

Genus XVII. Citrats: Not sufficiently known for us to find in them generic characters: to distinguish them, the citric acid must be separated by the most powerful mineral acids.

Genus XVIII. Gallats: All strongly characterized by their property of precipitating iron black from its solutions, and partly reducing the oxyds of silver, gold, and mercury, in separating them from the menstrua in which they are dissolved.

Genus XIX. Malats: Almost all deliquescent: not to be known but by obtaining their acid separately by the aid of mineral acids.

Genus XX. Benzoats: Ascertainable on discerning the smell of the benzoic acid, separated by acids of greater power.

Genus XXI. Tartrits: Sufficiently striking characteristics for distinguishing these, are to be found in their tendency to compose triple salts, and acidules less soluble than either the pure acid, or the neutral salts which the tartarous acid forms with the same bases.

Genus

Genus XXII. Oxalats: May be characterized by their tendency to form acidules of difficult solution, and their property of decomposing all calcareous salts.

Genus XXIII. Camphorats: Too little known to have generic characters assigned them: they are to be distinguished by the presence of the camphoric acid, and the recognition of its properties, when separated.

Genus XXIV. Pyromucits: Similarly circumstanced with camphorats.

Genus XXV. Pyrolignits: The same may be said of these.

Genus XXVI. Pyrotartrits: These rank with the three preceding genera.

Genus XXVII. Acetats: Yet too little distinguished from acetits: evolving, when decomposed by mineral acid, a very strong and pungent white vapour.

Genus XXVIII. Acetits: All recognizable by their acid disengaged by means of sharper acids.

Genus XXIX. Lactats: Very little known: their acid, separated by others, can alone characterize them.

Genus XXX. Saccholats: As the lactats: unknown.

Genus XXXI. Sebats: Emitting the white vapour and acrid smell of sebacic acid on the contact of the strongest mineral acids.

Genus XXXII. Lithiats: The weakest of all salts in their attractions, being decomposable even by the carbonic acid.

Genus XXXIII. Formiats: Very little known, and recognizable only by means of their acid.

Genus XXXIV. Bombiats: Similarly circumstanced with the formiats.

Genus XXXV. Prussiats: Completely characterized by their property of forming Prussian blue with solutions of iron.

To determine the specific characters of nearly two hundred and forty-five species contained in these thirty-five genera, they would require to be profoundly studied, and in this respect science is yet but little advanced. While our knowledge is thus defective, it is of importance to indicate at least the path we ought to pursue, to complete the history of these compounds, and to ascertain with precision the method of investigating their properties. Each compound earthy or alkaline salt presents to our observation, 1st, Figure, and the varieties of that figure. This ought to be described geometrically: the inclination and degrees of its angles, the primitive formation of the crystals, the interior form, their diffection, and the laws of decrease which determine their varieties, should be detailed. 2dly, Its existence by art or nature, with a comparison of the native and artificial salt. 3dly, Taste. 4thly, The action of fire; whether it be null, fusing, vitrifying, subliming, or decomposing, &c. 5thly, That of light. 6thly, The influence of the air; whether it be null, or impart water to the crystals, or elicit water from them. 7thly, The union with water, the quantity necessary to dissolution at different temperatures, the caloric absorbed or evolved, the crystallization produced by refrigeration or evaporation. 8thly, The attraction of earths which modify the salt, decompose it, produce no change in it, or unite with it to form a triple salt. 9thly, The effect of alkalis on it; whether null, decomposing, or sometimes combining with it, so that a triple salt is formed. 10thly, The comparative action of acids different from that which it contains, decomposing the salt, changing its nature, or producing in it no alteration. 11thly, The operation of other neutral salts on it; which may produce a complete union, forming a triple salt; a double decomposition, by an interchange of acids and bases; a precipitation, in consequence of their attraction for water; or no alteration whatever. 12thly, The dissolubility or indissolubility of the salt in alcohol. 13thly, Its alterability or unalterability by by means of charcoal, which may discompose its acid, or leave it untouched. 14thly, The influence of vegetation and fermentation on the salt. 15th, and finally, Its action on the animal economy.

If all these questions were answered with precision, in the present state of chemistry, the history of earthy and alkaline compound salts would not only be complete, but would throw considerable light on various phenomena of nature and art, which still remain plunged in great obscurity. Some saline combinations of an acid with two bases, particularly magnesia and ammoniac, are already known: these compounds bear the name of trisules, or triple salts; but a far greater number exists, of which we are not sufficiently aware, and which demand all the attention that can be paid them by chemists. The earth conceals, both at its surface and in its superficial cavities, saline compounds differing from those which art produces by the simultaneous existence of two bases, or even of two acids: borat of lime and borat of magnesia have already been found crystallized together in cubic quartz, phosphat of lime, and fluat of lime, in the earth of marmaroch and the estremadura stone, &c. These data successfully lead to the knowledge of native salts: the crystallization and purification of useful salts: the phenomena of solutions: the precipitation and preparation of alumin, magnesia, &c. the attraction of lime, potash, soda, and ammoniac, for acids: the formation of neutral salts by nature: all the details of halotechny: the preparation of the nitric, muriatic, boracic, and several other acids.

THE OXYDATION AND DISSOLUTION OF METALS.

Metals have already come under consideration in page 159, as indecomposed or single combustible bodies; and have been characterized by their most striking properties. But these general observations are not sufficient: the important parts performed by these substances, in the phenomena of nature and the processes of the arts, require, that they should be separately examined, and with sufficient minuteness to enable us to appreciate the whole of their influence. Though metals are capable of uniting in their metallic state with each other, with sulphur, with phosphorus, with carbon, and with combustible substances in general, it is much more common to see them combined with oxygen previous to their union with other bodies; or, in other words, for them to enter into the greater number of compounds of which they constitute a part, it is necessary, that they first unite with oxyen, or be converted into the state of burnt bodies. Accordingly, all the singular phenomena displayed by metals in their combinations, and the changes of form they undergo, are owing to their attraction for oxygen, and the different proportions in which they contain this principle. Though there are various circumstances under which metals may be united with oxygen, they may be reduced in general to three. The first is the contact of air, assisted by caloric; the second is owing to the decomposition of water; the third, to that of acids. In this triple view the oxydation and dissolution of metals are here to be considered.

All metals heated in the air, and raised to a temperature more or less high, are susceptible of burning with a vivid flame, great heat, and a true deflagration, either previous or subsequent to their entering into fusion: thus they absorb oxygen in a state of greater or less solidity: those which oxydate slowly, and without perceptible inflammation, equally disengage light and caloric from the vital air, but in so small a quantity at a time, that they are not rendered sensible to our organs. Elevation of temperature favours the absorption of the oxygen of the atmosphere by metals, and renders the combination of this principle with these combustible bodies more solid. While there are some metals which never burn in the air, except at a very high temperature, as gold, silver, and platina, there are others that burn at all temperatures, even the lowest, and with great promptitude; as manganese, which oxydates, and falls into powder,

der, in a few hours, on the contact of air several degrees below the freezing point. Some, as iron, copper, lead, burn slowly, and in the course of some months, in the air, even though cold. All metals increase their weight during this operation, which does not take place without the contact of air, and consequently absorb a principle, the oxygen of the atmosphere, without losing any one. Neither the name of calcination, which was given to this phenomenon, nor that of metallic calces, can be retained; but instead of these have been substituted the terms of combustion and oxydation for the operation, and of metallic oxyds to denote the metals thus burnt. The colours which metals display in burning, or with which their flame is tinged, appear to be owing to the dissolution of the metallic molecules in the light that is evolved. Thus copper yields a green flame, &c.

Not only do all metals compared with each other absorb different quantities of oxygen to saturate them in their combustion by the contact of air, but each metal considered separately absorbs different proportions, and stops at various points of oxydation, according to the degree of temperature to which it is raised. Thus tin, lead, copper, iron, change colour and assume the tints of the rainbow, at the first degree of fire to which they are exposed in contact with the air: lead first becomes a grey oxyd, next yellow, and lastly red: mercury passes from black to white, from white to yellow, and from yellow to red: iron, at first a black oxyd, becomes next green, then brown, and ultimately white: copper is at first a brown oxyd, from which it changes to blue, and its last degree of oxydation imparts to it a green colour. All metals differ in their attraction for oxygen. From some, as gold, silver, &c. oxygen is elicited by means of light almost alone, or assisted with a very small portion of caloric; others, as mercury, require for its separation a great degree of fire, and much light; while the greater number do not part with this principle, merely by the intervention of light and caloric. To decompose oxyds of the last description, they must be heated with charcoal, which attracts from them their oxygen. It is owing to this diversity of attractive power for oxygen, that some metals are deprived of it by others, as silver and gold are by almost all the rest, mercury by copper, copper by iron, &c. We are not yet perfectly acquainted with all these degrees of attraction, but the present state of our knowledge indicates the following order of the metals, beginning with that of which the attraction for oxygen is most powerful: Manganese, zink, iron, tin, copper, mercury, silver, gold.

Various metals decompose water, and this the more sensibly and rapidly the higher their temperature is raised, because then the abundant quantity of caloric employed more forcibly attracts and dissolves the hydrogen. Thus iron decomposes water with great rapidity when it is of a white heat, though it requires a considerable time to effect its decomposition at the highest temperature our atmosphere ever attains. Iron, zink, tin, and antimony, appear to be capable of decomposing water: it is probable, too, that manganese, and even some other metallic substances, are equally capable of effecting this purpose. This decomposition is attributable to a stronger attraction for oxygen than hydrogen possesses: whence it follows, that hydrogen completely decomposes the oxyds of those which do not decompose water. But it is requisite here to distinguish the different degrees of oxydation: for the oxyd of iron highly oxydated, or oxydated brown, is partly decomposed by hydrogen, and reverts to the state of black oxyd, because iron is capable of eliciting oxygen from water only to that degree which oxydates it black, and beyond this degree of oxydation decomposes it no longer. All metals capable of decomposing water effect this operation with more ease and rapidity, when assisted by the contact of a substance which has a great tendency to unite with their oxyds. Frequently even metals, like other combustible bodies, which alone would not decompose water, are rendered capable of it by the presence of some other substance, which acts by a predisponent affinity. Thus almost all metals are enabled to effect the decomposition of water by means of acids.

Metallic oxyds have this peculiarity in their combinations, that they seem, with regard to acids, to perform the functions of alkalis, or earthy and alkaline bases; though, on the other hand, they are capable of uniting with earths and alkalis, as if they were a sort of acids. Of the latter, indeed, there are fewer than the former; and it is observable, that they which saturate alkalis in the manner of acids, are in general those to which oxygen most powerfully adheres, as antimony, lead, iron, and manganese. It has already been said above, that there are three metals which are truly acidifiable. Metals cannot be dissolved by acids without being previously oxydated: for this reason, such metallic oxyds as are soluble in acids, dissolve in them slowly, and without effervescence; while metals themselves cannot be dissolved in the same menstruum, without motion and effervescence being produced. The effervescence occasioned by the dissolution of metals arises from this, that, in absorbing oxygen, they take it from a principle which assumes the form of gas, or elastic fluid. This principle proceeds either from the water, or from the acid, employed in the process, according as the one or the other is decomposed; and sometimes it originates from both, when both are decomposed at the same time by the metal. Sulphuric acid thus decomposed by metals, when in a concentrated state, gives out sulphureous gas; and nitric acid, nitrous gas. Sulphuric acid diluted with water, greatly facilitating the decomposition of the aqueous fluid by means of metals, evolves in this process hydrogen gas: this is eminently the case in the dissolution of iron or zink by dilute sulphuric acid. The phosphoric acid acts nearly in the same manner as the sulphuric with metals. Nitric acid is not only decomposed by several metals, but also admits the decomposition of water at the same time. For this it suffices, that the metal dissolved in it be extremely greedy of oxygen: such is particularly tin. In this case, the hydrogen of the water, uniting with the azot of the nitric acid, forms ammoniac; for which reason these solutions afford no gas, and contain ammoniacal nitrat. Hence we understand how most solutions of the white metals in nitric acid evolve ammoniacal vapours in the injection of quicklime.

The muriatic acid, as it is incapable of being decomposed by combustible bodies, of itself dissolves few metallic substances. It attacks only such metals as possess sufficient avidity for oxygen to decompose water: accordingly, during the dissolution of metals in the muriatic acid, hydrogen gas is always evolved. And not only is the muriatic acid incapable of being decomposed by metals, but it also possesses the property of attracting oxygen from most metallic oxyds: in doing which it passes to the state of oxygenated muriatic acid. To this strong affinity for oxygen the muriatic acid owes its property of easily dissolving metallic oxyds, on which account it is employed with success for dissolving the oxyd of iron, which other acids are unable to attack. If metallic oxyds be surcharged with oxygen when we dissolve them in muriatic acid, an effervescence arises, because a part of the acid flies off in the form of oxygenated muriatic acid gas. If the oxyds be only at the proper point of oxydation for uniting with this acid, they dissolve in it without any movement or effervescence, as salt or sugar will in water. The boracic and fluoric acids unite but feebly with metallic oxyds: they do not dissolve pure metals, because they are not decomposable by them; but they enable water to oxydate such of them as have most affinity for oxygen. It is the same with the carbonic acid, which unites well with most

most metallic oxyds, and is often found combined with them in their native state.

Metallic acids are easily decomposed by very combustible metals: they unite very perfectly with their oxyds, and are frequently found thus combined in a native state. Acids of the vegetable and animal kind, or of which the radicals are formed by hydrogen and carbon, are not decomposed by metals; but they render water extremely decomposable by them, and unite with metallic oxyds with considerable solidity. Many of them occasion these oxyds to revert to the metallic state.

The oxyds of metals cannot unite with acids, and still less remain combined with them, unless they contain certain proportions of oxygen: if they have less than the determinate quantity, no union will take place; if more, they will separate from them. Besides this general truth, there is another of the same kind peculiar to each acid and each metal; which is, that they cannot remain reciprocally united, but within certain limits of oxydation, and these oftentimes very confined. There is a determinate proportion of oxygen in the combination of an acid with a metallic oxyd. It is in consequence of this law, that metallic solutions exposed to the air grow turbid, and form a precipitate, in proportion as the metallic oxyd, by absorbing oxygen from the atmosphere, becomes gradually insoluble in the acid. This is the reason of the decomposition, which the atmosphere effects on most metallic sulphats and nitrats. It even frequently happens, that metallic oxyds dissolved in acids react by degrees on these salts, and take from them, though in close vessels and without the contact of air, a portion of their oxygen, so that they soon separate, and are precipitated to the bottom of the solution. Heat is eminently favourable to this successive decomposition of acids by metallic oxyds. Thus nitric solutions, when heated, grow turbid, or become more and more decomposable by air and water, which is particularly remarkable in the nitric solution of mercury. There are metals which have so great tendency to oxydate themselves with acids, that they cannot remain united, or form permanent solutions with them. This is particularly the case with those, which have the property of becoming acids, or forming oxyds capable of combining with alkalis: as arsenic, tungsten, molybdena, antimony, tin, iron, &c. accordingly we find the solutions of these metals, especially in the nitric acid, are always loaded with precipitates, and contain little or no metallic oxyd.

From what has been said it appears, that, to form metallic salts, the oxyds of metals must remain united with acids, and have no tendency to separate from them. It is requisite too, that we do not augment their affinity for oxygen, or bring them into contact with this principle.

Metallic compound salts have always, or almost always, an excess of acid: all of them likewise are more or less acrid or corrosive, which shows a tendency to become acid in most metallic oxyds. Those properties of metallic salts with which it is of importance to be acquainted, may be included under the following heads. 1. Figure, and its varieties. 2. Sapidity or causticity, more or less powerful. 3. Alteration by means of light. 4. Fusion, desiccation, decomposition, by means of caloric, more or less marked. 5. Deliquescence, efflorescence, or decomposition, more or less complete, by the action of the air. 6. Solubility in water, warm or cold; decomposition more or less promoted by pure water, &c. 7. Decomposition by earths and alkalis; nature of the metallic oxyds precipitated; complete precipitation, or formation of triple salts, partly alkaline or earthy, partly metallic. 8. Alteration of the metallic oxyds precipitated, at the instant of their precipitation, either by the air, or by the nature of the alkali employed for the precipitation, as happens when ammoniac is used. 9. Reciprocal alteration by different acids; decomposition taking place, or not; affinity of acids for the metallic oxyds; changes of the oxyds discoverable by their colour. 10. Alteration by earthy or alkaline neutral salts, whether exhibiting an union without decomposition, or a double decomposition. 11. Reciprocal action of metallic salts on each other, announcing either simple union, a simple change of bases by the acids, or a displacement of oxygen precipitating both the oxyds; one because it is partly disoxydated, the other because it is superoxydated, as is the case, for example, in the useful precipitation of the muriatic solution of gold by the muriatic solution of tin, which furnishes the purple precipitate of Cassius. 12. Union with earthy or alkaline sulphures; the formation of a kind of a sulphurous ores.

Metallic oxyds have different degrees of affinity with acids, and some may be employed to decompose combinations of others. But the different affinities of metals for oxygen are the most important cause of the phenomenon of the precipitation of metallic solutions. Thus several metals, by taking oxygen from others dissolved in acids, occasion their re-appearance in the metallic form; as mercury does with silver, copper with mercury, iron with copper, zink with iron, &c. Sometimes metals do not deprive metallic oxyds dissolved in acids of all their oxygen; which occurs when the precipitating metal has no occasion for all the oxygen of the metal dissolved, to assume its place in the acid: thus tin, when it precipitates the oxyd of gold, does not elicit from it all the oxygen it contains, but suffers it to precipitate in a peculiar state of oxydation. Metallic oxyds, in dividing oxygen among them in new proportions, precipitate with properties which deserve to be more accurately investigated than has hitherto been done. From the facts here laid down, we are enabled to investigate the preparation of all the metallic oxyds useful in the arts: coloured glass, enamels: metallic salts, of use in the arts: the effects of these salts in the arts in which they are employed: the solution and parting of metals: the precipitation of metallic oxyds by alkalis and earth. These applications are in general so useful and multifarious, that they cannot be exhibited unless in the particular detail of each metal.

THE FORMATION AND NATURE OF VEGETABLE SUBSTANCES.

The substances which constitute the texture of vegetables differ from mineral substances in this, that they are of a more complex order of composition, and, though all are extremely susceptible of decomposition or analysis, not one is an object of synthesis. Nothing but the texture of living vegetables, nothing but their vegetating organs, can form the matters extracted from them; and no instrument invented by art can imitate the compositions, which are formed in the organic machines of plants.

Though vegetables form all the materials which constitute their texture with four or five natural substances, caloric, light, water, air, and the carbon derived from some remains of plants decayed into mould, we find an extreme variety in the properties of these materials. These may be reduced, however, to a certain number of principal heads, under the name of *immediate materials of plants*, because they are obtained from them by simple processes, almost wholly mechanical, by a sort of direct analysis, which does not alter their nature. These matters, which are more or less compound, are placed in particular organs, vessels, distinct cells, &c. Sometimes their seat is in the root, or stalk, bark, and leaves, at the same time: at others they are contained only in the flowers, fruits, or seeds, and even in certain parts of these organs. This particular situation of the immediate materials indicates the different organization of the texture of the part, as the cause of the various nature displayed by each of them. The different place occupied by each of these materials of vegetables, often enables us to obtain them easily separate and pure. It is sufficient, when this local distribution occurs, to bruise and open the vessels or cells which contain them, and expel their liquid juices. Nature herself frequently exhibits this separation

paration at the surfaces of plants, even by the power of vegetation: thus the sap, manna, gum, resin, &c. spontaneously flow; though art is often obliged to separate from each other several of these materials united and confounded together. The means it employs for this purpose are usually simple and easily practised; such as rest, filtration, expression, ablution, and distillation with a gentle heat, which produce no alteration in the substances subjected to these processes.

Among the materials of vegetable bodies obtainable by simple means, which change not their nature, may be reckoned the following substances, either fluid, or solid: 1. The extractive matter, or extract. 2. Mucus, or mucilage. 3. Sugar. 4. Essential salts. 5. Fixed oil. 6. Volatile oil. 7. Aroma. 8. Camphor. 9. Resin. 10. Balsam. 11. Gum-resin. 12. Fecula. 13. Gluten. 14. Colouring matter. 15. Elastic gum. 16. The ligneous part. Beside these sixteen principles, a substance analogous to animal albumen has been discovered in the analysis of vegetables; and it is probable, that some other unknown vegetable principles exist, as the matter proper for tanning hides, or tannin, &c.

It is necessary here to be fully aware, that, on reducing all the facts of vegetable analysis to general terms, or leading results, nothing more has been found in any of the plants hitherto examined, than the eighteen substances above mentioned; so that we may affirm, that they actually compose the texture of all known vegetables, and that a very accurate analysis is made of a vegetable, when we separate these from it. Yet it is not to be understood, that all these eighteen immediate materials are to be found in the different parts of vegetables, or even in each vegetable taken all together. There are plants, all the parts of which do not furnish so many as five or six of these materials; others contain eight or ten; some afford them all. But supposing we could mingle and blend together, even chemically, all the plants which have ever occupied the attention of the chemist, this mixture, this combination, confused in appearance, would exhibit only the sixteen or eighteen above mentioned substances, as the results of the most accurate and refined analysis; whence we are justified in saying, that vegetables are formed of these immediate materials. Each of the materials above announced has peculiar distinguishing properties, among which those that can mark its characters, and render it easily discernable from the rest, should be selected. It is by no means impossible to treat this subject after the manner of botanists, and to have but one characteristic or specific phrase for each of these materials: and though this method has never yet been executed in chemistry, Fourcroy presents a sketch of it in the following manner:

Characters of the immediate Materials of Vegetables.

EXTRACTIVE MATTER, or EXTRACT: Dry; brown; a little deliquescent; soluble in water; obtained from the juices of vegetables by inspissation, or from decoctions or infusions of them by evaporation; affording by distillation an acid, a little ammoniac, and some oil; absorbing oxygen from the atmosphere, and by this absorption becoming gradually insoluble; erroneously considered as a native soap; composed of carbon, hydrogen, azot, and oxygen, and always tending to absorb more of the last than it contains in its primitive state.

MUCUS, or MUCILAGE: An agglutinative, viscous, insipid, substance; affording much pyromucous acid on distillation; soluble in both warm and cold water; absorbing no oxygen from the atmosphere; drying and becoming brittle in the form of gum; existing in roots, young stalks, and leaves; issuing from the bark of trees by expression; gluing their fibres together.

SUGAR: Sapid and agreeable to the taste; crystallizable, soluble, and fermentable; in most circumstances resembling mucilage, but differing from it in the property of fermenting and forming alcohol. Both mucilage and sugar are compounds of carbon, hydrogen, and oxygen; differing from extract, 1st, By possessing a smaller proportion of hydrogen, on which account they do not absorb, like extract, the oxygen of the atmosphere; 2dly, By the absence of azot, whence they afford no ammoniac on distillation.

ESSENTIAL SALT: Comprehending the vegetable acids, formed in general of hydrogen and carbon more oxygenated than in the three preceding principles: accordingly these are convertible into acids by the addition of oxygen. Vegetable acids, however numerous they may be, appear to differ only in the proportion of their three principles: they are all decomposable by fire, capable of being converted into each other, and, on an ultimate analysis, are reducible to water and carbonic acid by the addition of oxygen.

FIXED OIL: Formerly called gross or expressed oil; thick, sweet, inodorous; burning when volatilized; forming soap with caustic alkalis; mixed with a mucilage named the sweet principle of oils by Scheele; inspissating and becoming concrete by the contact of air and absorption of oxygen; experiencing the same effects by the action of acids and metallic oxyds; composed of carbon, hydrogen, and a little oxygen. It differs from the preceding compounds in containing a larger proportion of hydrogen; whence arise its combustibility, and its property of being converted into water and carbonic acid, when it burns with a sufficient quantity of air, as it does in the hollow wicks surrounded on all sides with air, which constitute Argand's lamp.

VOLATILE OIL: Heretofore named essential oil, or essence: highly acrid, highly odoriferous; entirely reducible to vapour at a heat of 184°; combining difficultly with alkalis; capable of being set on fire by acids; inspissating to a resin by the action of oxygen; burning more rapidly, and affording more water, than fixed oil, and admitting more speedily the precipitation of its charcoal, which forms lamp-black.

AROMA, formerly called *spiritus rector*: A very volatile principle, reducible to vapour by the ordinary heat of the air, and forming an atmosphere round plants; passing over with water in distillation in *balneo Mariæ*; sometimes of an inflammable nature, at others displaying saline properties, uniting with alcohol, fixed oils, vinegar, &c. forming by these combinations what are called in pharmacy distilled waters; contributing by its presence to the quantity of volatile oil distilled from plants, and bearing so great analogy to it, that they have been confounded together. The nature of aroma is not accurately known; some begin to suspect, that it is not a distinct body, a single principle disengaged from vegetable matters, but these matters themselves in substance reduced to a state of vapour.

CAMPHOR: A matter now recognised in a number of vegetables, and claiming to be reckoned among their immediate principles; of a concrete and crystalline form; very volatile; burning with the emission of smoke; soluble in a large quantity of water, in alcohol, and in ether; existing in several volatile oils; contained pure in the trunk and leaves of the species of laurel which furnishes it; too little known yet with regard to its intimate nature; yielding a peculiar acid by means of the nitric.

RESIN: A soft or dry substance; little odorous; combustible; soluble in alcohol, but not in water; uniting difficultly with alkalis; little alterable by acids; originating from inspissated volatile oil, and appearing to differ from it only by a larger portion of oxygen.

BALSAM: Resin united with benzoic acid; more odoriferous than pure resin; affording its acid in a concrete state by the agency of fire and water; yielding it to alkalis or earths; and approaching to resin after having lost its acids.

GUM RESIN: A concrete juice; partly soluble in water, and forming with it a kind of emulsion, as it does with vinegar, which has been supposed its universal menstruum, but still more soluble in alcohol; not exuding naturally

naturally from vegetables like resin, but extracted from their ruptured vessels, in the form of a white or coloured juice, of a fetid smell, more or less resembling garlic.

FECULA: A pulverulent, dry, white, insipid, combustible, matter; affording much pyromucous acid on distillation; soluble in boiling water, and forming a jelly with this liquid; convertible into the oxalic and malic acids by means of nitric acid; existing in all the white and brittle parts of vegetables, particularly in tuberose roots and gramineous seeds; constituting the base of the nourishment of animals, and disposed to become readily a principle of their bodies.

GLUTEN: An elastic ductile body, as if fibrous or membraneous; insoluble in water; slightly soluble in alcohol; affording a considerable quantity of ammoniac on distillation; putrescible like animal matter; turning yellow like it on the contact of nitric acid; convertible by this acid into oxalic acid; occasioning the difference between the farina of wheat and other farinaceous substances, and bestowing on it the capability of being made into a paste.

COLOURING MATTER: Always attached to one or other of the preceding materials; appearing variable in its nature; sometimes soluble in water; at others, attackable only by alkalis, oils, or alcohol; indebted for the diversity of its properties to the different quantities of oxygen fixed in it; possessing an affinity of attraction for alumin, oxyd of tin, &c. and capable of combining, more or less intimately, with the textures of vegetables and animals.

ELASTIC GUM: Analogous to gum-resin; appearing to exist in several vegetables; remarkable for the extensibility and elasticity it retains after desiccation; affording ammoniac when distilled; diffusing a fetid smell when burned; having been at first in the form of a white milky fluid, and converted from that state to an elastic solid, by the absorption of atmospheric oxygen.

The LIGNEOUS PART, or WOOD: A matter too much neglected hitherto by chemists; constituting the solid basis of all vegetables, but far more abundant in those which are hard; erroneously considered as an earth; insoluble in water; affording, on distillation, the peculiar acid called pyroligneous; containing a large quantity of carbon; passing to the state of three or four acids by the action of the nitric; and appearing to be the last product of vegetation.

From what has been thus exhibited respecting the immediate and known materials of vegetables, it follows, that they are all reducible, on an ultimate analysis, to three or four principles, which are their primitive component parts; namely, hydrogen, carbon, oxygen, and, in many, azot; and that they differ from each other only in the various proportions of the elements from which they are formed. Now, if we investigate, by simple calculation, the number of different compounds that may result from the union of three or four principles in every possible proportion, we shall find, that a much larger number might exist. But as each of the ternary or quaternary compositions which constitute the immediate materials of vegetables, admits, as far as it appears, a certain latitude of proportions, while retaining its general nature of extract, mucilage, oil, acid, resin, &c. it is easy to conceive, that the different proportions of the principles included within these several latitudes, set bounds to the vast immeasurable variety of colour, smell, taste, and consistency, which are observable in all the materials of vegetables, and which men discern in such of them as they employ in their food, garments, habitations, &c. On the same consideration, it will not be more difficult to conceive, that vegetables must vary in the nature and specific properties of their materials, according to the several periods of their vegetation; that they can never remain in the same state; and that the different scenes exhibited in the periods of germination, leafing, blossoming, fructification, and maturity, which constitute vegetable life, must be accompanied and marked by internal change, as they are by external appearance. Of this the variously modified taste, incessantly changing colour, smell not more stable, and difference of texture, which characterize the several epochs of vegetation, afford incontestible proofs.

A new advantage arising from the modern chemistry, is the having thus distinguished the nature of the materials in plants, far more complex than that of mineral substances. The acquisition of this knowledge, leads to an appreciation of the changes wrought in vegetable matters by different chemical agents. Thus we can no longer profess ourselves ignorant of the action of the destructive agent fire on vegetable substances. From the preceding considerations, are understood how, when a complete vegetable, or any one of its different products, is subjected to the action of fire, caloric tends to reduce these complicated compounds to more simple ones, by occasioning the union of their principles, two and two together, in proportions very different from those which before obtained. By gently heating them, the hydrogen is extricated, which burns alone, and much carbon remains: if they be strongly heated, the carbon is disengaged at the same time with the hydrogen, they both burn in the air, and the only residuum left, consists of that small quantity of earth and salts, which constitutes vegetable ashes.

All the immediate materials of vegetables being reducible in their ultimate analysis to three or four original principles; namely, hydrogen, carbon, oxygen, and a little azot in some of them, this analysis, moreover, answering with the utmost precision to the manner in which vegetables are nourished, grow, spread, and perpetuate their species, since we know that vegetation, to take place, requires only these simple principles; nothing more remains, but to find how plants appropriate these sorts of elements, and combine them in their organic strainers, to compose the different substances, the properties of which have been announced. It appears beyond all doubt, that water is the source whence vegetables derive their hydrogen; that they decompose this fluid in their leaves, by the help of the solar light, absorb its hydrogen, which becomes fixed in them in the state of oil, or extract, or mucilage, &c. and separate its oxygen, a great part of which, being dissolved in light and caloric, flies off in the state of vital air. But a portion of the oxygen of the water is fixed at the same time in the texture of the vegetable, in which it is retained chiefly by the carbon.

It is not so easy to account for the carbon that exists in vegetables. Some natural philosophers suppose, that vegetables decompose carbonic acid at the same time with water, and absorb its carbon: but this supposition is not proved, though it has acquired strength, since the decomposition of carbonic acid, combined with soda, by means of phosphorus, has been discovered. Other chemists are of opinion, that vegetable earths, mould, dung, and particularly the water of dunghills, furnish the carbon, attenuate, and even dissolved in water; that plants absorb this principle by their roots; and that they do not extract it from carbonic acid. According to this hypothesis, manure affords only carbon, and the water of it is nothing more than a saturated solution of this principle. To these data we must restrain at present the theory of vegetation.

The applications of the facts above-stated, are extremely multifarious; they relate to agriculture, rural economy, pharmacy, materia medica, and all the arts in which vegetable substances are employed. They also point out the true nature of germination: the developement of leaves: blossoming: fructification: the maturation of fruits and seeds: the successive formation of gum, extract, oil, resin, salts, sugar, the colouring matter, and wood, in the different periods of vegetable life: the growth of the woody substance, bark, &c. the pharmaceutical

maceutical preparations of juices, extracts, essential salts, mucilages, oils, resins, gum-resins, aromatic waters, &c. the arts of the sugar-maker, confectioner, miller, baker, starch-maker, vine-dresser, brewer, distiller, varnisher, dyer, paper-maker, indigo-maker, colour-man, flax-man, perfumer, oil-man, soap-boiler, maker of charcoal, &c.

THE FORMATION AND NATURE OF ANIMAL SUBSTANCES.

It is an established truth, that, without the aid of vegetables, animals cannot support their existence: accordingly it has long been said in natural history, that vegetables are formed from minerals, and animals from vegetables. But, if this truth has been long known, the mode in which these bodies are changed, or reciprocally converted into each other, has never yet been ascertained. On this point, however, the labours of chemists should be principally exerted: for, were this problem once solved, it would lead us to a precise knowledge of all that concerns the animal economy: and some results conducive to this grand inquiry are already afforded us by modern discoveries. The most certain means of solving this important problem, are unquestionably, first, to acquire an accurate knowledge of animal substances, to compare them with those of the vegetable kingdom, and to investigate with care their difference or analogy. There is no doubt, were these differences once well known, they would enable us to understand the cause from which they arise.

If we compare the results of all the modern analysis made of the blood and humours, and of the solid parts which manifestly originate from the concretion of these, we shall find, that animal substances differ from vegetable substances, in, 1. The property of affording a considerable portion of ammoniac, and very fetid products, by the action of fire: 2. In that of putrefying more easily, and more speedily, and giving out a far more noisome smell: 3. In yielding, when acted upon by nitric acid, much more azotic gas: and, 4. In contributing singularly to the formation of nitric acid.

All these differences seem to depend only on the presence of one principle in animals far more abundantly than in vegetables; which is azot. It may be said, therefore, that the addition of azot to vegetable matters, would suffice to convert them into animal substances. Yet it is proper to observe, that to these primary differences, which may be termed capital ones, some other particular phenomena may be added, the influence of which, though undoubtedly inferior, on the animal composition, ought by no means to be neglected. Such, among others, is the presence of phosphoric acid, and the different phosphats, particularly those of soda, lime, and ammoniac, in the animal humours. To these salts are owing the peculiar quality of the coal of animal substances, especially its being almost incombustible.

The peculiar principle, which is so abundant in these substances, and more especially renders them different from vegetable matter, azot, appears, then, to be the efficient cause of the properties which distinguish them, and particularly of that sort of concrescibility, or plasticity, which we shall soon consider more at large. It may be affirmed, therefore, that, if we were to deprive animal substances of azot, they would become again, in some measure, vegetables; as, to convert the latter into animal substances, it is sufficient to combine with them, or introduce into them, azot. Thus all the matters which form the bodies of animals may be considered as so many immediate principles, as was done in the preceding section with regard to vegetables. In the same manner each of these principles ought to be characterized by the enumeration of its most striking properties. If we so examine and describe the blood, milk, bile, fat, urine, &c. and the solids of animals, we shall obtain a comparative scale, which will exhibit the relations and differences that form the object of our research; viz.

BLOOD: A red fluid; warm at a temperature of 93° in man, quadrupeds, and birds; at the temperature of the medium they inhabit in oviparous quadrupeds, serpents, and fishes; sweetish; coagulable by cold; miscible with water; separating almost spontaneously into three different substances, white serum, red serum, or the colouring part, and fibrous matter; exhibiting in each of these substances distinguishing characters; namely, in the serum, alkalinity, coagulability by fire, metallic oxyds, &c. coagulability, owing to the more intimate combination of oxygen; the same general nature in the red serum, which differs from the white only in the presence of oxyd of iron; in the fibrous matter, or fibrin, spontaneous concrescibility, and solubility in alkalis. These principal characters ought to be considered in the whole of the blood, which appears to be the primary principle of all animal substances, the common origin of all the humours and of all the solids. It has been called fluid flesh, in consequence of the fibrin, which concretes in it on cooling. The cause of its heat has been discovered in the alteration and absorption of vital air in respiration: and the renovation of the blood by the chyle, and the conversion of the chyle into animal matter, have, in like manner, been found to originate from the extrication of a considerable quantity of carbon and hydrogen, which appears to take place in the lungs.

MILK: A white fluid, bland and saccharine, formed of serum, cheese, and butter, intimately mixed, and exhibiting a true animal emulsion. In the serum of milk we should particularly notice the substance called sugar of milk, which may be said to have the character only of an incipient sugar, and the quantity of phosphat of lime, more abundant than in the other humours, which seems to indicate, that nature thought fit to place in the first nourishment of animals a quantity of osseous base, with a view to the necessary celerity of the formation and growth of the bones in the earliest stage of their lives. The cheese is a true albuminous matter. The butter is a concrete oil, the solidity of which, and its easy separation from the milk by simple agitation, appear owing to the absorption of atmospheric oxygen during the formation of the cream.

BILE: An oily saponaceous fluid; composed of an oil approaching the state of spermaceti and soda, mingled with albuminous fluid; formed in the liver, a viscus which itself contains a large quantity of oil. In the system of the voluminous gland just mentioned, every thing indicates a disposition, an organization, designed to separate from the blood the large portion of fat, which arises from the retardation of this fluid in the venous system of the abdomen. This consideration, destined some day to become one of the principal bases of the physiology hinted at above, accounts for the bulk of the liver in the fœtus which has not breathed, as well as in animals which have no respiratory organ similar to those of man, birds, and quadrupeds. It also explains the origin of some diseases of the liver, particularly of its concretions or gall stones.

FAT: A sort of oily matter; formed at the extremities of the arteries, and as far as may be from the centre of motion and animal heat; affording a kind of reservoir, in which that large quantity of hydrogen which could not be evacuated by the lungs becomes fixed; an oil united to a considerable portion of oxygen, and containing besides sebacic acid. This manner of considering fat, is one of the most striking points of modern physics as it regards animals.

URINE: An excrementitious fluid; more or less coloured, acrid, and saline; remarkable for the large quantity of free phosphoric acid, and phosphat of soda, ammoniac, and lime, which it contains, and still more so for the presence of a peculiar acid not yet found in any other animal humours, which is now called *lithic*, because it forms the basis of the stones of the kidneys and bladder, which cause the disease known by the name of lithiasis.

lithiasis. Urine has been the source of discoveries highly valuable to the chemist, and must be of others still more valuable to the physician. Considering it first as a lixivium, designed to carry out of the body a large quantity of saline matters, which would injure the due exercise of its functions, we must not forget that it is an evacuation, the proportion of the principles of which, varying according to the state of the body, becomes a kind of standard to shew the modifications of the body, in health or sickness, by a series of observations, which physicians have already commenced under fortunate auspices. We should consider it, too, as always containing the matter of renal and vesical concretions, which seem to require for their formation only a little longer residence in the respective organs than nature intended, or the presence of a nucleus, which attracts, in some measure, the successive lithic strata. We must also observe the proportions of the different principles in the urine, particularly of the uncombined acids it contains, and the phosphat of lime which it carries along with it; for these, differing remarkably in diseases of the joints, the aponeuroses, and the bones, will, at some future period, become, in the hands of skilful observers, new means of discovering the nature of these complaints, ascertaining their progress, and, perhaps, insuring their cure.

Little can be added here of the other animal fluids, such as the insensible perspiration, sweat, the gastric juice, saliva, tears, the mucus of the nose, the cerumen, the seminal liquor, &c. because none of these fluids have yet been much examined. All have unquestionably their peculiar composition, and differ in some points, particularly in the proportion of their principles. Some of these humours, with which modern experiments have rendered us a little better acquainted, exhibit the union of a peculiar mucilage with water, pure soda, phosphat of lime, and phosphat of soda: such are the tears, the nasal mucus, and the spermatic fluid. Of these the first and second display likewise the property of inspissating by the contact of the air and the absorption of oxygen, which probably constitutes the maturity, as it is called, of the humours in catarrh, whether it be confined to the nose and fauces, or extend to the lungs. The seminal liquor has offered us the singular phenomenon of the crystallization of phosphat of lime, which was never before known. On considering the whole of the solid matters which compose the various textures of the different organs of animals, the substances of which they are formed may be divided into three principal genera: the first comprehends the albumen; the second, the gelatin, or gelatinous matter; the third, the fibrin, or fibrous matter: two of these have already been distinguished above, under the article on the blood, we shall therefore now only give a concise sketch of the constant phenomena, which may be considered as the characters of each of these genera.

Genus I. Albumen: Coagulable by heat, acid, oxyds, and, in general, by oxygen in a concrete or nearly concrete state; soluble by alkalis; found more or less condensed or oxygenated, and interwoven in the membranes, tendons, cartilages, and, in general, all the white parts of animals.

Genus II. Gelatin: Participating the solidity of the first in most of the white organs, but capable of being separated from it, and easily dissolved by boiling water, to which it gives the form of a jelly on cooling. As it constitutes the base, or principal part, of all the white organs in general, these are more or less completely soluble in boiling water, and form transparent jellies by the refrigeration of these solutions.

Genus III. Fibrin: Insoluble in water, at any temperature; soluble in acids; containing a large quantity of azot; condensed, concrete, and organized, in muscular flesh, which may be regarded as the proper receptacle of all the fibrin contained in the blood: accordingly, considering the muscles as the secretory organs of the fibrous matter of the blood, we ought to investigate all its modifications, with respect to the quantity or proportion which fixes in these organs, and more particularly with regard to their apparent exclusion of it under various circumstances of disease, old age, &c.

These three matters, albumen, gelatin, and fibrin, in a state of concretion, of combinations of two and two, or all three together, and especially in different proportions, form all the solids of animals, and are separable from each other by a simple and easy analysis: they also, particularly the albumen, form many of the fluids of animals; only in these they contain less oxygen, more water, and are combined with acids, neutral salts, &c. It must be observed, that in the fluids, the gelatin is as deficient as in the solids it is abundant, appearing to acquire its nature of gelatin in passing from the fluids to the solids. Albumen dissolved in acids by art assumes properties analogous to those of gelatin. The solid animal matter, or bony substance, is of another order of composition. A large quantity of an earthy salt, almost wholly insoluble, phosphat of lime, is amassed in the texture or primitive parenchyma of the bones. This is the whole mystery of the structure and composition of this part of the animal frame; and for this reason bones yield jelly on being boiled in water, and a considerable quantity of oil and ammoniac on distillation; and when thoroughly calcined, or burnt, they are nothing more than calcareous phosphat, mingled with some small portion of carbonat, muriat, and phosphat of soda.

When any one of the preceding animal matters, particularly of the condensed white fluids, or white organs, is treated with nitric acid, there will be extricated a more or less considerable quantity of azotic gas, and of prussic acid gas, which appears to be nothing but a combination of azot, hydrogen, and carbon, with a little oxygen. Gelatin yields the least, albumen somewhat more, and fibrin the most. In proportion as this change of combinations in the principles of animal matters is effected by means of the nitric acid, they seem to revert to their ancient state of vegetable matter, from which they do not essentially differ, as has already been said, but by the presence of azot, their proportion of carbon and hydrogen not being the same, and greater complication in the number of principles, from a combination of which they are formed. Thus, instead of being ternary compounds, as vegetable substances are, animal matters are quaternary compounds, and even still more complicated. Azot is the fourth primitive principle, which is superadded to hydrogen, carbon, and oxygen. Accordingly, the conversion of vegetable into animal matter, which consists only in the fixation or addition of azot, must be considered as the principal phenomenon of animalization: this alone explains its chief mysteries; and, when once we are perfectly acquainted with the mechanism of this addition of azot, most of the functions of the animal economy, which effect it, or depend on it, will become equally known.

What we already know of the subject, is confined to the following considerations: the phenomenon is not so much owing to the fixation of a new quantity of azot, as to the subtraction of other principles, which increase its proportion. In respiration, the blood exhales a large quantity of hydrogen, and of carbon, either simply dissolved in hydrogen gas, or converted into the state of carbonic acid by the very act of circulation, and in the vascular system, according to some modern philosophers. In the cavities of the bronchia, during the act of respiration, and by the instrumentality of this act, the hydrogen forms water, which exhales in expiration. A portion of oxygen appears at the same time to become fixed in the pulmonary blood, and, circulating with this fluid through the vessels, gradually combines with the carbon, so as to form that carbonic acid, which is extricated from the venous blood in the lungs. It is easy to conceive, that, by thus disengaging a large quantity of hydrogen and

and carbon, respiration must necessarily augment the proportion of azot. The study of the mechanism of the other functions, which remains to be pursued, will undoubtedly lead to new discoveries, still more important than the preceding: what has been performed within a few years, naturally prompts us to imagine, that still more will be done. The analogy of action which has been discovered between digestion, respiration, circulation, and insensible perspiration, has begun to establish on new views, more solid than were heretofore possessed, a system of animal physics, which promises an abundant harvest of discoveries and improvements. Unquestionably it will be in pursuing the phenomena of digestion and growth in young animals, that an edifice equally novel and solid will be erected on these foundations. Every thing is ready for this grand work; several philosophers pursue this unbeaten path of experience; fresh ardour, springing from these new conceptions, animates those who are engaged in this branch of physics; and the track they have just begun to explore, appears such as must lead them to more precise and accurate results, than any that have hitherto been advanced on the functions which constitute animal life. The advantages, therefore, to be derived from a due contemplation of these matters, will be found in our acquiring a superior knowledge of the functions of the animal economy, particularly respiration; digestion; hematosis, or sanguification; insensible perspiration; the secretion of the bile; ossification and osteogony; nutrition; the diseases dependent on the degeneration of the humours, &c. animal concretions; the action of various medicines on the humours, &c. the arts employed in the manufacturing of animal matters, particularly those of the tanner, currier, preparers of different kinds of glue and size, makers of catgut, those who extract oils, and those who work on horn, bone, tortoiseshell, &c.

THE SPONTANEOUS DESTRUCTION OF VEGETABLE AND ANIMAL SUBSTANCES.

When vegetables and animals are deprived of life, or when their products are removed from the individuals of which they made a part, movements are excited in them, which destroy their texture, and alter their composition. These movements constitute the different kinds of fermentation. The intention of nature in exciting them is evidently, to render more simple the compounds formed by vegetation and animalization, and to cause them to enter into new combinations of different kinds. When a portion of matter has been employed for some time in the fabrication of an animal or vegetable body, it must be rendered up by it to form new compositions, as soon as the functions of the body are at an end. From the general definition of fermentation, it would seem that there ought to be as many peculiar and different fermentations, as there are vegetable and animal matters to be changed and decomposed: but several of them pursuing a similar path to arrive at a more simple state of composition, the number of fermentations has been reduced to three, the vinous, acetous, and putrid.

Vinous fermentation, as its name imports, is that which produces wine or alcohol. The saccharine matter is the only one which undergoes this fermentation, when diluted with a certain quantity of water, and mingled with a third substance of some kind, vegetable or animal, as extract, salt, fecula, or the like: for it is now fully proved, that sugar and water alone never enter into vinous fermentation. The saccharine matter is so abundant and generally diffused through vegetable and even animal substances, that there are a great number of bodies capable of affording wine, or yielding alcohol. All sweet and saccharine fruits reduced to a pulp, and more especially their expressed juices, undergo a movement, when they are at a temperature of 62° or upwards, if they be in a large body, and particularly when neither too thick nor too thin. Hence the great number of different wines, comprehending the decoctions of grain malted, and by this process converted in part into saccharine matter, and even the vinous liquors made with milk, honey, blood, &c. Vinous fermentation announces itself in saccharine liquors by an increase of volume, the formation of a copious scum which covers their surface, rise of temperature, the disengagement of a considerable quantity of carbonic acid gas, and the conversion of a sweet fluid into a sharp, warm, and pungent, liquor. The cause of this fermentation appears to be owing to a decomposition of water, a great part of the oxygen of which, attacking the carbon of the sugar, burns it, and converts it into carbonic acid. At the same time the hydrogen of the water attacks the sugar divested of its carbon, and, combining with it, gives birth to alcohol. Thus alcohol may be defined to be sugar minus a certain quantity of carbon, and plus a certain portion of hydrogen. This theory explains both the formation of the carbonic acid evolved during the progress of vinous fermentation, and that of the alcohol, as well as all the properties of this new production.

Pure alcohol is a white liquid, of a strong smell, of a hot and acrid taste; rising in vapour at a temperature of 150°; inflammable at any temperature; affording much water and carbonic acid in burning; yielding no smoke in combustion; miscible with water in any proportion, and expelling its air and a part of its caloric while combining with it; dissolving pure or caustic alkalis; decomposing acids, and convertible into ether by this decomposition; dissolving deliquescent neutral salts, and several metallic ones; taking from vegetables their volatile oil, aroma, resin, balsam, part of their gum-resin, and many colouring matters; and of great use in various processes of the arts, in consequence of these several properties. The reader may have already remarked, that the formation of alcohol takes place at the expence of the destruction of a vegetable principle, and that the saccharine matter undergoes a decomposition, which reduces it to a more simple term; thus vinous or spiritous fermentation is a commencement of the destruction of principles formed by vegetation: and hence it may be regarded as one of the movements established by nature, to simplify the order of composition, which vegetable substances exhibit.

The acid or acetous fermentation is the second natural movement, which contributes to reduce vegetable compounds to more simple states of composition. This fermentation, which produces vinegar, takes place only in liquors that have previously undergone the vinous fermentation. It has been observed, that the contact of air is necessary to the production of vinegar: it has even been perceived, that wine in turning sour absorbs air; so that a certain portion of the oxygen of the atmosphere appears to be necessary to the formation of the acetous acid. Unquestionably there are several other fermentations analogous to that which forms vinegar, though their products are not yet well known; such, for instance, are that of water mixed with starch, called starchmakers sour water, and those which form sour bread, sour kraut, and sour liquors. All these changes are to be considered as means of decomposition for simplifying the complex combinations of vegetables.

Finally, after vegetable liquors, or their solid parts moistened, have passed to the acid state, their decomposition, continuing under favourable circumstances, namely, a gentle or warm temperature, exposure to air, and the contact of water, leads them into putrefaction, which terminates in volatilizing most of their principles under the form of gas. Water, carbonic acid, carbonated, and even sulphurated, hydrogen gas, volatile oil in vapour, and sometimes even azotic gas and ammoniac, are evolved; and after this there remains nothing but a brown or black residuum known by the name of mould, formed of carbon somewhat fat and oily, from which water still extracts some saline substances and a little extractive matter.

Nature,

Nature, in organizing animals, and forming their fluids and solids by complex compositions, has placed in them a germ of destruction, which developes itself after the death of the individual. This destruction is effected by the movement termed putrefaction, which consists in a kind of fermentation, a slow decomposition of the solid or fluid substances. Their order of composition, being more complex than that of vegetable matters, renders them still more susceptible of the putrid decomposition.

Animal substances composed of hydrogen, carbon, oxygen, and azot, and frequently still more complicated by the union of sulphur, phosphorus, &c. when deprived of that movement, and more particularly of that renovation, which constitutes animal life, are soon altered by more simple attractions between their principles, which have a tendency to unite two and two together. This re-action gives birth to binary compounds, such as the carbon acid, nitric acid, ammoniac, and carbonated hydrogen gas, which gradually escape into the atmosphere, proportionably diminishing the quantity of animal matter. It is thus, in consequence of a natural decomposition, that we perceive this animal matter soften, change colour and smell, lose its texture and form, and diffuse through the atmosphere vapours and gases, which dissolve into the air, and transfer to other bodies, particularly those of vegetables, the materials necessary for their formation.

All the phenomena of the putrefaction of animal substances depend on the mechanism here explained. In the union of hydrogen and azot we perceive the formation of ammoniac, which has been deemed the principal offspring of putrefaction. The combination of carbon with oxygen explains the generation and evolution of carbonic acid, in which all the mystery of putrefaction was made to consist, about the time when gases were first discovered. Nitric acid, to the production of which it is well known how much animal substances contribute in artificial nitre pits, arises from the union of oxygen with azot. A certain quantity of hydrogen gas is extricated, and carries off with it carbon, sulphur, and even phosporus: hence the various noisome smells, and, perhaps the phosphorescence, of all putrefying animal matter. When all these volatile principles have united two and two together, and diffused themselves in the atmosphere, nothing remains but a portion of carbon, combined or mingled with fixed saline substances, such as the phosphats of soda and of lime. These residua form a sort of mould termed *animal earth*, which frequently retains a little sulphurated and carbonated hydrogen gas, fat, and extract, and in this vegetables find in abundance the principles requisite for the formation of their materials. It is on this account, that the residuum of animal matter is so proper for manure, when sufficiently concocted. A certain portion of water is necessary for this putrid decomposition of animal substances: it furnishes them with the quantity of oxygen necessary to the composition of carbonic and nitrid acids; and it contributes highly to the production of the putrefactive movement, by the attractions of the oxygen it introduces to them. It is equally indubitable, that the hydrogen arising from the decomposition of this water, contributes greatly to the formation of ammoniac: for it is a well known fact, that, when animal matters are diluted with a large quantity of water, they furnish abundance of ammoniac in their decomposition.

Putrefaction, consisting in a series of particular attractions, is modified in many different ways by external circumstances, such as temperature, the medium the animal substance occupies, the state of the atmosphere, whether more or less light or heavy, moist or dry, &c. Thus dead bodies buried in the earth, immersed in water, or suspended in the air, are differently affected; and moreover their bulk, their quantity, their propinquity to other bodies, and all the varying properties of the three mediums above enumerated, diversify the effects produced. We have proofs of this assertion, in what happens to bodies interred singly, and those which are buried in numbers heaped on one another. The former, surrounded with a large quantity of earth, are soon destroyed by putrefaction; the aeriform or liquid products of which are absorbed by this earthy mass, or by the atmosphere. The latter, not having around them this kind of earthy or atmospheric recipient, remain a long time without being destroyed; and the animal matter is wholly converted into ammoniac and concrete oil, which are known to form a soap similar to that which is found in the soil of burying-places surcharged with dead. The phenomena attending the destruction of animal substances immersed in water are likewise different. As new products are formed, the water dissolves them, and transmits them to the air. Continual moisture, with a constant temperature somewhat above 32°, favours the putrefaction of these substances, and their dissolution into a state of gas. On the contrary, a hot and dry air, volatilizing the water, desiccates and hardens the bodies of animals, and preserves them almost as well as the dry and burning sand of Egypt, so abounding in natural mummies. Though all the circumstances of putrefaction, and the almost innumerable varieties of the phenomena they exhibit, are not yet described, or even known, we have discovered, that they are confined to the conversion of complex substances into substances less compound; that nature restores to new combinations the materials which she had but lent, as it were, to vegetables and animals; and that she thus accomplishes the perpetual circle of compositions and decompositions, which attests her power, and demonstrates her fecundity, while it announces equal grandeur and simplicity in the course of her operations.

Beside the subjects mentioned at the end of the two preceding sections, to which the articles of this almost directly apply, we find, in the several facts here enumerated, the following deductions: The preservation of all substances extracted from vegetables: the several spontaneous alterations they undergo, the acetous fermentation, the vinous, &c. the products of these alterations, frequently employed for the purposes of the arts: the production of ammoniac and nitric acid: the influence of putrefaction in the different regions of living bodies: the contagion and maladies produced by the effluvia of putrefied substances: the theory of the situation and management of hospitals, drains, sinks, laystalls, cemeteries, &c.

Of PRACTICAL CHEMISTRY; with the MODERN CHEMICAL APPARATUS.

Practical chemistry teaches to detect and to know the intimate and reciprocal action of bodies upon each other; how to separate their parts; and to reunite or combine them when separated: and this it does by two methods, viz. *analysis*, or decomposition; and *synthesis*, or combination. These two methods are incessantly practised in the grand operations of nature, and of which the chemist is only an imitator.

Examples of simple and compound Analysis.

Analysis is either *simple*, or *compound*: simple, when by synthesis we can reunite the body with the substances which result from the analysis: but, when this cannot be done, it is called complicated or *compound*. Thus, in analysing a solid body, as cinnabar, we find it composed of two substances, mercury and sulphur. If we unite these two bodies, we shall find the substance appear again just as it was before decomposition: this, therefore is simple analysis. But, if we analyse a piece of wood, the results will be, 1. A matter as long and as broad as the piece of wood, not quite so thick, lighter, of a black colour, without smell or fibres, easily broken; this is called *carbon*, or coal. 2. A deep-red water tinged with black. 3. Another water of a lighter red, less filled with dense molecules than the first. But to unite these parts, and

and bring back the wood to its original state, is impossible. This is therefore what constitutes compound analysis.

Synthesis, is that operation which serves as a proof of the analysis. Many syntheses are made in analysing a body; for, if that body contains three or four substances, two or three of them often unite while we are separating the third or fourth. Besides, the *order* and *proportion* which enter into the composition of a body, give occasion to many syntheses. By *order* is meant the nature of the bodies which combine; and *proportion* is the quantity of the parts of each of the bodies which unite together. And this intimate and reciprocal action of bodies upon each other is produced by *attraction*.

Chemical attraction, is the principle of the intimate action of the molecules of the body, which we are to distinguish from the vital action. Mr. Kirwan, defines it to be, "that power by which the invisible particles of different bodies intermix and unite with each other so intimately, as to be inseparable by mere mechanical means. In this respect it differs from magnetic and electrical attraction. It also differs from the attraction of cohesion in this, that the latter takes place betwixt particles of almost all sorts of bodies whose surfaces are brought into immediate contact with each other; for chemical attraction does not act with that degree of indifference, but causes a body already united to another, to quit that other and unite with a third; and hence it is called *elective* attraction." This principle was well known in the earliest times, but it was not attended to with sufficient care, till experience had shown that its influence on the practice, is equal to that on the theory, of the science we are treating of. It is this doctrine that must guide the practitioner in the researches necessary for the advancement of chemistry, and must be consulted by the philosopher who collects and compares the facts. It is the compass by which both must steer; and it may be truly affirmed, that he who closely investigates the chemical attractions, will speedily know every thing that the sublimest chemistry has to offer.

There are two kinds of chemical attraction: the molecular, or attraction of aggregation; and the attraction of composition. The difference between these two kinds of attraction, is, that aggregation gives always the same body for the result, because it consists only in the successive and constant collection of similar molecules. Hence where the attraction of aggregation ceases, the action of composition begins. The attraction of composition, on the contrary, forms different bodies, according to the order and proportion in which the different molecules or elementary particles are brought together. These operations, as may be imagined, are infinite as to form, colour, and all other modifications.

Examples of the Attraction of Aggregation.—Two drops of water, and two globules of mercury, occasion an aggregation; but nothing can thence arise but an increase of the mass, without the nature of the substance undergoing the least change. But here aggregation must not be confounded with *collection*: in the latter, the integral parts have no sensible adhesion. Aggregation and collection, again, must be distinguished from *mixture*: a mixture always contains constituent parts of a different nature; as gun-powder; and, in general, all the pharmaceutical compound powders. There are also different sorts of aggregates; hard or solid, soft, fluid, and gaseous. *Solid*, as wood, sulphur, &c. *Soft*, as pitch, the fat of meat, &c. *Liquid*, as water, oil, alcohol, &c. *Gaseous*, as air, and the different vapours or steams. Aggregates are likewise divided into, *irregular*, as native stone; *regular*, as crystallized stone; *organical*, as wood, and bone. *Destruction* of aggregation, denotes the mechanical means employed by analysis to divide bodies. By lessening the aggregation, bodies present less adhesion and more surface: thus is the action of chemical agents facilitated, and their energy increased.

Examples of the Attraction of Composition.—Ten Laws, established by Fourcroy include all the phenomena of the attraction of composition.

I. *It takes place only between different bodies.*—To demonstrate that two heterogeneous bodies act mutually upon each other, by reciprocally giving out their particular properties, put into a glass a little potash, or powdered marble, pour thereon some nitric acid. The phenomenon which takes place, and the composition which results, prove, that these bodies, though heterogeneous, combine extremely well.

II. *It takes place only between the least molecules of bodies.*—To shew that attraction acts sensibly only on the elementary molecules of bodies, put sulphur in substance in contact with alcohol, and there will be no action; but, if powdered sulphur be put with the alcohol, then they will form an union. To perform this, powdered sulphur is to be put into a glass cucurbit, suspended within a vessel containing alcohol, as shewn in Plate I. fig. 1. of the chemical apparatus: put on the head or top, and fasten a small matrass to its neck; then lute all the joinings close, and heat the apparatus. The sulphur sublimes, the alcohol volatilises; in this state the two bodies meet; the alcohol dissolves the sulphur; and a slightly-coloured fluid is found in the matrass: this is *sulphurated alcohol*. To prove that the sulphur has been dissolved by the alcohol, add thereto some distilled water, and sulphur is precipitated. By putting together ammoniac and muriatic acid, the same effect is produced. A white smoke immediately arises; the muriatic acid mixes with the ammoniac, and hence is produced the composition called *muriat of ammoniac*.

III. *Attraction may take place between several bodies*; as in Darcet's Mixture.—This is a mixture of eight parts of bismuth, five of lead, and three of tin. The combinations of acids with alkalis may also be brought as examples to this rule; the formation of the sulphuric acid, or the combination of sulphur with oxygen, &c. which Fourcroy denominates *complicated* attractions. This term, however, has been rejected by Morveau, as conveying an incorrect notion of what occurs in the cases of chemical combination to which it refers. "It frequently happens, he observes, that three separate bodies, meeting in a fluid state, unite and form a single mass, which has all the characters of a homogeneous compound, and which retains this character, till its composition has been altered by chemical means. Such, for example, is the alloy of gold, silver, and copper. It has been said, that this triple compound is formed by *complicated affinity*; but this kind of expression serves only to divert the mind from taking a just view of the experiment. It is not the simultaneous and reciprocal action of the three metals on one another, that is essential to the success of the experiment; we have this proof of it, that precisely the same alloy is obtained, whether the gold be first united to the silver or to the copper, or though the copper be first united to the silver. We have, therefore, two successive combinations during the experiment. In the first of these, a particle of one of the metals comes into contact, and unites with a particle of one of the other metals; and, in the second, this newly formed compound unites to a particle of the third metal, in consequence of the affinity which, as a compound, it acquires for that metal. There is nothing peculiar or extraordinary in this. We have, as in other cases, two chemical forces acting in succession, and two successive combinations formed. What has been said of the alloy of three metals, may be applied to all similar cases, whatever be the nature or the number of the substances employed." See article *Affinity* of the chemical part of the *Encyclopédie Méthodique*, page 550.

IV. *That bodies may unite chemically, one of the two at least must be liquid or fluid.*—There are bodies which cannot analyse themselves, though they constantly obey the law of synthesis. There are others which cannot analyse, and then unite with other bodies, till after some prelimi-

 nary

nary preparations have taken place; thus, it would be useless to leave sulphur and mercury together in a vessel, because they would form no combination; but, if caloric be added, they will readily unite. In the same manner, in making of glass, if one of the substances which enters into the composition be not rendered fluid, there would be no action between them: we are therefore obliged to add caloric; the alkali is thus rendered fluid, the sand then melts; and thus glass is made. The union of an acid with any earth whatever, is another proof of the necessity of one body being liquid: from this phenomenon arises what is called *a solution*. Examples of the various phenomena of solution may be noticed from sugar in lump or in powder; sea-salt crystallised, or in powder, &c.

V. *When the attraction of composition takes place between bodies, their temperature changes.*—By applying experiment to theory, the truth of this assertion will appear. When lime is killed, we know that there is a disengagement of caloric. If concentrated sulphuric acid be mixed with water, a considerable heat is produced, so that by plunging in a tube containing water, it will be made to boil: the proportion necessary for this, is four parts of the acid to one of the water. If muriat of ammoniac be dissolved in water, a thermometer plunged therein will fall considerably. This effect will be much more sensible in a mixture of muriat of soda with ice. If a quantity of water of 60 degrees of heat be poured on an equal quantity of ice, the melted result will be 0; 60 degrees of heat will therefore have been combined.

VI. *Bodies between which the attraction of composition takes place, acquire different qualities from what the bodies themselves possessed before.*—This truth is a fundamental axiom in chemistry, and infinitely worthy of attention. Chemists in general have thought that the properties of a compound body held a medium between the properties of the substances which composed it; this is an error which it is important to correct; a prejudice which it is essential to remove, because it tends to hinder the progress of the art. This rule therefore requires to be examined under different points of view. 1. In the *taste*, exemplified by oxygenated muriat of mercury, and sulphat of potash. These prove, that the taste is very different when the bodies are combined. The first is most deadly poison; yet its constituent parts (muriatic acid and mercury) may be taken separately without injury to the human frame. The second is bitter and slightly purgative, while neither the sulphuric acid nor the potash have of themselves either of these properties. 2. In *smell*, exemplified by muriate of ammoniac, and sulphur of potash. The muriat of ammoniac affords an example of two odorous bodies, which form a composition without smell. Sulphure of potash, on the other hand, when moistened, gives out a fetid smell; yet neither sulphur nor potash, in their dry state, have any smell. 3. In *colour*, exemplified by red and yellow oxyds of lead: blue oxyd of cobalt: green oxyd of copper, &c. By comparing these different oxyds with the pure metals, it will be easy to see the difference between them. It is the same thing with respect to form, consistence, infusibility, &c. Two substances which are very infusible, or very difficult to fuse separately, become very fusible when united; the combinations of sulphur and of metals, afford very striking examples of this fact.

VII. *The force of the attraction of composition is measured by the difficulty of separating the component parts.*—Many chemists have taught the contrary of this fact, for the following reasons:—Nitrous acid easily combines with mercury; but the muriatic with great difficulty; hence they concluded that the nitrous acid had more affinity with mercury than the muriatic acid. This specious reasoning is erroneous for, if the nitrous acid combines easily with mercury, it quits it as easily; and, if there is a difficulty in uniting the muriatic acid with the mercury, the difficulty of disengaging it is also equally great. Farther, if muriatic acid be poured over nitrat of mercury, it will unite with the mercury, and separate the nitrous acid; which is an evident proof of the truth of this law.

VIII. *There is a very different attraction of composition between all bodies in nature.*—This we shall easily demonstrate. Fourcroy divides this attraction into simple or single elective attractions, and double or compound elective attractions. If into a dissolution, containing two substances, we add a third body which produces a separation of one of the dissolved bodies, this body, re-appearing under a solid form, takes the name of *precipitate*, and is an example of simple elective attraction or affinity. But there are several kinds of precipitates: true, false, pure, and impure. A true precipitate is when the body separated falls to the bottom of the vessel; it is false, when the mixture is precipitated. A precipitate is pure when with the results the original body may be recomposed; it is impure when this cannot be done, and when it is possible to reduce it still farther from its original state. But it is necessary to observe that precipitation does not always take place in the body expelled or disengaged; for it frequently happens, in decomposing a body formed of two substances by the intervention of a third, that the expelled body volatilises, or is dissipated in the form of an aerial fluid. We have an instance of this in the decomposition of muriat of ammoniac by means of quick-lime; a calcareous muriat is formed, and the ammoniac is volatilised.

Double or compound elective attraction.—Double affinity, is the decomposition of one body by another composed of two or three substance, but which could not be done by those substances taken separately. This attraction or affinity may be considered in two states. 1. Necessary. 2. Superfluous; and which may be illustrated by the following formula:

		Nitrat of soda.		
	A Soda	7 Divellent	D Nitric acid.	
Sulphat of soda.	8. Quiescent	attractions	4=12	Calcareous nitrat.
	B Sulphuric acid	6 — 13	C Lime	
		Sulphat of lime.		

This table is thus explained: a composition of sulphuric acid B, and one of soda A, cannot be decomposed by the lime C, nor by the nitric acid D, taken separately; but the analysed compound CD will decompose the composition, BA, because C and D have less affinity towards BA than B and A have to each other, and CD have more affinity towards one of those bodies than that body has towards them. The first are called *divellent* affinities, the last *quiescent*. When the quiescent affinities are stronger than the divellent, it makes no change in the combinations; but, if the divellent affinities are strongest, the existing combinations are broken, and new ones are formed. This method of affinities may be further explained by the following formula:

		Muriat of potash.		
	Muriatic acid.	32	Potash	
Muriat of barytes.	36	+	9=45	Carbonat of potash
	Barytes	14 — 46	Carbonic acid	
		Carbonat of barytes.		

If a solution of muriat of barytes be mixed with a solution of carbonat of potash, the affinity of the muriatic acid with the barytes, and that of the potash with the carbonic acid, are quiescent affinities. The affinity of the muriatic acid with the potash, and that of the barytes with the carbonic acid, are divellent. These last are strongest or most numerous: the first combinations are broken; and, instead of muriat of barytes and carbonat of potash, we have muriat of potash and carbonat of barytes, which, being insoluble in water, is precipitated.

In every case where more than three bodies are required for the production of any chemical change, we are to consider the change as depending not on simple affinities, or on the independent affinities of single bodies to one another, but upon the sum of all the affinities that concur in tending to the same end. To illustrate the principle, that in double elective attractions, the condition by which decomposition is determined, is the relative sum of the divellent and quiescent affinities, and not the strength of any single affinity in particular, it may be proper to give an instance in which no decomposition takes place, when two substances are used together, though either of them could have effected it if employed separately. The acetit of lime is decomposed by soda; it is also decomposed by the muriatic acid; yet it resists the action of the muriat of soda. The following table will illustrate this:

Acetit of lime.	Acetous acid	25	Soda	Muriat of soda.
	19	+	28 I = 47	
	Lime	20	Muriatic acid	
		= 45	I	

In this instance the affinity of soda with the acetous acid is greater than the affinity of lime with the acetous acid; and the affinity of the muriatic acid with lime is greater than the affinity of the acetous acid with lime; but the sum of the quiescent affinities is greater than the sum of the divellent affinities, and therefore no decomposition takes place. In many cases of chemical mixture, the affinities of more than four substances are concerned; and, though such cases are of the same nature with those of double elective attraction, yet that term seems inapplicable to them, as it implies the agency of only four substances. Morveau has, therefore, substituted the language of *concurrent affinity (affinité par concours)*, as the general expression for that tendency to chemical combination, which is rendered efficacious by the conjoined operation of more affinities than one. It is probable that this expression will be adopted in the place of Bergman's, which is evidently too restricted in its literal application.

It may also farther be observed, that in every chemical combination which is preceded by decomposition, the divellent and quiescent affinities must be equally attended to, in order to form a proper estimate of the experiment; for the quiescent affinities, even when they cannot prevent decomposition entirely, are still able to diminish the promptitude with which it takes place, and frequently to stop its progress at a lower point of saturation than the *divellent* substance would otherwise require. It will also happen, on some occasions, that the concurrence of several divellent affinities, though not absolutely necessary to produce a particular effect, will yet accomplish it more completely, and with greater facility, than any of them singly could have done.

IX. *Attraction in the inverse Ratio of Saturation.*—If sulphuric acid be brought in contact with mercury, we shall obtain, by the help of caloric, sulphureous acid and sulphat of mercury. A part of the acid then is decomposed; the oxygen which made it sulphuric acid has oxydated the mercury. The first portions of the oxygen then are easily disengaged, while the last adhere strongly to the sulphur: hence it arises that the first molecules which unite to a body adhere much more strongly than the last; and, in proportion as it approaches to the point of saturation, the molecules adhere less and less to the body, so that it is often very easy to separate the first molecules from the principles of a compound, while the latter molecules are separated with great difficulty: and of which the example above given is a striking proof.

Predisposing Attractions.—Sulphur works no change upon water; which proves that sulphur has less attraction for oxygen than hydrogen has; but, if sulphur be united with an alkali, this composition decomposes water, though the alkali itself has no attraction for the oxygen; the alkali then can only be attracted by the sulphuric acid, which should be formed by the union of the sulphur with the oxygen of the water. This attraction favours the decomposition of the water, and is what is called *predisposing attraction*. The results of the experiment are, an alkaline which has the property of decomposing water when brought into contact; a sulphurated hydrogenous gas is expelled, and the oxygen of the water flies upon the sulphur which is formed of the sulphuric acid, and which possesses itself of the alkali to form a sulphat.

To these laws of chemical affinity proposed by Fourcroy, M. Morveau has added the following two: I. He shows, by a variety of instances, that when two bodies are presented to one another, the saturated compound which results from their union is capable of combining with an access of one of its constituents; but the affinity which produces this last combination is not the same with the affinity which unites together the constituents of the compound itself; nor has it any known ratio to this latter affinity, but appears in every case to be very much inferior to it in strength. The following is an apposite illustration of these facts and inferences. The sulphat of barytes is one of the strongest combinations in chemistry and one of the most perfect neutral salts. When the concentrated sulphuric acid is boiled over this salt, a considerable quantity of it is dissolved by the acid, and this quantity is instantly precipitated by the addition of water. We have in this case a saturated compound (the sulphat of barytes) uniting with an excess of the sulphuric acid, but forming with it a combination infinitely weaker than the sulphat of barytes, since it is decomposed by the single affinity of the sulphuric acid with water. The following case will serve as another example of a compound uniting with an excess of one of its constituents, and at the same time will explain an apparent exception to the ordinary laws of chemistry. It is known that the sulphuric acid has a greater affinity with potash than the nitric acid has. Yet Baumé, having dissolved the sulphat of potash in an equal weight of the nitric acid, obtained, after filtrating and evaporating the liquid, a considerable quantity of crystallized nitrat of potash. In this curious experiment there is a part only of the sulphat of potash decomposed, and what remains is combined with an excess of acid. From these data, and from analogous experiments with the muriatic and tartarous acids, Morveau has constructed the following table, to explain in what manner part of the salt is decomposed.

Nitrat of potash.

Nitric acid.	58	Potash saturating about one third of the neutral salt.
2	+	62 = 64
Sulphat of potash which remains undecomposed.	34 — =92	Sulphuric acid saturating the same quantity of the salt.

Sulphat of potash with an excess of acid.

To take but one other example:—Morveau procured oxalate of lime, by adding lime-water to the oxalic acid; the liquor was still manifestly acid; he separated the oxalate,

late, poured a little distilled water upon it, to carry off any uncombined acid which might be adhering to it, and, having placed it to digest in the syrup of violets, he found, at the end of a few hours, that the syrup was quite green. We have, in this instance, the example of a compound uniting with an excess of one of its constituents, though an excess of the other was present.

II. Chemical affinity is influenced by temperature; its action being accelerated, retarded, prevented, or rendered efficacious, according to the degree of the temperature. There are two cases in which temperature modifies the action of chemical affinity. In the one, the composition of bodies is changed, in consequence of the different affinities of their constituent parts with caloric, at different temperatures. Let the affinity of A with B=6, and its affinity with C=5; and let A and C be very fixed substances, or at least much less volatile than B; it is evident that A will unite with B at the common temperature of the atmosphere. But, if we continually augment the temperature of the three bodies, the tendency of B to the state of vapour will increase in a faster ratio than that of the other two, till at length this tendency, in addition to the affinity of C with A, will overcome the opposing affinities; B will escape in the state of vapour, and C will combine with A. Obvious examples of this mode of influencing affinity by means of temperature, occur in every part of chemistry.

2. But there are cases where the accumulation of caloric appears to be a condition essentially requisite to determine bodies to unite, without the caloric combining with any principle separated from these bodies at the instant of their union, or remaining in combination with the new compound formed. This happens particularly in cases of combustion. Every one knows, that either a very high temperature, or an ignited spark, is necessary to dispose hydrogenous gas to combine with the oxygen of atmospheric air or oxygenous gas. In the same manner charcoal, sulphur, phosphorus, &c. require a certain temperature for their combustion, and this temperature varies according to the condition of the oxygen presented to them. Some of these bodies, phosphorus in particular, burn at different temperatures, but with very different phenomena. These effects of temperature upon the affinities have been expressed in a general form by Morveau; but he has not attempted to give any rationale of their cause; nor indeed has any satisfactory explanation of them yet been given. From some cursory observations made by Berthollet, in an Essay on the Combination of Metallic Oxyds with Alkalis and Lime, it would appear, that, together with Monge, he conceives that this effect of caloric may be generalized, by assimilating it with the operation of mechanical pressure in producing certain chemical combinations. Dr. Higgins has also proposed an hypothesis on the subject. See Minutes of the Society for Philosophical Experiments and Conversations.

Two substances may have an affinity for each other, and yet there may be some condition wanting, which is necessary for their chemical combination. Acids do not unite with alkalis, unless the one or the other be dissolved in water. Metals do not form alloys with one another, unless in the state of fusion. Metals are not soluble in acids, unless they be previously oxydated; and some metallic oxyds, those of iron and manganese for example, are capable of uniting with an excess of oxygen, so as to be rendered a second time insoluble in acids. To procure a chemical union in these cases, it is necessary to dissolve the acid or alkali in water; to reduce the metals to the state of fusion; to oxydate the metals that are to be combined with acids; and to disoxygenate in part those oxyds which have received an excess of oxygen. But when substances have an affinity for one another, and are prevented from combining together, as in these instances, by the absence of some condition necessary for their union, Morveau applies the term of *affinité disposée* to express the change that takes place in the operation of their affinities when the obstacle to their union is removed. The use of this term may be illustrated from an explanation that has been given of the facility with which iron dissolves in the diluted sulphuric acid. It is necessary to mention that iron, like the other metals, is insoluble in acids, unless previously oxydated. It is also necessary to observe, that iron decomposes water slowly at the common temperature of the atmosphere; but when a little sulphuric acid is added to the mixture of water and iron, the water is then decomposed rapidly, and an oxyd of iron formed, which is immediately dissolved by the acid. But upon what principle does the sulphuric acid accelerate the decomposition of the water, since it is incapable of uniting with the iron till the latter has already decomposed the water, and acquired the state of a black oxyd? We answer, that the iron, in its metallic state, has an affinity with the sulphuric acid; that this affinity is indeed incapable of producing combination, because the iron, in its metallic state, cannot unite chemically with any acid; but this affinity, superadded to the affinity which the iron has for the oxygen of the water, increases the sum of the divellent powers that concur in producing the same series of chemical effects. The affinity of the acid with the iron, and the affinity of the iron with the oxygen of the water, tend to the same common end, and therefore favour each other's operation. The affinity of the iron with the acid is unable to produce combination; we must have the affinity rendered efficacious (the *affinité disposée* of Morveau); we must have the iron oxydated. This is accomplished by the concurring affinities of the iron with the acid, of the iron with the oxygen of the water, and of the acid with the oxygen of the water, as forming a necessary constituent of the metallic oxyd.

It would appear, then, that the term of *affinité disposée* may be retained in chemistry, as the general expression for the effect of those changes in the condition of bodies; in consequence of which, their previously existing affinities are enabled to unite them chemically, and without which their union is impossible. The *affinité disposée* includes, as a more comprehensive expression, what has been called the *affinity of intermedium*. It is true, that the sulphat of iron is ultimately formed in consequence of the affinity of the sulphuric acid with the oxyd of iron; but how are we to explain the rapid oxydation of the iron, without a previously existing affinity between the acid and iron, in its metallic state; and why not a general expression, for the effect produced by the removing of those obstacles in the present condition of a body, which prevent its affinity for another body from accomplishing their union. The anomalous appearances which had suggested to Baumé and Corvette the idea of reciprocal affinity, have been accounted for, on the received principles of chemistry, by Bergman and Berthollet; and their explanations have been adopted by Morveau. The views entertained by the most philosophic of the modern chemists, upon this interesting subject, are too remote from immediate application, to find a place with any propriety, in an elementary work. They will be found in Bergman's *Opuscula*, in Macquer's *Dictionnaire de Chimie*, article *Pesanteur*, and in the article *Affinity*, of the chemical part of the *Encyclopédie Méthodique*.

OF THE PRINCIPLES OF BODIES.

In every age philosophers have admitted, that all the variety of natural bodies are formed of primary substances, more simple than themselves, which they have distinguished by the name of *principles*. Chemists, who have the strongest conviction of this leading truth from their analyses, have formed ideas, sufficiently precise, of the nature and difference of these principles; and have even admitted several classes of them. It must, how-

ever, be remarked, that they use the word *principle* in a different sense from that adopted by the ancient philosophers. For Aristotle and Plato did not regard any substances as principles, but such as are too minute to be perceived by the senses; and form, by their assemblage, bodies somewhat less simple, which are within the sphere of perception, and were by them called elements; a name still retained, and applied in the same sense. These are what other philosophers have called *atoms*, or *monades*. But chemists, not choosing to enter rashly into speculations of such subtlety, apply the term principle in general to all bodies, whether simple, or more or less compounded, which they obtain in their analyses. Yet as principles, considered in this point of view, are very different from each other, they have divided them into *proximate* and *remote* principles. The first are such as are separated by a first analysis, and may themselves be composed of others; as for example, in decomposing a vegetable substance, oils, mucilages, salts, and colouring matter, are separated from each other, and are the proximate principles from which, by new operations, other principles may be had. By remote principles they mean substances more simple than the former, and which enter into their composition, since they may be obtained from them. Thus mucilage, which is a proximate principle of plants, affords, by a new analysis, oil, water, and earth, which are the remote principles of the plant. Other names have also been given to these two orders of principles, such as principiated principles applied to those before called proximate, and principiant principles to those called remote. These words imply, that the first are composed of other principles, and that the last are such as serve to form or constitute others more compounded. Some chemists, for greater accuracy of distinction, admit several orders of principles. They call the most simple, or those which cannot be farther decomposed by the name of primitive, primary, or first principles. Principles composed of the most simple kind united are called secondary, or principles of the second order. Principles of the third order or ternary, are composed of these last; and lastly, those into the formation of which principles of the third order enter, are termed quaternary, or principles of the fourth order, &c.

The number of elements has not been always the same among philosophers. Some, with Thales the Milesian, who was placed in the rank of the seven sages of Greece, on account of his uncommon acquisitions in knowledge, and who, according to Cicero, was the first of the Grecians who applied himself to natural philosophy, have regarded water as the principle of all things. According to Anaximenes, air occupies this first place; and he did not scruple to deify this element, on account of its great importance. Some conferred this privilege on fire; others bestowed the chief dignity upon the earth; the leader of whom was Anaximander, the disciple of Thales, and master of Anaximenes. Every one found reasons to support his own opinion; but, as the true method of conducting chemical and philosophical inquiries was not then known, we can only esteem these early notions as speculations, void of all foundation. About three centuries after the time of these philosophers, Empedocles, a physician of Agrigentum, thinking that the simplicity of the four substances contended for as the principle of all things to be equal, united their opinions, by admitting of four elements, fire, air, earth, and water. In the succeeding age, Aristotle and Zeno adopted this opinion of Empedocles. When we reflect on the reasons that may have engaged these philosophers to regard fire, air, earth, and water, as elements, we are tempted to believe that it was not so much in consequence of the accurate knowledge they could have acquired concerning these bodies, as in consideration of the magnitude or quantity of them, and the constancy or invariability of their properties. Fire exists every where, and its effects are always the same. Our globe is surrounded by a mass of air, the quantity and essential properties of which do not seem subject to variation. Water is presented to observation on the surface of the globe, in an immense mass, that fills up or conceals its abysses or cavities. And, lastly, the globe itself, whose volume far exceeds that of all the creatures that inhabit it, seems to be formed of a solid matter, little subject to change, capable of fixing or serving as a base for the other elements. It appears, therefore, that it was from considerations, founded on the bulk and apparent immutability of these bodies, that the early sages were induced to regard them as the materials used by nature in the formation of all other beings.

The peripatetic doctrine which prevailed in the schools, preserved the Aristotelian distinction of elements, till the sixteenth century. At that period, the sect of chemists, which began to prevail against the others, admitted a new division of primary substances. Paracelsus, who was more of the artist than of the philosopher, drew immediate inferences from the results of his operations, and acknowledged five principles; spirit, or mercury; phlegm, or water; salt; sulphur, or oil; and earth. By spirit, or mercury, he understood every volatile and odorous substance, though simplicity is far from being a constant attendant on these properties. Water, or phlegm, comprehended in his system, all the aqueous and insipid products, and is liable to the same objection with respect to its pretended simplicity. The word sulphur, or oil, denoted all inflammable and liquid substances, and consequently a great number of bodies more or less compounded, as the fat and essential oils, &c. By salt, he indicated every dry substance possessing taste and solubility, qualities that belong to a great number of compounds. Lastly, the word earth was applied in the doctrine of Paracelsus, to the dry, fixed, and insipid residues of operations, all of which are now known to differ exceedingly from each other.

Beccher, a chemist, who has treated his subject in the most philosophical manner, was aware of the objections that might be urged against the doctrine of Paracelsus, and, from a conviction of its insufficiency, he took another method of arriving at the elements of bodies. He first distinguished two principles very different from each other, humidity and dryness, water and earth. He divided this last into three species; namely, the vitrifiable, inflammable, and mercurial. Vitrifiable earth, according to him, was that which alone possessed the greatest immutability; but, when mixed with some saline earth, was capable of forming the most perfect glass. He likewise attributed to it the property of rendering the combinations into which it entered solid, and little subject to change. The inflammable earth was known by the combustibility of the combinations it enters into. Beccher regarded it as the cause of smell, colour, and volatility. The mercurial earth he supposed to consist in mercury, arsenic, marine acid, &c. and its peculiar character was that of giving a very considerable volatility and specific gravity to the compounds in which it existed, two inconsistent and opposite qualities. Stahl adopted, and commented on, the doctrine of Beccher. He regarded the inflammable earth as fire fixed in bodies, and gave it the name of phlogiston. He could not succeed in demonstrating the existence of mercurial earth, and there has nothing been done to this day which at all establishes it. Stahl paid the greatest attention to combinations containing earth, water, and especially phlogiston; but he has said nothing concerning air, which Hales, nearly at the same period, proved to be a principal agent in chemical phenomena. From the time of Beccher and Stahl to the present, no change has been made by chemists in the doctrine of the elements laid down by the ancient philosophers. Like Empedocles, they have acknowledged four elements, and have considered each in two different states. 1. As free, or insulated; in the large

large masses of air in the atmosphere, fire taken in general, water, and the earth, attended to at large. 2. Or as combined; and in this state they consider the air, water, and earth, obtained from different bodies in their ultimate analysis.

Such were nearly the opinions adopted respecting the principles of bodies, from the time of Beecher and Stahl, till the valuable discoveries of Priestley and Lavoisier, on fixed air and combination, necessarily introduced new opinions. In fact, if immutability of properties, unity, and simplicity, be the true characters of elements; and if it be admitted that this simplicity no longer exists, when a body is found to be capable of decomposition, it must be remarked: 1. That among the four elements there are at present two, namely, air and water, the principles of which, art has succeeded in decomposing and separating. 2. That elementary earth is a creature of the imagination; since it is now abundantly shewn, that there are many earthy substances equally simple and incapable of decomposition. From this general enumeration of facts hereafter to be fully explained, it follows, that the true principles, or first elements of natural substances, escape our senses and our instruments; that many of those which have been called elements, on account of their volume, their influence in the phenomena of nature, and their multiplied existence in its different products, are very far from being simple and unchangeable bodies; and that probably there is no body which falls under our senses which is simple, but only appears such to us, because we do not possess the means of decomposing it. These assertions, moreover, agree with the opinions of some of the ancient philosophers, who did not regard the elements as the most simple bodies, but supposed them to be formed of principles of a far greater degree of tenuity and unchangeableness. These notions concerning those bodies, which have for so many ages enjoyed the exclusive title of elements, and to which we deny that prerogative, do not prevent us from considering fire, air, earth, and water, as containing the principles of which most natural bodies are formed, and of which we shall now treat.

OF FIRE.

Among the four bodies anciently called elements, no one appears to be more active, nor at the same time more simple, than fire. The most early philosophers, and after them philosophers in every age, have given this name to a substance which they supposed to be a fluid extremely moveable and penetrating, formed of particles continually agitated, by them regarded as the principle of fluidity and of motion. When we reflect on this subject, we shall find that these properties could only be attributed by conjecture to a body placed among the elements, since its existence has never been demonstrated; as that of the three other elementary substances has always been. It is, indeed, natural to think that this name, fire, has, in all languages and times, been given to the *impression* that heated bodies communicate, or make on the senses: and which is synonymous to the term heat, as well as to the light that bodies emit when in combustion. This is the idea which the greater part of mankind entertains; they recognize the presence of fire only by that of heat and combustion. The chancellor Bacon is one of the first who doubted the existence of fire as a peculiar fluid, and took notice that philosophers, in defining it, had always mistaken a property for a separate substance. Boerhaave, whose Treatise on Fire will always be regarded as a master-piece, was sensible of this difficulty, and, in order to render the properties of this pretended element more evident, he examined its effects on bodies wherein it is thought to exist; so that he, like all the philosophers who preceded him, has written a history of heated, luminous, rarified, burning, bodies, rather than that of fire itself. This confusion is likely to be always found in natural philosophy; for the properties of fire are necessarily connected with those of the bodies whereon it acts; so far from having it in our power to insulate it, we cannot even form an idea of its separate existence: and, notwithstanding the advanced state of chemistry, it has not been found possible to seize and confine this principle, which philosophers seem agreed to call a fluid, and whose effects they explain with sufficient facility, when, led by custom, they regard its existence as well established. These difficulties have caused several chemists, and in particular Macquer, to believe, that fire is nothing else but light, and that heat is a modification of bodies arising from the motion and collision of their particles. This opinion no longer exists among philosophers who cultivate the science of chemistry. To form an adequate notion of the different theories proposed for some years past, respecting fire, we must not confine attention to general positions. The ideas we should deliver, would be as vague as the subject itself. The only method of attaining exactness, is to divide the subject, and examine its operations of light and heat, attributed to combined fire, formerly called phlogiston.

OF LIGHT.

The physical properties of light are, elasticity, weight, reflection, and transparency. It would be difficult to make experiments on this part of natural philosophy, without entering into disquisitions which do not belong to this article. Such are in general the properties of light as free, or as emanating from the sun and the fixed stars. Let it be our province to consider it chemically, or in the mode in which it acts upon bodies, forms combinations, decompositions, &c.

Effects of light upon acids.—If concentrated nitric acid be poured into a decanter, with a stopper of crystal, and exposed to the sun's rays, in a certain time the decanter will be full of red vapours, and become nitrous. If oxygenated muriatic acid be exposed to the light, oxygen gas is produced. For this purpose, the muriatic oxygenated acid is to be poured into a decanter; adapt thereto a glass tube, which is to pass under the bell-glass of an alembic, or jar of the pneumatic machine, hereafter to be described; care must be taken that the tube do not touch the acid. The light striking directly upon the liquor, decomposes this acid; one part of the oxygen oxyds the manganese which was employed in oxygenating the muriatic acid, and the other is disengaged in the state of oxygen gas: thus we readily obtain common muriatic acid.

Effects on metallic oxyds.— If red oxyd of mercury be exposed to the rays of the sun, the oxyd will be decomposed; the oxygen it contains, which makes it an oxyd, will be disengaged, and the metallic oxyd will recover its natural state. Metallic salts may also serve as proofs to shew the action of light. Muriat of silver is thus prepared: Take nitrat of silver in solution; add muriatic acid thereto; it attacks the oxyd of silver, and forms an indissoluble salt, which is muriat of silver. Expose this muriat to the light, on a piece of glass which has black paper pasted underneath it: in a few hours it will be seen that the light has acted only on the surface; the salt is reduced to the metallic state; but where the light has not penetrated there is no decomposition.

Effects on vegetation.—Light is hurtful to the growth of seeds. Put the seeds of cresses on a bit of cork wrapped up in blotting-paper; leave it to float on the water; if deprived of light, you will see how quickly they will shoot up, compared with such to which light is admitted. The more light they are exposed to, the more tardy are the seeds in growing up; so that the brightest light, that of the sun, is always the most hurtful to them.

Light presents another very curious phenomenon: Place a certain number of leaves in a bell-glass full of water; reverse it, and expose it to the action of caloric; a gas will be disengaged from the leaves, which, besides many other properties, will have that of being improper for

for combustion. If, on the contrary, the same apparatus be exposed to the sun's rays, a gas will be produced which has the property of being fit for combustion: which shews clearly that the production of this fluid arises from the influence of the light upon the leaves.

Light changes the colour of vegetable substances; deprived of light, they become pale and insipid, and are what we call *etiolated*. Plants grow very well in perfect darkness, and even increase faster than in the sun, provided the air which surrounds them be respirable. The mode the gardeners use for the *etiolation* or bleaching of endive, celery, lettuce, &c. is well known; when come to a certain height, they bind them round, or earth them up, and thus deprive them of all contact with the light. Maturity and the resinous principle are properties which depend thereon. An observation made by M. Humboldt, might lead to useful inquiries on the subject of etiolation, He found that several plants of the class cryptogamia, (see BOTANY, vol. iii. p. 279.) such as the lichen verticellatus, push out green stalks, though placed in mines, where the light has no access to them; and that several of the gramina, the poa annua and trefolium arvense in particular, have green leaves, when growing in the galleries of certain mines, at the depth of sixty toises below the surface of the earth. Examining the air in these situations, he found that it was mingled with hydrogenous gas. It would seem, from this casual observation, that the presence of hydrogenous gas compensates, to a certain extent, in vegetation, for the absence of light. M. Ingenhousz has also remarked, that when hydrogenous gas is mingled with the air in which vegetables grow, the verdure of the latter acquires a much deeper shade. M. Humboldt also mentions, that he has discovered another species of lichen in the mines at Marienburg, which had ramifications of a bright green colour. He also found, that the cheiranthus incanus, and cheiranthus cheiri, placed in certain circumstances, push out green leaves, without the presence of light. He imputes these singular phenomena to the hydrogenous gas uniting with the excess of oxygen, which he supposes to be present in etiolated plants, and to be the immediate cause of their etiolation. See *Journal de Physique*, part 2d, for 1793.

The more plants are exposed to the solar rays, the more colour they acquire. Such, therefore, is the origin of those colouring matters, of so much value for their liveliness and durability, which many of the eastern nations extract from woods, bark, and roots, &c. and which the utmost industry of the European dyers has not succeeded in imitating. But colour is not the only property that is obtained by vegetables from the contact of the rays of light. Taste, odour, and combustibility, are likewise derived from the same source. Light contributes greatly to the maturity of fruits, and is the cause why, under the burning sun of South America, vegetables are in general more odoriferous, of a stronger state, and more abounding with resin. From the same cause it happens, that hot climates seem to be the native country of perfumes, strong smelling fruits, dying woods, and resins, of various kinds. Lastly, the action of light is so powerful on the organism of vegetables, as to cause them to pour forth torrents of vital, or pure air, from the superior surface of their leaves into the atmosphere, while exposed to the sun-shine; whereas, on the contrary, when in the shade they exhale nothing but a noxious fluid, or true acid, similar to that obtained from chalk. This important discovery, due to Dr. Priestley, and more minutely inquired into by M. Ingenhousz, shews, in a striking manner, the influence of light on vegetation.

We see, likewise, that the influence of light upon living animals has a very sensible effect: earth-worms and woodlice are whitish; birds of night, and moths, are distinguished from birds who seek the light, and from butterflies, by their pale imperfect colours: there is a difference also between those of the north and those of the south. Animals accustomed to the light, on being deprived of it, fall sick, and even die. If a man be long shut in a dark dungeon, pustules filled with watery matter, arise on the skin, and he becomes dropsical.

Dr. Hutton, of Edinburgh, has lately pointed out a new principle in the action of light, considered as a power influencing the temperature of bodies; and has applied this principle to the explanation of various phenomena. Dissertation on the Philosophy of Light, Heat, and Fire, 1794. The following are his speculations upon that subject: he observes, that the efficacy of the different species of light, in raising the temperature of bodies, is not proportioned to their action upon the sense of vision. The influence of the red light from a fire of coals, and of the white light from flame, upon the thermometer, were compared together: when the intensity of their action upon the organ of sight was apparently the same, it was found that the effect of the red light upon the instrument was incomparably greater than that of the white light. When bodies are heated to incandescence, they emit light, in which the white or compound species prevails; but, as their temperature diminishes, the light gradually becomes of the red species. It would appear, from this observation, that the light emitted from bodies, while they pass from the state of incandescence to the common temperature of the atmosphere, has its power of exciting vision diminished in a greater ratio than its power of influencing temperature. When the light emitted from a body ceases to be visible, we are not to conclude that the body ceases to radiate light. The fact proves no more, but that the light radiated is unable to excite our sense of vision. This light emitted from bodies, without affecting sensibly the organ of sight, is called, by Dr. Hutton, obscure or invisible light.

We have seen that the light emitted from bodies, as they pass from the state of incandescence to the common temperature of the atmosphere, has its power of exciting vision diminished in a greater ratio than its power of influencing temperature. It may therefore happen, that our obscure or invisible light shall still retain the power of sensibly influencing temperature; and this suspicion will be confirmed, if we find that a substance exhibiting the distinctive properties of light is radiated from a body of elevated temperature, but not luminous; and if we find that this radiated substance is capable of raising the thermometer. But this is precisely what happens in the experiments made by Saussure and Pictet. Two concave mirrors are placed opposite to one another, at the distance of many feet, the bulb of a thermometer is in the focus of the one, and a glass matrass, filled with boiling water, or an iron bullet heated so as to be just not visible in the dark, is placed in the focus of the other. A substance is radiated from the matrass or iron bullet; it passes with incalculable velocity through the air; is reflected from the mirrors, and concentrated according to the laws of light, and then influences the thermometer placed in the focus, according to the degree of its concentration.

It is supposed by Saussure and Pictet, that the substance radiated in these experiments, is not any species of light, but what Lambert and Saussure calls *chaleur obscure*; that is, caloric unaccompanied with light. But the properties of this radiation, its velocity and reflexibility, identify it with light, while they are inconsistent with the slow diffusion of caloric, and with the known disposition of caloric to be arrested by the bodies through which it passes, or with which it comes into contact. The above experiment, made by M. Pictet, serves to confirm this reasoning. He blackened the bulb of his thermometer, and found that it was then more speedily influenced by the radiation than before, and that it rose to a greater height. But it is notorious, that black surfaces absorb light more powerfully than white surfaces do, and have their temperature more considerably affected by it. It may be urged, in objection to this conclusion, that if we suppose

suppose the thermometer dilated by the reflected and concentrated light, why should not that light be rendered visible by the concentration? Dr. Hutton conceives, that, since the peculiar efficacy of this light, in affecting the temperature of bodies, must depend on its greater aptitude to combine with them, this same disposition for combination, will disqualify it from appearing as light. At the same time, he leaves to experimentalists to determine how far this species of light, after having once disappeared to our senses, is incapable of becoming again visible; unless the temperature of the body with which it has combined, be raised to the degree of incandescence, in which case it may possibly be emitted from the body, as visible light. Taking it for granted that the emanation which affects the thermometer in these experiments, is invisible light; we learn, from the same experiments, compared with others made by Marriotte and Scheele, that this invisible species of light is much absorbed in passing through a glass lens, while it is but little diminished, in being reflected by a metallic surface.

Dr. Hutton afterwards proceeds to analyse M. Pictet's curious experiment of apparently reflected cold: it will, however, be unnecessary to repeat this part of his work; for, although his observations on the phenomena of that singular experiment appear to be exceedingly just, and his doubts respecting the course of the radiation to be founded on the most solid grounds, yet he has left the subject in a state of confessed uncertainty; having merely pointed it out, without having performed any of the experiments necessary for its elucidation. In the course of his observations on this experiment, he is led to propose another hypothesis respecting invisible light. He supposes that bodies are constantly radiating invisible light, in proportion to their temperatures; and that this invisible light falling upon other bodies, raises their temperature, or is reflected by them, according to their respective natures. At the same time, the sensible heat of bodies (the free caloric) is always tending to equilibrium, according to the laws of its diffusion, and in consequence of the mechanical operation of the elastic fluids conveying it from place to place. From the combination of these causes, the temperature of bodies is always tending, on the one hand, to equality; and this perfect equality is, on the other hand, prevented from actually taking place, by the different dispositions of bodies to absorb invisible light, and to have their temperatures affected by it. Dr. Hutton applied this theory to explain M. Pictet's experiment, and at the same time suggests an experiment, by which he conceives the truth of his own theory may be confirmed, or its fallacy discovered. It may be worth while to add, that M. Prevost, of Geneva, has published some speculations, extremely analogous, in many respects, to Dr. Hutton's views upon this subject; with this difference, that what Dr. Hutton calls invisible light, M. Prevost, conformably to Saussure's opinion, terms *chaleur rayonnante*. *Recherches Physico-Mechaniques sur la Chaleur*, 1792.

It is, after all, impossible for chemists, in the present state of the science, to decide, whether the light emitted during combustion, be derived principally from the combustible body, or from the oxygenous gas? For it seems improper to derive it exclusively from either, when there is reason to believe that it enters into the composition of both. It must be confessed, indeed, that the evidence for light being a constituent part of oxygenous gas, is far from being unexceptionable. The principal argument is taken from the singular influence of light, in separating oxygen from its combinations, and making it assume the state of oxygenous gas. Light, as we have seen, disengages oxygenous gas from the nitric acid, from the oxygenated muriatic acid, and from the oxyds of several metals. But in these, and many similar instances, does the light combine with the oxygenous gas? Or, does it unite with the substance from which the oxygen is separated? There is no fact in chemistry that will enable us to decide between these two hypotheses; and those chemists who, with Fourcroy, regard light and caloric as two substances essentially different, have absolutely no reason for inclining to the one hypothesis, in preference to the other. The existence of light, as a constituent part of combustible bodies, is proved in the most satisfactory manner, by the experiments of Deiman, Paets, and Van Trootswyck. These chemists exposed a mixture of sulphur and zink to a high temperature, without any substance being present, from which they could derive oxygen. At the instant when the sulphur and zink formed a sulphure, there was a vivid emission of light; and, when the materials were afterwards examined, it was found that no oxydation had taken place. This experiment succeeds with other metals, besides zink; such as copper, tin, lead, and faintly with iron. It has been tried with equal success in vacuo, above mercury, and in hydrogenous, azotic, and carbonic acid, gases.

It has been for a long time a desideratum in chemistry, to possess a method of measuring the quantity of light emitted from bodies in the state of combination. Count Rumford has published, in the Philosophical Transactions for 1794, the description of a very simple instrument, which he has contrived for this purpose. The following are the principle results of his experiments with this instrument, which is called a *photometer*. The transparency of air is so great, that the diminution which light suffers in passing through sixteen or eighteen feet of air, is not perceptible with this instrument. Somewhat less than 2-10ths of a beam of light are lost in passing through a pane of fine, clear, transparent, well-polished, glass, such as is commonly made use of in the construction of looking-glasses; somewhat more than 3-10ths are lost in passing through two panes of such glass; and about 12-100ths, in passing through a pane of thin colourless window-glass. The light fell perpendicularly upon the glass in these experiments; but the loss was very little greater in oblique incidences, provided the angle of incidence did not exceed 40° or 50°. Somewhat more than 1-3d of a beam of light was lost by reflection from a very excellent glass mirror; and about 46-100ths, from a common looking-glass. The angle of incidence was 45°, and the result was not sensibly affected by increasing the angle to 85°. Count Rumford has collected, in the following table, the results of his experiments on combustion. It is to be observed, that each of the under-mentioned articles is supposed to afford the same quantity of light; the table denoting how much of each must be employed for that purpose.

		Equal parts in weight.
Bees wax.	A good wax candle, kept well snuffed, and burning with a clear bright flame	100
Tallow.	A good tallow candle, kept well snuffed, and burning with a bright flame	101
	The same tallow candle, burning very dim, for want of snuffing	229
Olive oil.	Burned in Argand's lamp	110
	The same burned in a common lamp, with a clear bright flame, without smoke	129
Rape oil.	Burned in the same manner . . .	125
Lintseed oil.	Likewise burned in the same manner	100

Count Rumford concludes his paper with an account of some experiments on the transparency of flame; from which it appears that light sustains no sensible diminution in consequence of passing successively through the flames of several candles.

OF CALORIC.

Caloric, as we have seen above, is a substance which produces the sensation of heat. The caloric of the French chemists is the phlogiston of Stahl and Priestley,

ley, synonymous with the igneous fluid of Lavoisier, with the absolute heat of Dr. Crawford, and with the matter of heat of La Place. These terms express a particular kind of matter, or a particular quality of matter, which exists under a variety of modifications that are mutually convertible. One of these modifications is *free* caloric. It is in this state that caloric affects animals with the sensation of heat, and that it expands in every direction the bodies into which it enters. Free caloric is synonymous with the expressions of interposed caloric, uncombined caloric, thermometrical fire, and caloric of temperature; and was formerly called *sensible heat*. It is communicated in general to bodies in three ways: 1. By contact with a heated body. 2. By friction. 3. By the act of combination. Dilatable bodies are so only by the caloric passing from one body to another; according to which circumstances we have dilatation or condensation of liquids; an operation which points out the construction of thermometers. The action of caloric may be considered as tending to destroy aggregation, and to promote combination: this happens from *melting*. This object may be explained under four principal heads: 1. There are bodies which are not altered, but only dilated, by heat. 2. Caloric causes bodies to pass from the solid to the fluid state: this phenomenon is called *fusion*, and those bodies are called *fusible bodies*: such are sulphur, lead, &c. This fusibility, when carried farther, is called *volatilization*; and bodies susceptible of this property, are called *volatile bodies*: such are benjamin, boiling water, &c. Those which have not this property are called *fixed*. There are several degrees of this volatility: the *ultimatum* is bodies melted into gas. 3. Bodies decomposable without alteration, which constitutes the true analysis. One of the bodies is always fixed; the other volatile: as, oxyd of red mercury, &c. 4. If bodies exposed to the action of caloric, be composed of several principles, volatile and fixed, the volatile parts unite, and the fixed combine also; hence new compositions are produced: this is called *false* analysis.

All bodies contain two distinct portions of caloric; viz. the combined caloric, and the interposed or disengaged caloric. Combined caloric is that which is fixed to bodies by the force of affinity or attraction, constituting a part of their substance, even of their solidity. Interposed caloric is that which, without being engaged in any combination, is found between the molecules, or elementary particles, of bodies. A familiar example will render the difference between these two portions of caloric more clear. A piece of bread put into water contains two distinct portions of water; one portion is in a state of combination, and forms a constituent part of the bread; the other is only interposed between the particles; it appears as water, and escapes by pressure.

Caloric is also to be distinguished from heat, because we must not confound the *effect* and the *cause* under the same denomination. Heat is only the effect produced upon our organs by the passage of the caloric which is disengaged from the surrounding bodies. When we touch a cold body, the caloric passes from the hand into the body we touch, and we feel the sensation of cold; when we touch a hot body, the caloric passes from the body to the hand, and we have the sensation of heat. But all bodies do not furnish equally a free and easy passage to caloric. Here, then, we must distinguish, 1. Caloric conducted; 2. Caloric stopped or obstructed. Metals, and most liquids, furnish examples of the first point. If one end of an iron wire be held in the flame of a candle, the person soon feels a sensation of heat. If, on the contrary, you take a coal, lighted at one end, and touch at a little distance from the burning end, no sensation of heat will be produced. The reason of these effects is, that the caloric is quickly propagated or conducted through the elementary particles of the iron, while the particles of the coal resist its passage. Glass, resins, silk, wool, straw, &c. resist the passage of caloric more or less; or, in other words, they are good or bad conductors of heat. From a due consideration of these effects, it may be seen what useful applications may be made in the arts, and even in the common concerns of life, by the medium of these properties. The property which bodies have of absorbing a quantity of caloric, is called their *capacity*. Thus, to raise to the same number of degrees the temperature of two bodies equal either in mass or in volume, it is generally necessary to communicate to them unequal quantities of caloric. Regarding caloric as an eminently elastic fluid, which is always tending to expand, according to certain laws peculiar to itself, it is said that caloric tends constantly to the state of equilibrium; and upon this property of caloric is founded the use of thermometers. When a mercurial thermometer is immersed in water, the caloric of the water makes an effort to diffuse itself through the mercury, and the caloric of the mercury makes an effort to diffuse itself through the water. If the tendencies to expand be equal in these two quantities of caloric, both quantities will remain at rest; the mercury will neither be expanded by the entrance of caloric from the water, nor will it be contracted by the loss of any part of its own caloric. But when the tendencies to expansion are unequal, the caloric is impelled from the substance where it had existed in the state of the greatest tension, into the substance where it had existed in the state of the least tension; and this flow of caloric continues till the forces expanding it are in equilibrium. When this happens, the degree of dilatation of the mercury, or other fluid employed in the construction of the thermometer, is said to indicate the temperature of the substance to which it is applied.

Caloric is constantly tending to the state of equilibrium, though it passes with different degrees of facility through different substances. Bodies are hence said to be more or less permeable to caloric, or to conduct caloric more or less readily. When equal quantities of water, at different temperatures, or of any other homogeneous substance suited for such experiments, are mixed together, the caloric flows from the quantity which has the highest temperature, and diffuses itself through the quantity which has the lowest temperature, till the forces expanding it are in equilibrium in every part of the mass; and it is then found that the temperature of the mass is the arithmetical mean between the temperatures of the two quantities that had been originally mixed together. When equal quantities of two different substances are taken, and mixed together at different temperatures, the caloric, as in the former case, flows from the body which has the highest temperature, and diffuses itself through the body which has the lowest temperature, till the expanding forces are in equilibrium, and consequently till both substances have acquired the same temperature; but the temperature of the mixture is no longer, as in the former case, the arithmetical mean between the temperatures of the two substances that had been originally taken. In every known instance it deviates from that mean, approaching more or less to the temperature of one of the substances employed. An example will illustrate this fact, and the conclusion to be deduced from it. When a pound of ice, at 32°, is mixed with a pound of the white oxyd of antimony by nitre (diaphoretic antimony), at 27°, the uniform temperature of the mixture is 31°; the ice having lost 1° of temperature, and the oxyd of antimony having gained 4°. Now, the oxyd of antimony receiving precisely as much caloric in this experiment, as is taken from the ice, it follows, that the same quantity of caloric, which is capable of raising the temperature of the oxyd of antimony 4°, is capable of raising the temperature of the ice only 1°, since the abstraction of it has reduced the temperature of the ice only 1°. This fact is expressed by saying, that the capacity of the white oxyd of antimony for caloric, is to the capacity of ice for caloric, as one is to four; that is, the capacities of bodies for caloric express the relative quantities of caloric,

caloric, which are necessary to raise the temperature of equal quantities of these bodies the same number of degrees, provided the bodies do not change their state or form, while this increase of temperature takes place. Lavoisier and La Place have employed the language of specific heat, to express the same idea.

Temperature denotes the state by which a body possesses the power of exciting the undefinable sensations of heat or coldness; and it is to be observed, that the words temperature and heat are here taken in the most extended sense. The organs of the human frame are not only imperfect when applied to measure the temperatures of bodies, but likewise exceedingly limited in this as well as in every other similar case. Temperature is therefore used to express every degree of heat or coldness, whether within the limits of perception or not, and is appreciated by the observation of its effects on bodies. *Heat*, considered as the cause of temperature and of other effects, is for ever subject to variation. It is therefore an object of mathematical inquiry, as possessing quantity either absolutely, or in the same sense as various attributes, such as ratios or motion, are said to possess it. But it is no part of this inquiry, whether heat be motion or matter. Perspicuity requires that these objects should be separately attended to.

Bodies in contact, or communicating with each other, do, after a length of time, assume or acquire one common temperature; but the time of acquiring the common temperature is different in different bodies. When the temperature of a given solid is increased, there is a certain period at which it becomes fluid; and, as the temperature is increased beyond this last point, the fluid takes a rare and elastic form, with more or less rapidity forming vapour. Whether an increase of temperature would convert vapour into a fourth state, namely, that of a permanently elastic fluid, or air, has not been decided; but it is probable. The temperatures at which different bodies assume the fluid of vaporous states, are exceedingly various. Some bodies, as for example, mercury, are not frozen but by extreme cold: others, as rock crystal, cannot be melted, but by the most vehement heat modern chemistry can excite: others again cannot be brought into some of the states; and of these the rule is inferred from analogy, till future experiments may tend to clear up the point. The importance of the theory of heat, however in chemical operations, requires a more strict and critical investigation of the subject than has hitherto been given.

Axiom 1. The quantities of heat in two equal bodies of the same kind and temperature are equal.

Theorem 1. The quantities of heat in bodies of the same kind and temperature are as their masses.

Theorem 2. Two equal bodies of the same kind, but different temperatures, being brought into contact; the hotter will impart half its surplus of heat to the other. For they will acquire a common temperature by contact, and by that means, the quantities of heat will be made equal. This can only be effected by the hotter body imparting half its surplus.

Theorem 3. Two bodies of the same kind, but different temperatures, being brought into contact; the surplus of heat, by means of which the one exceeded the other in temperature, will be divided between the two bodies in proportion to their masses. For they will acquire a common temperature, and the whole quantity of heat in each will then be in proportion to its mass. This can only be effected by dividing the surplus in the same proportion.

Corollary 1. The quantities of heat required to be added to, or taken from bodies, of the same kind, to bring their temperature to a given standard, will be as their masses.

Corollary 2. Hence a thermometer, with a very small bulb, may be considered as possessing the temperature of the body it is in contact with, because the common temperature will not sensibly differ therefrom when the body is of considerable magnitude.

The mercurial thermometer nearly measures the true increments of temperature. This is determined by an experiment of De Luc: let a thermometer be graduated so as to show the equal increments of the expansion of the mercury; and the common temperature of two equal bodies of the same kind in contact (as for example, measures of water) will be nearly the arithmetical mean between the two original temperatures, as shown by such an instrument. The instrument therefore gives results nearly agreeing with deductions made from the general phenomena of heat, or it nearly measures the true increments of temperature.

Axiom 2. If two equal masses at different temperatures be brought into contact, and the common temperature be either higher or lower than the arithmetical mean, the surplus of heat, by means whereof the one exceeded the other in temperature, will be unequally divided; and the disposition to be heated, or the capacity or affinity for heat, is greater in one body than in the other.

Theorem 4. The capacity of equal masses for heat are inversely, as the changes of temperature they undergo, when differently heated and brought into contact: and the contrary. For the surplus of heat is divided into equal parts by the thermometer: of these parts, the hotter body loses a certain number by communication to the colder, and retains the remainder. The number of degrees lost, constitutes the change of temperature in the hotter, and the remainder is the change in the colder. But causes are ever proportional to their effects; therefore the capacities are as the proportions of heat retained by each, that is, inversely as the changes of temperature.

Corollary 1. Hence if any given body, as for example, fluid water, be assumed as a standard, the capacities of other bodies being experimentally found, may be ranged numerically, so as to form an useful table.

Corollary 2. The quantities of heat required to be added to or taken from bodies of equal mass, to bring their temperature to a given standard, will be as their capacities.

Corollary 3. The quantities of heat required to be added to or taken from bodies in general, to bring their temperature to a given standard, will be as their masses, and their capacities jointly.

Corollary 4. The capacities, in general, will be directly as the quantities of heat so taken, and inversely as the masses; or they will be in the inverse ratio of the changes of temperature, and the masses of two bodies placed in contact. This, in the form of a practical rule, is, Multiply the weight of each body by the number of degrees between its original and the common temperature, and the capacities of the bodies for heat will be inversely as the products.

Theorem 5. The whole quantities of heat contained in the bodies of equal mass and temperature are as their capacities. For if the temperatures of various bodies be supposed gradually and equally to diminish till the absolute privation of heat be obtained, the quality of heat given out in any portion of the time will be proportional in each body to its capacity. And the whole time being made up of such portions, the respective sums of the quantities of heat given out by each body will be in the same ratio. It is the business of experiment to determine whether the ratios of the capacities be the same in all temperatures, *cæteris manentibus*.

Scholium. From the foregoing theorem, many writers have called a table of capacities by the name of a table of specific heats. These terms, which seem improper, or at least unhappy, because applied to quantities that continually fluctuate, have certainly rendered the theory of heat less easy to beginners.

As far as experiments have hitherto been made, it is found

found that the capacity of a given body for heat is least when solid, greater in the fluid state, and greatest in the vaporous state. Thus for example, ice and water being exposed in equal quantities to similar heating matters, as before a fire, the ice will be melted without increase of temperature, while the water acquires 162° of Fahrenheit's thermometer. Or equal parts of water at 162, and ice at 32° being mixed, the ice will melt, and the whole, instead of the mean temperature, will remain at 32°. In either case the ice requires 130° of heat, which produces no other effect than rendering it fluid, and is not shown by the thermometer. So likewise the condensation of steam, though little if at all hotter than boiling water, communicates much more heat to a refrigeratory, than the same quantity of water equally hot, and therefore it contained more heat. The quantity of heat which constitutes the difference between the several states of the body, has been improperly called *latent* heat.

Problem. The ratio of the capacities of the same body in the solid and the fluid states, and also the number of degrees the fluid would increase in temperature by the heat which would simply melt the solid, being given; it is required to determine the number of degrees of the same thermometer, between the natural zero, or *absolute privation of heat*, and the temperature of the solid just melting.

The whole quantity of heat in the solid, when just melting, will be denoted by the number of degrees of its temperature from the natural zero: and the whole quantity of heat in the fluid will be denoted by the same number added to the number of degrees the temperature of the solid would have been raised by the heat applied to melt it, if its capacity had not been changed by melting. This last number consists of the observed increase of temperature in the fluid augmented in the inverse ratio of the capacities. Now the capacities of the solid and fluid being as their whole quantities of heat, it will follow that

The difference between the numbers expressing the capacities,

Is to the number expressing the capacity of the solid;

As the difference between their respective quantities of heat in the thermometrical degrees of the solid,

Is to the number of degrees expressing its whole quantity of heat, or its temperature from the natural zero.

This in the form of a practical rule, is, Multiply the number expressing the capacity of the fluid into the number of degrees the fluid would have increased in temperature by heat sufficient to melt the solid; divide this product by the difference between the numbers expressing the capacities, the quotient will be the number of degrees of temperature from the natural zero. From experiment, it appears, that the natural zero is 1268° of Fahrenheit's scale below 0, or 1300 degrees below the freezing point of water.

Corollary. The difference between the zero of any scale, and the natural zero, being once determined from experiment, it will be easy in all cases, where any two of the three quantities, the capacity of the fluid, the capacity of the solid, and the number of degrees the fluid would be raised by heat sufficient to melt the solid, are given, to find the third.

The foregoing theory of heat may be applied to explain all the changes of temperature in bodies, from the utmost violence of ignition to the most intense cold. For whenever by condensation or freezing, or by a change in the chemical combinations of bodies, the capacities are diminished, a part of the heat contained will be applied in raising the temperature. And, on the contrary, cold will be produced whenever bodies are melted, or evaporated, or any chemical process goes forward, by which the capacities are increased.

The diminution of temperature produced by evaporation, had been observed by Marian, and accurately described by Richmann; but it was first referred to its proper cause by Dr. Cullen, in his Essay on the Cold produced by evaporating Fluids. In the 78th volume of the Philosophical Transactions, Dr. Darwin has related several experiments, to prove that a diminution of temperature takes place when the air is mechanically expanded; and conversely, that the temperature rises when the air is condensed. He has applied this doctrine with great ingenuity to explain a variety of curious phenomena. Dr. Cullen had observed that a thermometer suspended in the receiver of an air pump, sinks always two or three degrees while the air is exhausted.

The grand question, whether heat be merely a vibration of the parts of bodies, or a peculiar fluid, is not decided. If heat be merely vibration, it will be scarcely possible to account for its not being universally communicated to bodies according to their masses, as the established laws of motion require; but if heat be a peculiar fluid, the notion of a greater or less capacity for that fluid, whose variations of density will be the cause of change of temperature, will very naturally account for the different quantities required to be imbibed or given out by bodies of equal weight, before a like density or temperature can be produced in all. Neither will it be at all difficult, according to this hypothesis, to give very probable accounts of what happens when bodies change their states of solidity, fluidity, or vapour. But the various theories respecting heat, considered as matter, and a component part of bodies, are not sufficiently grounded on decisive facts, to admit of a cursory discussion, or indeed to be ranked with the established doctrines collected and arranged in this place; though it must be allowed that several of them do honour to the genius and abilities of their inventors. The late Dr. Black of Edinburgh, Professor Wilcke of Stockholm, Dr. Irwine of Glasgow, Dr. Crawford of London, are among the leading names of philosophers who invented and illustrated this excellent theory; and it is sincerely to be wished, that some cotemporary writer would settle their respective claims before the lapse of time shall have rendered it difficult.

There are two opinions concerning the change of temperature which bodies undergo when they change their state or their mode of combination. By such changes it is found that heat is either absorbed or given out; or to speak more unexceptionably, the alterations of temperature are either less or greater than would have been inferred from general reasoning. Some philosophers say, that the capacities of the bodies are changed, and therefore require more or less heat to occasion similar mutations of temperature than they did before; others affirm, that the heat which disappears or appears has no relation to the capacity, but is either received in combination, as a principle of bodies, or given out as such. These positions are not matter of opinion, but relate to facts, about which philosophers will acquire more knowledge by experiment than by reasoning. If the natural zero be determined truly by Dr. Irwine's theorem, noted above, and the capacities of various bodies in their states of solidity and fluidity, be found from direct experiment, the corollary to that theorem will give the number of degrees the fluid would be raised by heat that would simply melt the solid. If this deduction should be found in all cases to agree with the facts, the former opinion is true; but if not, there is a portion of heat not accounted for, which, if heat be matter, may probably be a principle of bodies.

There are two methods of determining the capacities of bodies for caloric. The one consists in mixing together equal quantities of different bodies at different temperatures, and observing the temperature of the mixture as soon as it becomes uniform. The capacities of the bodies are in this case inversely, as the changes of temperature. The other method consists in raising the temperature of different bodies to the same degree, enclosing equal quantities of them separately in a sphere of ice, and collecting the quantity of water which is obtained from the thawing of the internal surface of the ice, while the

the body placed within it is cooled down to the temperature of 32°. The capacities in this case are directly as the quantities of ice melted. The first of these methods has been practised by Dr. Crawford. The second was contrived by Lavoisier and La Place. It is still a question among chemists, whether the whole quantities of caloric contained in equal weights of different bodies, having the same temperature, be proportioned to the capacities of these bodies? It has been ascertained, that in many chemical changes, caloric disappears, is absorbed, or becomes *latent*; while, in the converse of these changes, precisely the same quantity of caloric re-appears, is evolved, becomes free or sensible. Thus, when a pound of ice at 32° is mixed with a pound of water at 167°, the ice is liquefied, but the temperature of the mixture continues at 32°; that is, ice absorbs as much caloric in thawing, as would raise the temperature of an equal quantity of water 135°. In the same manner, when water at 212° is converted into steam, the steam absorbs as much caloric without having its temperature increased by it, as would raise the temperature of an equal quantity of water 943°, if the water were not convertible, at that temperature, into steam. But the capacity of steam for caloric, is greater than the capacity of water, and the capacity of water is greater than the capacity of ice. Consequently, more caloric will be necessary, to give water the temperature of 32°, than to give ice the temperature of 32°; and more will be required to give steam the temperature of 212°, than to give water the temperature of 212°. It may then be questioned, whether the whole caloric that disappears in the melting of ice, and in the conversion of water into steam, has been absorbed by the water and steam respectively, in consequence of their change of capacity? Or, whether some part of it has not been chemically united with the water and steam respectively, in such a manner as not to affect their temperatures? Dr. Crawford inclines to the former of these hypotheses; the French chemists are disposed to admit the latter.

It is principally with the view of determining whether the specific caloric of bodies be proportioned to their capacities, that the inquiry after the real zero, or point of total privation, has been pursued. It is taken for granted, in this inquiry, that whenever caloric is absorbed or evolved by a system of bodies, the quantity absorbed or evolved has the same ratio to the whole caloric existing in the system after the experiment is concluded, which the difference between the former and present capacity of the system has to its present capacity. An example will illustrate the manner in which the real zero is calculated from these principles. When ice is converted into water, its capacity is increased in the ratio of nine to ten, according to Kirwan; and as much caloric is absorbed, according to La Place, as would be sufficient to raise the temperature of water 135°. Let us suppose that the whole of this absorption depends on the change of capacity in the ice; it will follow, that 1-10th of the whole caloric contained in water at 32°, is sufficient to maintain the temperature of the water at 135°; and, consequently, the remaining 9-10ths will be able to maintain its temperature, $135° \times 9° = 1215°$. That is, the whole caloric contained in water at 32°, is sufficient to communicate the temperature of 1350° to a body, having the same capacity with water; and therefore the absolute zero, or point of total privation, as determined by this calculation, is 1328° below 0 of Fahrenheit's scale.

When we consider the expansive power of caloric, and its consequent tendency to the state of equilibrium, it is evident that the real zero, or point of total privation, must be the same in bodies of every kind; and the preceding calculation will therefore conduct us, in every instance, to the same point, provided the principles on which it is founded are just, and provided the necessary experiments have been made with accuracy. It is in this view, that the inquiry after the real zero, serves to ascertain whether the hypothesis be true, that the specific caloric of bodies is proportioned to their capacities. For, if different experiments shall, without exception, indicate the same point, as the absolute zero, it may be inferred, that the hypothesis in question is just; and, on the contrary, if the conclusions from different experiments shall disagree, and if their differences be greater than what may be reasonably allowed for, on account of the difficulty of conducting experiments of so great nicety, it may be inferred, that the specific caloric of bodies is not proportioned to their capacities; that the absorption and evolution of caloric, in different processes, depend not entirely upon the changes of capacity in the substances employed, but, in some measure, on the entrance of caloric into chemical combination. The experiments that have been hitherto made, to ascertain the real zero, are not sufficiently numerous, nor sufficiently free from objections, to authorise either of the preceding conclusions, though they are infinitely more favourable to the latter than to the former.

The diffusion of caloric among a system of bodies, which was thought analogous to motion, seems to depend on two causes; on their respective capacities for caloric, and on their respective conducting powers. M. Pictet has illustrated the manner in which these causes co-operate, with singular perspicuity. It is impossible to place the subject in a clearer point of view than by a free translation from his work. Let us suppose a focus, from which flows a constant and uniform stream of caloric; and let us place at equal distances from this focus, and connected with it by the same medium, a number of bodies, having the same nature, and the same magnitude. These bodies will be filled with caloric in the same manner, their temperatures will rise by similar gradations, and will cease to rise when the caloric they contain shall have acquired an expansive power sufficient to resist the introduction of more caloric from the focus. But let us place at equal distances from the same focus, a number of bodies, having the same weight, and differing in their nature, such as a pound of water, a pound of glass, a pound of mercury, &c. These bodies will be filled with caloric as the former bodies were, and they will arrive at length at the same common temperature, but in different times, and by dissimilar gradations. This difference will depend on the combination of two causes. The one is, the different permeability of the bodies to caloric, or their different conducting powers, in consequence of which caloric will take a longer or shorter time to penetrate their substance. The other is, the different capacities of the bodies for caloric, in consequence of which they will require unequal quantities of free caloric to arrive at the same common temperature; that is, to the state in which the free caloric of the whole system of bodies tends to expand itself with the same force.

We have little accurate information respecting the permeability of bodies to caloric. We owe to Dr. Franklin the observation, that the non-conductors of electricity are also bad conductors of caloric, and that the best conductors of electricity are also excellent conductors of caloric. We have examples of this analogy between the electric fluid and caloric, in metals upon the one hand, and in glass and resinous substances on the other. But this rule is liable to many exceptions. The common torricellian vacuum affords a ready passage to the electric fluid; but Sir B. Thompson found, that it was less permeable to caloric than atmospheric air, which itself is a very bad conductor of caloric. Sulphur and oils, which are non-conductors of electricity, are represented by Humboldt as among the best conductors of caloric. In order to construct a table of the permeability of bodies to caloric, it would be necessary to know the times during which equal weights of different bodies acquire the same increase of temperature when exposed to equal calorific causes, or sustain the same loss of temperature when exposed to equal cooling causes. It would be

be alſo neceſſary to know the capacities of the bodies for caloric. The conducting powers would be directly as the capacities, and inverſely as the times, when the changes of temperature were equal. But in the attempts that have been hitherto made to calculate the permeability of bodies to caloric, the conſideration of their capacities has been uniformly neglected; and in many of Sir B. Thompſon's experiments, unequal weights of different ſubſtances were uſed, and no attention afterwards paid to this difference in calculating the conducting powers. He makes, for example, the conducting power of mercury : conducting power of water :: 1000 : 313; but in the experiments from which this eſtimate is taken, he had uſed equal volumes of the water and mercury, and conſequently had communicated the ſame increaſe of temperature to more than thirteen times as much matter in the one experiment as in the other.

The following table of the conducting powers of different ſubſtances is taken from the *Journal de Phyſique* for October 1793. It is there given as the tranſlation from the German of an eſſay by Humboldt, on the Conducting Powers of different Bodies for Caloric. From the ſhort account prefixed to it in the Journal de Phyſique, it would appear to be defective in this reſpect, that the conducting powers of the ſubſtances which it contains have been calculated without regard to the differences of their capacities; but, as it is the lateſt and moſt comprehenſive table of the kind, it has been thought the moſt proper for inſertion. It is neceſſary to mention, that the conducting powers given in the table refer to the ſame volumes, and not to the ſame weights, of the ſubſtances enumerated.

TABLE OF CONDUCTING POWERS.

Conducting Media.	Specific Gravities.	Conducting Powers.	Authorities.
Torricellian vacuum . .		0·1760	Sir B. Thompſon
Atmoſpheric air, denſity = 1	·0012	0·2550	The ſame
Rarefied air, denſity = 1-24th		0·2490	The ſame.
Wood aſhes	1·5560	0·7072	Humboldt.
Sulphuric acid	1·7000	0·7764	
Ruſt of iron	4·5000	0·8889	
Copper	8·5760	0·8970	Richmann.
Iron	7·8076	0·9430	
Braſs	8·3960	0·9430	
Cow's milk	1·0300	0·9727	Humboldt.
Vinegar	1·0110	0·9900	Mayer.
Water	1·0000	1·0000	
Gold	19·0400	1·0504	Humboldt.
Moiſt air		1·0543	Thompſon.
Nitrous acid	1·5800	1·0989	Humboldt.
Silver	10·0010	1·2195	
Muriatic acid	1·1500	1·2787	
Calcareous earth . . .	2·8570	1·3674	
Olive oil	0·9130	1·5472	
Tin	7·2910	1·5410	Richmann.
Zink	6·8620	1·5455	Humboldt.
Oxyd of lead	8·9400	1·6474	
Antimony	6·8600	1·6952	
Alcohol	0·8150	2·0379	
Lintſeed oil	0·9280	2·0412	
Pitcoal	1·5000	2·4003	Humboldt.
Mercury	13·5800	1·9700	Mayer.
Lead	11·4459	0·3138	Richmann.
Biſmuth	9·8610	2·3584	Humboldt.
Eſſence of turpentine . .	0·7920	2·6752	
Sulphur	1·8000	3·0358	Humboldt.
Ice	0·9160	1·2130	
Mercury	13·5800	3·1948	Thompſon.

II. The *capacities* of bodies for caloric have been ſucceſsfully inveſtigated by a variety of chemiſts. The following table exhibits the principal concluſions reſulting from thoſe experiments. But it is neceſſary, in the firſt place, to explain what is meant by the *permanence* of the capacities of bodies for caloric. The capacity of a body for caloric is ſaid to be *permanent*, while the ſame quantity of caloric that has raiſed its temperature any given number of degrees, continues to be ſufficient to raiſe its temperature an equal number of degrees. The capacity of a body for caloric is ſaid, on the contrary, to increaſe, when more caloric is required to raiſe it a certain number of degrees than was required to raiſe it an equal number of degrees, when it had a different temperature; and the capacity is ſaid to decreaſe, when leſs caloric is required for that purpoſe. Dr. Crawford has made a variety of experiments on this ſubject. He found that the capacity of water is permanent from the freezing to the boiling point; and afterwards, making uſe of water as a ſtandard, he tried ſimilar experiment with moſt of the metals and metallic oxyds. The general reſult of theſe experiments tended to prove, that the capacities of bodies, while they retain the ſame form, are not liable to be varied by a change of temperature. This concluſion is corroborated by the uniformity of the law which bodies obſerve in parting with caloric, when they are placed in a temperature inferior to their own. This law, firſt inveſtigated by Sir Iſaac Newton, and ſince corrected and tried experimentally by Martine and Muſſchenbrock, ſhows, from its application to the cooling of different bodies, that the capacities of theſe bodies are either permanent, or, if they change, that the changes are preciſely ſimilar in all of them

But theſe experiments embrace only a ſmall number of natural bodies; and Dr. Crawford's in particular were neceſſarily confined to a mere point in the ſcale of temperature. It is, therefore, departing from the ſtrictneſs of induction to conclude, as Dr. Crawford has done, that the capacities of all bodies are permanent at all temperatures, provided they do not change their form. We have, indeed, the moſt complete proof that this principle is not to be received without many limitations. The capacity of air is increaſed by mechanically expanding it, and diminiſhed by mechanically condenſing it. (Pictet *ſur le Feu*, and Darwin's Frigoric Experiments on the Mechanical Expanſion of Air, Philoſophical Tranſactions for 1788.) Mr. Wedgwood's clay thermometer has its capacity for caloric diminiſhed one-third, when burnt to 120° of his ſcale; and as it loſes in weight, during this operation, little more than two grains on a pound, while its volume is reduced one-half, the diminution of capacity muſt be attributed to its condenſation. Theſe facts prove deciſively that the capacity of a body may be changed without any change of form; and the free caloric evolved from ſo many bodies by friction and attrition, while its production is illuſtrated by theſe obſervations, ſerves at the ſame time to multiply the examples of a change in the capacity of bodies without a change in their form. See Wedgwood's Paper on the Light produced by Attrition, Philoſophical Tranſactions for 1792. It is proper to mention, that Lavoiſier and La Place, in their *Memoires ſur la Chaleur*, had called in queſtion, upon very plauſible grounds, the ſuppoſed permanence of the capacities. Reaſoning from the known effects of fuſion and evaporation upon the capacities, they ſuggeſted, as extremely probable, that the capacities would alſo vary with the degree of dilatation, and poſſibly according to a different law for every different body. Subſequent obſervations ſeem to juſtify their conjecture with reſpect to many bodies at leaſt.

TABLE OF CAPACITIES.

		Authorities.
Hydrogen gas	21·4000	Crawford.
Oxygen gas	4·7490	
Atmoſpheric air	1·7900	
Steam or aqueous vapour	1·5500	
Carbonic acid gas	1·0454	
Arterial blood	1·0300	

		Authorities.
Water	1·0000	Crawford.
Cows milk	·9999	
Venous blood	·8928	
Azotic gas	·7936	
Hide of an ox with the hair	·7870	
Lungs of a sheep	·7690	
Muscular flesh of an ox	·7400	
Alcohol	·6021	
Rice	·5060	
Horse-beans	·5020	
Spermaceti oil	·5000	
Fruit of the pine-tree	·5000	
Pease	·4920	
Wheat	·4770	
Barley	·4210	
Oats	·4160	
Sulphuric acid	·4290	
Pitcoal	·2771	
Charcoal	·2631	
Chalk	·2564	
Rust of iron	·2500	
Washed diaphoretic antimony	·2272	
Oxyd of copper nearly freed from air	·2272	
Quicklime	·2229	
Cinders	·1923	
Ashes of pitcoal	·1855	
Rust of iron nearly freed from air	·1666	
Washed diaphoretic antimony do.	·1666	
Ashes of elm wood	·1402	
Oxyd of zink nearly freed from air	·1369	
Iron	·1269	
Brass	·1123	
Copper	·1111	
White oxyd of tin almost free of air	·0990	
Zink	·0943	
Ashes of charcoal	·0909	
Tin	·0704	
Yellow oxyd of lead almost free of air	·0680	
Antimony	·0645	
Lead	·0352	
Snow	·9000	Magellan.
Ice	·9160	Humboldt.
Bar-iron	·1099	Lavoisier &
Rock-crystal	·1929	La Place.
Mercury	·0290	
Quicklime	·2168	
Mixture of 9 parts of water with 16 of quicklime	·4391	
Sulphuric acid, having the sp. gr. of 1·87	·3345	
Mixture of 4 parts of this acid with 3 parts of water	·6031	
Mixture of 4 parts of the same acid with 5 of water	·6631	
Nitric acid, having the sp. gr. of 1·29895	·6613	
Mixture of 9¼ of this acid with 1 of quicklime	·6189	
Mixture of 1 part of the nitrat of potash with 8 parts of water	·8167	
Sulphur	·1830	Kirwan.
Lintseed oil	·5280	
Crystallized muriat of soda	·2160	Gadolin.
Saturated solution of muriat of soda in water (containing 372 parts of the salt to 1000 parts of water)	·7930	

Fourcroy seems to be of opinion, that caloric to some substances imparts additional ponderosity. But so far from caloric adding to the weight of bodies, it would appear, from an experiment very accurately related by Dr. Fordyce, that caloric *diminishes* the weight of the bodies into which it enters, as *latent* caloric. It was found in this experiment, that 1700 grains of water acquired by freezing the additional weight of very nearly 1-16th part of a grain. The water and ice were both weighed at the temperature of 32°. (Philosophical Transactions, 2d Part, for 1785.) This experiment has been confirmed, in a very satisfactory manner, by Sir Benjamin Thompson. Water was counterpoised with spirit of wine, and the apparatus was then placed in a low temperature, where the water was frozen, while the spirit of wine remained liquid. The water, as in Dr. Fordyce's experiment, became heavier, in consequence of its conversion into ice. It is proper at the same time to state, that, in a similar experiment, Lavoisier found no difference between the weight of the ice and water. The quantity of water which he made use of in this experiment was one pound, and it weighed precisely as much before as it did after it was frozen. The balance he employed was sensible to the difference of 1-10th of a grain when loaded with eighteen or twenty ounces. (Memoires de l'Academie de Sciences, 1783, page 419.) An attempt has been since made by Dr. Higgins, to ascertain whether the caloric emitted during the slaking of lime produces any sensible difference in the weight of the materials employed; but the experiment failed.

Since latent caloric appears, from Dr. Fordyce's experiment, to diminish the gravity of bodies, there is reason to enquire, whether free caloric has not a greater tendency to ascend than to descend. M. Pictet has made several experiments to ascertain this point. A cylindrical bar of copper was placed vertically within a glass tube, which was afterwards exhausted of air, by means of the air-pump. The concentrated rays of the sun were thrown upon the middle of the cylinder, and the successive dilatations of two mercurial thermometers, connected with its two extremities, were carefully observed. It was found, that, in the same times the mercury in the upper thermometer rose to a greater height than in the under one; and, after the light was withdrawn, the under thermometer sunk faster than the upper one. *Essai sur le Feu*, chap. 2d.

M. Pictet has published some experiments on the caloric produced by friction. He had imagined that the caloric evolved by friction was obtained from a mechanical decomposition of the air between the rubbing surfaces; but he found that the same degree of friction raised the thermometer somewhat higher in vacuo than in the open air. This difference was no doubt occasioned by the greater conducting power and greater capacity of the air than of the vacuum; but still the experiment showed that his first conjecture had been unfounded. In his subsequent experiments, it appeared that more caloric was evolved by the friction of soft bodies against this friction-machine than when hard bodies were employed; and the friction of a small quantity of cotton upon the bulb of his thermometer, increases the effect most remarkably. *Essai sur le Feu*, chapitre 9.

Notwithstanding these various researches into the nature and principles of light and heat, and the very able discussions of the phlogistic and antiphlogistic writers on chemistry, it is to be lamented that no absolute decision has yet been made on this long controverted subject. After the ingenious Lavoisier had successfully combated and refuted the phlogistic system of former chemists, M. Bucquet and Macquer endeavoured to restore the same doctrine under a different form.

M. Bucquet, in his latter courses of lectures, explains upon this principle the greater part of the phenomena of combustion, calcination, and reduction of metallic calces; but it does not afford adequate reasons for the flame which is produced by bodies in a state of ignition, nor the rapid motion and other changes that attend it. M. Macquer, though well aware of the influence of the modern discoveries on chemical theory, advanced an opinion that they do not entirely overthrow the phlogistic doctrine of Stahl; and he has found means to unite the pneumatic doctrine of the moderns, with that of phlogiston, by considering this principle as *light* fixed in bodies. After having shown that pure light, such as is emitted by the sun,

sun, may be regarded as the true matter of fire, and that by admitting it as fixed in bodies, it constitutes the phlogiston of Stahl, he conceives that in every instance of combustion, the pure air disengages the light or phlogiston from inflammable bodies, and occupies its place; so that calcination may be regarded as the precipitation of air, and disengagement of light. When, on the contrary, phlogiston is restored to neutral substances, the matter of light serves to disengage in its turn the air fixed in those bodies, by which means they again resume the metallic state. In this theory, which perfectly answers the intention of its author, by uniting the doctrine of Stahl with that of the moderns, Macquer thinks that phlogiston can unite with bodies even in closed vessels, because light, which he regards as the true phlogiston, passes through glass vessels, as every one knows, and even penetrates metallic or earthen vessels when heated to ignition. Scheele has proposed a different theory, which also had its adherents among the northern chemists. He supposed that fire, heat, and light, were compounds of vital air and phlogiston; that, by passing through the vessel, the light was decomposed, it deposited its phlogiston, and the vital air was disengaged as in the reduction of the metallic calces or oxyds. But this ingenious theory, by the assistance of which Scheele explained the influence of solar light and heat differently modified, in a great number of chemical phenomena, does not afford the reason of the increase of weight in metals, sulphur, phosphorus, &c. after their combustion.

The attention of chemists was next drawn from the hypothesis of Macquer, to the very ingenious defence of the doctrine of phlogiston by Mr. Kirwan. According to this philosopher, phlogiston, or the inflammable principle, may exist in two different states; 1st, Combined, as in all bodies susceptible of combustion. 2dly, Free and isolated, as in inflammable air. Besides the evolution of light and heat, combustion, therefore, is supposed to consist in the union of this inflammable principle with oxygenous gas, and in the consequent generation of carbonic acid. A full account of this hypothesis, which the author has since very candidly retracted, may be seen in the last edition of Kirwan's Essay on Phlogiston. The hypothesis of Macquer has also of late been revived with some slight alterations by Richter, Gren, Lichtenberg, and others in Germany. Phlogiston, or the inflammable principle, according to the first of these chemists, is merely the basis of *light* united to combustible bodies. In combustion, this basis is disengaged, and, uniting with a portion of caloric, produces the light or flame which usually accompanies that process. The combustion of any inflammable substance, phosphorus for instance, is, therefore, to be considered as the effect of a double affinity. The base of the oxygenous gas, unites with the phosphorus to form phosphoric acid, while a portion of the caloric, disengaged from this gas, unites with the phlogiston, or basis of light, to produce flame. The varieties which occur in the quantity of light emitted by different bodies, and in the colours which it exhibits, are supposed to depend on the quantity of phlogiston contained in these bodies, and on the proportions in which it is united to caloric. See *Critique des Antiphlogistichen Systemes von J. B. Richter*, Bresslau, 1793. *Systematisches Handbuch des Chemie von F. A. C. Gren*. Halle, 1794.

Dr. Hutton has likewise published a new modification of the phlogistic doctrine, together with several objections to the French theory of combustion. The following are his principal conclusions upon these subjects: 1. The caloric, which becomes free by combustion, did not previously exist as latent caloric, either in the oxygenous gas consumed, or in the combustible body. 2. The immediate effect of combustion is the disengagement of light, and this light produces free caloric, by its action, in the bodies upon which it is incident. To use Dr. Hutton's own words, "it is not heat which is the cause of light in fire, but it is the light of fire which is then the cause of heat." 3. The light which is disengaged during combustion previously existed in the burning body in the state of phlogiston. This phlogiston is a peculiar modification of the solar substance, existing in combustible bodies, and distinct from any modification of heat. It neither adds to the weight of bodies, nor does it seem, like latent caloric, to impair their weight. It communicates ductility and splendour to the metals. It is separated from its union with gravitating matter during combustion, and appears in the form of light. It is formed in plants during the process of vegetation, and may be transferred from one body to another. See *Dissertations on Different Subjects in Natural Philosophy*, and *Dissertations upon the Philosophy of Light, Heat, and Fire*, by James Hutton, M.D.

It would be an endless, as well as useless task, to enumerate all the different modifications of phlogiston which have been proposed by the partizans of that doctrine, since Lavoisier first ventured to question its existence. Those readers who will take the trouble to peruse all the different writings on this controversy, will immediately perceive that no two chemists are agreed with regard to the precise nature and properties of this principle, and that it is merely for the name, and not for the thing, that phlogistians so eagerly contend. It would be easy to illustrate the truth of this remark, by a reference to the writings of Priestley, Kirwan, Wiegleb, La Methrie, Macquer, Richter, Gren, &c. but this reference is unnecessary. Stahl is universally allowed to have been ignorant of the principal phenomenon that occurs in every instance of combustion; and does it not seem strange, that we should adhere tenaceously to the theory which he invented to explain that process, and continue to use the language of a system now so avowedly defective?

The theory of Lavoisier, if we may to give it that name, is merely a simple relation of facts. Unable to discover the source from which the light is derived in combustion, that philosopher, in his Elements of Chemistry, has taken care not to mix any hypothesis concerning it with the facts he had fully ascertained by experiment. Whether future discoveries shall show, that heat and light are modifications of the same substance, or that they are essentially different from each other; whether the whole of the light disengaged in combustion shall be found to come from the oxygenous gas, or from the combustible body, or partly from both, the theory of combustion, as established by Lavoisier, will remain unalterably the same. Discoveries with regard to the origin and nature of light, can only tend to widen and to strengthen its basis.

It now remains that we investigate the properties of heat as a chemical agent, employed in the processes of decomposing and of combining natural productions. The first circumstance to be attended to, is the measure of the degrees of heat necessary to effect the changes of which the matters under examination are susceptible. The degrees of heat are generally considered under two principal divisions; one comprehending those under the temperature of boiling water, and the other such as are above that temperature. The scale of the thermometer serves to distinguish the former; the latter, for the greatest part, can be estimated only from the fusibility of different substances.

The first division of heat below the boiling water point, extends from 45° to 60° of Fahrenheit. This temperature favours putrefaction, vegetation, slow evaporation, &c. It is not commonly used in chemistry, because not considerable enough; except in certain macerations made during winter, or for the crystallization of saline mixtures, after due evaporation, placed in caves, or other situations of this temperature. The second division extending from about 68° to 80°, continues to promote putrefaction. It excites the spirituous fermentation in saccharine liquors, and facilitates evaporation, and the slow crystallization which follows. This is the ordinary heat of temperate climates. It is used for digestion, saline solutions

solutions, fermentations, &c. The third division lies between the 88th and 100th degrees of the thermometer. In this temperature the acid or acetous fermentation in vegetables is best carried on, and plants are successfully dried for practical use. It is adopted for some saline solutions, and to promote fermentations. The fourth division is at, or near, the temperature of about 145°. This is called the mean degree of heated water, and is that of the vessels called balneum mariæ. It destroys the organization of animal matters, and volatilizes the more subtile parts of essential oils, especially the spiritus rector. It is used in the distillation of vegetables and animal matters, whose phlegm and principle of smell are intended to be separated. The temperature of boiling water, or 212°, is used in decoctions, the extraction of essential oils, &c.

The first division of heat above boiling water, melts sulphur, burns organized matter, or gives a low red heat to glass vessels. The second extends from the fusion of the softer metals, such as lead, tin, or bismuth, to that of the softer kinds of glass. The third division may be considered as including the fusion of metals of a middle consistence, such as antimony, silver, and gold. The fourth serves to bake porcelain, and fuses the more refractory metals, such as cobalt, copper, iron, &c. The last and highest of all is found in the focus of the burning glass. This extreme heat calcines, burns, and vitrifies, in a very short time, all bodies susceptible of such a change. A similar degree of heat may be excited by a stream of vital air or oxygenous gas thrown upon charcoal, by means of the bellows or blow-pipe. M. Monge is of opinion, that by presenting atmospheric air in a state of compression, to combustible bodies in a state of inflammation in the furnace, an effect may be produced similar to that excited by vital air. This process may hereafter be applied to operations in the large way.

Though these divisions above boiling water are determined by phenomena well known to chemists, their admeasurement has not the desired precision. An instrument capable of indicating with exactness the degrees employed in these operations, would be an acquisition of great value and importance. Mr. Wedgwood has constructed a pyrometer for this purpose; it is formed of small pieces of clay half an inch in diameter. These pieces, when contracted by heat, advance to a greater or less distance between two rules of copper convergent towards each other, upon a plate of the same metal. In this manner, by means of a scale drawn upon these rules, the degree of contraction, and consequently of heat, which they have experienced, is ascertained.

The heat required in chemical operations, is produced by the combustion of charcoal, or common mineral coal. For this purpose, various furnaces of different forms and names are constructed, according to the purpose they are intended to answer. The manner of communicating heat to bodies in the various chemical processes, likewise deserves attention. If the combustible matter be applied to the substance itself or the vessel immediately containing it, the operation is said to be performed by a naked fire. If any substance be placed between the fire and the vessel containing the matter under examination, the interposed substance is called a bath. Hence the names balneum mariæ, or water bath, sand bath, dung bath, cinder bath, &c. The form of the vessels employed in the treatment of bodies by fire, and the different phenomena presented by the matter exposed to its action, have occasioned a considerable number of operations to be distinguished by particular names. Such as roasting, calcination, fusion, reduction, vitrification, cupellation, cementation, stratification, detonation, decrepitation, fulmination, sublimation, evaporation, distillation, rectification, concentration, digestion, infusion, decoction, lixiviation: and these operations, performed by the agency of fire, constitute much of the practical part of chemistry.

Roasting is a process by which mineral substances are divided, some of their principles being volatilized, and others changed, so as to prepare them for other operations, to which this may be regarded as preliminary. Minerals are subjected to this, in order to separate their sulphur or arsenic, and to render them more pulverable or friable. In the small way, this is done in crucibles, roasting nets, or capsules of earth or iron, and generally with access of air. Sometimes it is performed in closed vessels, for which purpose two crucibles are usually luted mouth to mouth.

Calcination is, as it were, a more advanced stage of the process of roasting. Minerals are by this deprived of their water, calcareous stones are thus converted into lime, and the metals into metallic oxyds. The same vessels are employed for this purpose as for roasting.

By fusion, bodies are made to pass from the solid to the fluid state, in consequence of the application of heat. Salts, sulphur, and metals, are the chief bodies subjected to this process. Crucibles of baked clay of porcelain, of course grit of iron and platina, of various kinds and figures, with metallic cones or ingot moulds, are the instruments chiefly used. These last give the figure to the matter, which, after being melted and cooled again, has the form of a bar, or ingot, or a button. The facility with which metals may be united by fusion, after they have been divided, is probably the circumstance that induced mankind to use them as the mediums of exchange, or signs of value of all other commodities.

In reduction or revivification, the oxyds of metals are restored to their metallic state by the assistance of fire, with charcoal or oils, or other inflammable matter.

Vitrification, is the fusion of substances capable of assuming the brightness, transparency, hardness, and other properties, of glass. Vitrifiable earths with alkalis, and metallic oxyds, are the principal matters subjected to this operation.

Cupellation is the purifying of perfect metals, and the extraction of the imperfect mixed with them, by means of an addition of lead. This promotes the vitrification of the imperfect metals so that these last are carried off, and the perfect metals are left nearly pure. The name of this operation is taken from the vessels made use of, which are a kind of flat crucibles, similar to small cups, called cupels. These are formed of the earth of bones, which, on account of its porosity, easily imbibes the glass of lead.

Certain powders made use of for including particular bodies intended to be changed by their action, in close vessels, subjected to heat, are called cements. Thus it is that iron is cemented with powder of charcoal to convert it into steel; and glass with plaster or sand, to convert it into a kind of porcelain. Cementation, in certain cases, requires a very strong heat.

Stratification is a process nearly similar to the foregoing: it consists in the arrangement of various solid bodies in a crucible, or other vessel capable of resisting the fire. These are generally in the form of bars or plates, and are blended with pulverable matters, capable of altering their nature. The form and the disposition of these matters in beds or layers, *strata super strata*, has given rise to the name stratification. In this manner copper or silver are treated with sulphur, in order to effect a combination. This process differs from fusion, calcination, or vitrification, only in the particular disposition of the matters subjected to it.

Detonation is peculiar to nitre, and those matters of which it is a component part. It consists in the greater or less noise produced by the explosion of these substances when heated, suddenly or slowly, and by degrees in open or close vessels. Decrepitation which differs from detonation in its noise being much less, and in the kind of crackling sound with which it is accompanied, is peculiar to such salts as burst asunder by heat, which causes their water of crystallization to expand, and make its escape. It is particularly observed in common salt or muriat of soda. Fulmination is a quick and sudden detonation observed in fulminating gold, fulminating powder, and the combustion of inflammable and pure air, &c.

The operation of volatilizing by heat, such substances as are in a dry, solid, and often crystalline state, is called sublimation. The sublimatory vessels are of glazed earthen ware, or earthen cucurbits, with glass heads, or pots of earthen ware, or porcelain, called aludels, matrasses, &c. Sulphur, arsenic, cinnabar, and many mercurial preparations, some vegetable matters, and in particular camphire and benzoin, are the chief substances which are raised in sublimation. In this process, the condensed vapours, which generally assume a powdery form, are called flowers: such are the flowers of brimstone, of benjamin, of zink, &c. Solid products obtained in this way are called sublimates.

Evaporation is the action of heat upon liquids, in order to diminish the fluidity and quantity of the residuum, and to obtain the fixed bodies it may hold in solution. In this way the water of the sea or salt springs is driven off, and the salt is left. This operation is made in broad vessels of earth, glass, silver, or other metals, according to the nature of the liquids under examination. Evaporation is performed by an open fire, or with access of air, in order that the fluid intended to be driven off may be at liberty to expand and be dissipated, and that this may be effected more quickly by virtue of the dissolvent power of the air on fluids in a state of vapour.

Distillation is a process nearly of the same nature as the preceding, but performed in closed vessels; which are either alembics, or retorts, calculated to separate the volatile from the fixed principles, by means of heat. Distillation is improperly distinguished into three kinds, by ascent, *per ascensum*; by descent, *per decensum*; and sideways, *per latus*. These distinctions, which are but futile, seem to have been taken from the form of the vessels. Matter in a state of vapour always tends to rise, but distillation by alembics has been called *per ascensum*, because the capital being immediately above the body, the vapours rise in an obvious manner. The distillation by retorts has been called *per latus*, because the neck of the retorts come out at the side of the apparatus, though the roof of the retort be higher than its neck, and though the vapours pass over only after having been condensed by the external cold in the roof, or highest part of the retort. As to the distillation *per descensum*, it is an unskilful and ill-contrived operation, which is no longer used, because its products are for the most part lost, and those which are obtained are in a foul and imperfect state. It was performed by placing some vegetable substance on a cloth extended over the mouth of a glass vessel containing some water; on this was laid a metal dish containing live coals. In this way cloves, and several odoriferous matters were in the ancient pharmacy, and for perfumers' use, distilled to obtain their essential oil. The product passed through the linen, and was condensed by the water; but the greatest part made its escape between the metallic dish cover and the cloth. A distinction relating to the manner of heating bodies intended to be distilled, is much more necessary to be made than those we have been speaking of. The water bath, the vapour bath, the sand bath, the bath of ashes, consist of these substances contained in proper vessels over the fire. In these the distillatory vessels are plunged, and are by that means kept at a more certain and equal heat. The naked fire is also used in distillations, as is also the flame of a lamp, or of spirit of wine.

Rectification is a second distillation, in which substances are purified by their most volatile parts being raised by heat carefully managed. Thus spirit of wine, ether, &c. are rectified by their separation from the less volatile and foreign matter, which altered or debased their properties.

Concentration is the inverse of rectification, as it is intended to deprive fixed fluids of the water which weakens them. This operation implies, it is evident, that the matter to be concentrated is heavier than water, and is used for certain acids, particularly the sulphuric, phosphoric, and also for solutions of alkaline and neutral salts.

Digestion is an operation in which such matters, as are intended to act slowly on each other, are exposed to a slow heat continued for a long time. It is particularly used in the extraction of such parts from vegetables as are soluble in spirit of wine, or other fluids used for this purpose. The ancient chemists held this process in great estimation. Though this confidence seems well founded, in consideration of the change which, after strict examination, it is found that most vegetable and animal substances undergo by a too powerful heat, yet it is not carried to that enthusiasm which the alchemists shewed in their pursuits. These men, with more assiduity and labour than their pretended art deserved, made digestions of many years duration, and believed, by that means, that it would be in their power to work a great number of miracles. Digestion is now confined to the preparing of tinctures, elixirs, cordials, &c. and it is successfully used in the extractions of vegetable or animal principles without alteration. It is likewise used to advantage in several processes with minerals.

Infusion is a process well known. It consists in pouring water of any required degree of temperature on such substances as have a loose texture, as thin bark, wood in shavings or small pieces, leaves, flowers, &c. It is very useful in separating the most soluble parts of these, and is applied in a great number of chemical operations.

Decoction, or continued ebullition with water, is employed to separate such parts of bodies as are only soluble at this degree of heat. It greatly alters vegetable and animal matters, coagulates the lymph, melts the fat and resins, hardens fibrous parts; and is advantageously used in chemical operations, by such as are acquainted with its effects.

Lixiviation is the operation of dissolving or extracting, by the help of hot water, the saline and soluble matter contained in the ashes of plants, or the residues of distillation, or combustion, or of coals, or natural earths, intended to be analysed. As, by this operation, salts of the kind termed lixivial are generally obtained, it was natural to give it the name which it bears: the synonymous word *lessive*, is, at present, more frequently used in France, than even the term lixiviation. This operation, therefore, is nothing more than a solution by the assistance of heat, and does not differ from infusion, except in the particular application of the latter to vegetable and animal matters, while the former is applied to substances that have the properties of minerals.

Such are the different operations performed in chemistry, by the assistance of fire: and as nothing was formerly done without this agent, this science was then no more than an art, and was called Pyrotechnia. At present it is much less used, in consequence of the discovery of more certain methods of analysing natural substances. The action of solvents, or menstruums, employed without the application of any heat beyond the temperature of the air, is sufficient to effect the most singular changes, and is productive of clear and valuable deductions. This method is pursued with success in the examination of salts, earth, vegetable matters, &c. Heat is now regarded only as an auxiliary agent, by which combinations are forwarded. As it is employed in different degrees, it would be a valuable acquisition if we knew how to apply it with uniform intensity. A furnace of this kind has long been a desideratum among chemists, and the manipulations of artists have hitherto been the only guide to the chemist; but it is impossible by this means to have the degree of precision so much to be desired. The late Dr. Black seems to have succeeded best in contriving furnaces proper to produce a regular and uniform heat, and is therefore much recommended.

As the whole of the practical part of chemistry consists in placing bodies in contact with each other, so that they may exert their respective attractions or powers of combination

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bination without intermixture or disturbance of other bodies not intended to enter the proposed experiments, and also in raising or lowering the temperature of such bodies under examination, it is evident that the degree of success attending these researches must greatly depend upon the vessels or apparatus adapted to that purpose. The instruments that have from time to time been used with this intent, are many and various. Modern chemistry however, has rejected several which only caused trouble and confusion; for which reason we shall confine ourselves to the description of those only in present use.

The Modern Chemical Apparatus.

The articles which first present themselves, as being immediately requisite, are crucibles or pots, adapted to the purposes of roasting, calcination, and fusion. The most perfect of these are said to be made of Groffallmerode and Elltrode in Hesse, manufactured by refractory clay and sand. Some of them are large and round, some triangular, having stands and covers. Some are smaller, called *set-crucibles*, because they are of different sizes, and fitted into one another like sets of chip-boxes. In some cases iron and silver crucibles are used. Those of Ips in Upper Austria, or of Hafnerzell, consists of black lead and sand; they are made of different sizes, and are very durable under every change from heat to cold; but improper for melting many saline substances. In the chemistry Plate I. is delineated at fig. 1, a round crucible, with its cover and stand; fig. 2, a triangular crucible, on its stand. For the melting of ores in small quantities for docimastic purposes, *assaying* crucibles are employed, made of the same materials as the earthen ones. They have, in their inner cavity, the form of a double cone, bellying out in the middle, and contracted at both ends; one of these is shewn at fig. 3. The chalice-form crucibles, and the scorifying tests and capsules, are also of this class.

Cucurbits, or matrasses, are glass, earthen, or metallic vessels, usually of an ovate or egg shape, and open at the top. They serve the several purposes of digestion, evaporation, solution, &c. Two of these are shewn at fig. 4 and 5, in the plate. That with the ring on its neck, at fig. 4, renders it capable of being suspended by a string.

Retorts, are globular vessels of earthen ware, glass, or metal, with a neck bent on one side. Some retorts have another neck or opening on their upper part, through which they may be charged, and the opening may be afterwards closed with a stopper. These are called *tubulated* retorts; the other *simple*. The tubulated retort is used, when, on account of the two rapid extrication of gases or acids, its neck must be luted to the receiver or balloon, before the materials are introduced, or the fire applied. Holes are also sometimes drilled on the upper parts of simple retorts, to let out, by opening their stoppers, the elastic fluids when too copious. Fig. 6, a simple retort, with its neck introduced into a receiver. Fig. 7, a tubulated retort.

Receivers, or balloons are vessels, usually of glass, of a spherical form, with a large straight open neck, into which the neck of the retort is usually inserted. When any proper substance, in the different chemical experiments, is put into a retort, and heated, its volatile parts pass over into the receiver, where they are condensed. But in some operations, such a prodigious quantity of vapours are disengaged, that it is dangerous to condense them; and there is also a considerable loss in the product: to obviate or remedy these defects, Woulf introduced his ingenious and elegant apparatus. Fig. 8, represents a small receiver with the neck of a retort introduced into it. Fig. 9, a large balloon; fig. 10, a phial, often used as a receiver; fig. 11, a proof or disengaging bottle; fig. 12, a tubulated proof, with a moveable bent glass tube; fig. 13, adopters, or glass vessels, open at both ends, and let into each other, for the purpose of forming tubes, to unite certain parts of the different apparatus.

The alembic, is a vessel used for distillation, when the products are too volatile to admit of the use of the last-mentioned apparatus. It consists of a matrass or cucurbit, to which is adapted a head, of a conical figure, with its external circumference or base depressed lower than its neck, so that the vapours which rise, and are condensed against its sides, run down into a circular channel formed by its depressed part, from whence they are conveyed by the nose or beak projecting from the head, into the receiver; as shewn at fig. 14. This instrument is less simple than the retort, which certainly may be used for the most volatile products, if care be taken to apply a gentle heat on such occasions. But the alembic has its conveniences. In particular, the residues of distillations may be easily cleared out of the matrass; and in experiments of sublimation, the head is very convenient to receive the dry products, while the more volatile and elastic parts pass over into the receiver.

Fig. 15. is the drawing of an alembic on a larger scale, commonly made in metal: this is placed on the common small furnace. It is extremely useful for many experiments in the small way.

Fig. 16, is the delineation of the common still used in the distillation of ardent spirits. Instead of using a refrigeratory or receiver, the spirit is made to pass through a spiral pipe called the worm, which is immersed in a tub of cold water, and represented by the dotted scroll on the tub. During its passage it is condensed, and comes out at the lower extremity of the pipe, in a fluid form, and is let off by a cock into a receiver or jug. Fig. 17, is a copper vessel for distilling in water-bath; it fits into the mouth of the still, and the same head serves for both.

The most essential article in operations made by fire, is the furnace; and yet the best construction of a furnace does not appear to have been well ascertained from experience. There are facts which shew that a fire made on a grate near the bottom of a chimney, of equal width throughout, and open both above and below, will produce a more intense heat than any other furnace. What may be the limits for the height of the chimney is not ascertained from any precise trials; but thirty times its diameter would not probably be too high. It seems to be a disadvantage to contract the diameter of a chimney, so as to make it smaller than that of the fire-place, when no other air is to go up the chimney than what has passed through the fire; and there is no prospect of advantage to be derived from widening it.

Fig. 18, exhibits the common small evaporating furnace. This is not only used in evaporations, but likewise for digestion, dissolution, distillation; and all those operations which require a heat necessary only for the ebullition of liquids. Sometimes the vessels are placed directly over the coals, which is called working with an *open fire*; sometimes sand or water is interposed, when it is either called the *sand-bath*, or *balneum mariæ*. This furnace is composed of an ash-hole and a fire-place, parted by a grating which holds the fuel. There are generally two or three slits made through the walls of the furnace, towards the top, to favour aspiration and combustion.

Fig. 19, shews the reverberatory furnace. This is necessary for the distillation of substances, for which a retort must be used, and which require a higher degree of heat. It is composed of four parts; the ash-pan, to give passage to the air, and to receive the ashes which fall down; the fire-place, heated off by a grating to sustain the fuel; a portion of a cylinder, called a *laboratory*, because it is this part which receives the retorts employed in the *labour* of distillation; these three pieces are covered with a dome, or portion of a sphere, perforated in the middle to give passage to the air, and which forms the chimney. The dome serves to reflect the flames, and causes

causes them to surround the vessel, which is by that means more strongly heated; whence this furnace gets the name of *reverberatory*. Without this circumstance the retort would only be heated in its bottom, the vapours raised from the contained substance would condense in the upper part, and a continual cohobation would take place, without any thing passing over into the receiver; but, by means of this dome, the retort is equally heated in every part, and the vapours being forced out, can only condense in the neck of the retort, or in the receiver placed on its side.

Fig. 20, is Macquer's docimastic or assaying and cupelling-furnace, which serves for assaying metals, refining gold and silver, &c. Its construction is as follows: A. the body of the furnace, built square, from 12 to 15 inches each side, of fire-proof clay, or thick iron-plates, and terminating in a truncated open pyramid. B.B.B. three strong iron-bands, fixed with screws, and morticed in the front for grooves to the sliders. C.C. the sliders with handles. The semicircular and oblong apertures in front are contrived for inspecting the operation, and so placed, that when the sliders are shut, or meet in the middle, they do not reach the open part of the muffle. D. the ash-pit, with a semicircular aperture. Immediately above it is the grate. E. a semicircular aperture, of a proper size to receive the muffle. F. holes through which iron bars are inserted for supporting the muffle. G. a circular hole, by which to manage the coals. H. a pyramidal cover, with a chimney, that may be added or removed, and occasionally heightened by an additional tube, in order to increase the intensity of heat. The fuel is put in at top. The dimensions are shewn by the scale. K. the muffle, formed of baked clay, open in front, and closed behind. Its form is half a cylinder cut length-ways. The openings on the sides are to admit more heat, yet without admitting ashes. L. a scorifying test. M. two assaying tests, or cupels of a smaller size: one is circular; the other of an inverted, truncated, pyramidal form. On their spherical cavities the materials are placed.

The great desideratum in the construction of furnaces is, to obtain an intense and equable heat. The failure of most of them in this particular, induced the late Dr. Black to try many experiments for their improvement, and in which, by means of registers, he was enabled to succeed in a very considerable degree. Dr. Black's furnace being therefore in high estimation, we have, in the Chemistry Plate II. given an exact representation of it, as follows: A. fig. 1, a perspective view of the furnace. The larger hole at top serves for introducing the sand-pot, &c. and is often the mouth of the furnace. On the smaller aperture, the vent or chimney B is fixed. C. the ash-pit, separable, and a little than the furnace, which is inserted into it, and rests on its projecting border. Fig. 2, a perspective section of the furnace. Fig. 3, a perspective view of the ash-pit, provided with a small door, and a damping-plate, or register, of six different sized holes. The section of the grate is shewn in the figure above. Fig. 4, a ring with three hooks, to be sunk about one foot deep into the furnace, and on which the retort rests when distilling, &c. in open fire. This furnace is of an elliptical form, made of strong wrought-iron. Its inside is coated in such a manner as to represent an inverted cone. The lower opening for the grate is not in the middle of the bottom, but purposely nearer to one end of the ellipse, towards the larger aperture at top.

Charcoal is the fuel most commonly used in furnaces. It produces an intense heat without smoke, but it is consumed very fast. Coke or charred pit-coal produces a very strong and lasting heat. Neither of these produce a strong heat at a distance from the fire. Where the action of flame is required, wood or coal must be burned. Several inconveniences attend the use of coal, as its fuliginous fumes, and its aptitude to stop the passage of air by becoming fused. It is used however in the reverberatory furnaces of glass-houses, and is the best material where vessels are to be supplied with a great quantity of heat at no great intensity, such as in distilleries, &c.

In various experiments conducted with furnaces, it is necessary to guard the retorts from the immediate action of the fire, to condense and retain the vapours, which are expansile, subtile, and often corrosive; for these purposes *lutes* are employed. A lute, which is to close the joinings of vessels must be as impermeable as the glass itself, insomuch that no matter, how subtile soever, except caloric, can penetrate. To prevent glass vessels from cracking by the sudden variations of heat, and to render them capable of preserving their figure in a higher degree of heat than they could sustain without it, it is usual to put over them a covering of earth: this is called a coating: it may be made of fat earth and fresh horse-dung; or clay and fine sand well worked together into a paste with the addition of some hair, such as bricklayers use; either of those compositions may be laid upon the vessel in successive thin coatings. When it is necessary to condense or prevent the escape of vapours of a corrosive and volatile nature, the composition called the *fat lute* is used. First take boiled linseed oil, that is, linseed oil, which has been oxygenated and rendered drying by the addition of litharge, or semi-vitreous oxyd of lead. This is known in the shops by the name of drying oil, and is thus prepared: Put into a copper-pan 100 parts of linseed oil with nine parts of litharge ground to a fine powder and strained through silk; place the vessel in a furnace, and heat it sufficiently for the oil to dissolve the litharge; stir the mixture continually with a wooden spatula till the litharge is entirely dissolved; then take the vessel off the fire; leave it to cool; and preserve the oil thus prepared in a jar well corked. To make the *fat lute*, take a certain quantity of clay, wash it, then dry it well, and reduce it to a very fine powder or dust, which pass through a silken sieve; put it into an iron mortar, add a sufficient quantity of the oil as above; beat it well a long time, till it makes a thickish paste, which does not however stick to the hands. As this lute does not harden, but rather grows softer by the heat, it requires to be secured in its place by strips of bladder or linen dipped in a lute made of lime and whites of eggs, which is called the *dry lute*. Here we must observe, that upon exactness and nicety in luting, depends all the success of chemical operations conducted by means of intense heat.

Little dishes of baked earth are used for calcining ore or metallic substances; this is called the *roasting-dish*: it should be broad and flat, very even, that it may commodiously receive all the metallic oxyds or powders which are put into it. The cupel, as shewn in Plate I. fig. 20, is a flat crucible, wide and broad, hollowed almost hemispherically, in the form of a *cup*, whence the name: it is formed of the calcined bones of sheep's trotters, pulverised, strained through silk, and well washed; the powder is mixed with water, and cupel formed in a mould.

An ingenious student in chemistry, when he has familiarized himself with the first principles, will soon perceive that there are few philosophical enquiries, if any, in the small way, that require a large apparatus of furnaces or vessels. A tobacco-pipe is a very useful crucible, in which a great number of operations may be performed in a common fire, especially if urged with a pair of good double bellows. An earthen pot, or iron ladle, will contain a sand-bath; and apothecaries phials, or Florence flasks, serve very well for matrasses. Chafing dishes, or small iron stoves, may be applied to serve many useful purposes. And the blow-pipe and spirit-lamp, with a set of small retorts and receivers, may be adapted to the performance of almost every part of experimental chemistry. The black lead crucibles are also very convenient for constructing a variety of moveable furnaces. They

may

The Modern Chemical Apparatus &c.

may be cut without difficulty by a saw whose teeth are set wide, and very easily admit of being scraped, drilled, or ground with sand, to give them the requisite figure. In Dr. Lewis's construction, the crucibles which are intended to be applied to each other, are ground flat upon a stone, with a little sand, the holes are sawed with the common compass-saw of the carpenters, and are made a little narrower externally than internally, by which means it is easy to fit them with stoppers. Three or four hoops of copper-wire, about the thickness of a crow-quill, and first softened by heating it red hot, are fastened round the pots in the most convenient places, to render them more durable by keeping their parts together, after they may have been cracked. A thin copper hoop serves to secure the place of junction of two pots. Large crucibles, from twelve to fifteen inches high, are also employed for portable furnaces; and are capable of a vast number of operations. The construction of one of these is given in the above-mentioned plate, viz. Fig. 5, shews the crucible, perforated on its lower part, and supported by a stand. The cover is made of iron-plate, or tile. Its smaller circular holes serves to put in additional fuel, and to give vent to the air. It may also be provided with a moveable chimney. The larger hole admits the sand-pot, with the retort, or other vessel. Fig. 6, is a section of the furnace and grate. Fig. 7, the sand-pot, which also may serve for a water-bath, or for calcining.

Every effect of the most violent heat of furnaces may be produced by the flame of a candle or lamp, urged upon a small particle of any substance, by the blow-pipe. This instrument consists merely of a brass-pipe about one-eighth of an inch diameter at one end, and the other tapering to a much less size, with a very small perforation for the wind to escape. The smaller end is bent on one side. For philosophical or other nice purposes, the blow-pipe is provided with a bowl or enlargement towards the small end, in which the vapours of the breath are condensed and detained, and also with three or four small nozles, with different apertures, to be slipped on the smaller extremity. These are of use when larger or smaller flames are to be occasionally used, because a larger flame requires a large aperture, in order that the air may effectually urge it upon the matter under examination. See this instrument at fig. 8, in the plate.

There is an artifice in the blowing through this pipe, which is more difficult to describe than to acquire. The effect intended to be produced is a continual stream of air for many minutes, if necessary, without ceasing. This is done by applying the tongue to the roof of the mouth, so as to interrupt the communication between the mouth and the passage of the nostrils; by which means the operator is at liberty to breathe through the nostrils, at the same time that by the muscles of the lips he forces a continual stream of air from the anterior part of the mouth through the blow-pipe. When the mouth begins to be empty, it is replenished by the lungs in an instant, while the tongue is withdrawn from the roof of the mouth, and replaced again in the same manner as in pronouncing the monosyllable tut. In this way the stream may be continued for a long time without any fatigue, if the flame be not urged too impetuously, and even in this case no other fatigue is felt than that of the muscles of the lips.

A wax candle of a moderate size, but thicker wick than they are usually made with, is the most convenient for occasional experiments; though a tallow candle will do. The candle should be snuffed rather short, and the wick turned on one side towards the object, so that a part of it should lie horizontally. The stream of air must be blown along this horizontal part, as near as may be without striking the wick. If the flame be ragged and irregular, it is a proof that the hole is not round or smooth; and if the flame have a cavity through it, the aperture of the pipe is too large. When the whole is of a proper figure and duly proportioned, the flame consists of a neat luminous blue cone, surrounded by another flame of a more faint and indistinct appearance. The strongest heat is at the point of the inner flame. The body intended to be acted on by the blow-pipe ought not to exceed the size of a pepper-corn. It may be laid upon a piece of close-grained well-burned charcoal, unless it be of such a nature as to sink into the pores of that substance, or to have its properties affected by its inflammable quality. Such bodies may be placed in a small spoon made of pure gold or silver, or platina. Many advantages may be derived from the use of this simple and valuable instrument. Its smallness, which renders it suitable to the pocket, is no inconsiderable recommendation. The most expensive materials, and the minutest specimens of bodies, may be used in these experiments, and the whole process, instead of being carried on in an opake vessel, is under the eye of the observer from beginning to end. It is true, that very little can be determined in this way concerning the quantities of products; but, in most cases, a knowledge of the contents of any substance is a great acquisition, which is thus obtained in a very short time, and will at all events serve to shew the best and least expensive way of conducting processes with the same matters in the larger way.

The blow-pipe has deservedly, of late years, been considered as an essential instrument in a chemical laboratory, and several attempts have been made to facilitate its use by the addition of bellows, or some other equivalent instruments. These are doubtless very convenient, though they render it less portable for mineralogical researches. It will not here be necessary to enter into any description of a pair of double bellows fixed under a table, and communicating with a blow-pipe which passes through the table. Smaller bellows, of a portable size for the pocket, have been made for the same purpose. The ingenious chemist will find no great difficulty in adapting a bladder to the blow-pipe, which, under the pressure of a board, may produce a constant stream of air, and may be replenished, as it becomes empty, by blowing into it with bellows, or the mouth, at another aperture furnished with a valve opening inwards. The chief advantage these contrivances have over the common blow-pipe is, that they may be filled with vital or dephlogisticated air, which increases the activity of combustion to an astonishing degree. Little need be said concerning the manner of making experiments with fluid bodies in the common temperature of the atmosphere. Basons, cups, phials, matrasses, and other similar vessels, form the whole apparatus required for the purpose of containing the matters intended to be put together; and no other precaution or instruction is required than to use a vessel of such materials as shall not be corroded or acted upon by its contents, and of sufficient capacity to admit of any sudden expansion or frothing of the fluid, if expected. This vessel must be placed in a current of air, if noxious fumes arise, in order that these may be blown from the operation. The more complicated, and very elegant chemical machines, which have, within a very few years past, been invented, shall be described as we come to speak of their uses, by which means we hope to make them better known and readily understood.

Of OXYGEN GAS.

Different substances may be used for obtaining oxygen gas: 1. Red oxyd of mercury, or precipitate *per se*. 2. Red oxyd of mercury by nitric acid. 3. Oxyde of manganese, either alone or sprinkled with sulphuric acid. 4. Super-oxygenated muriat of pot-ash. 5. Leaves of plants, &c. There are several other substances from which oxygen gas may be obtained; of those we shall speak as we may have occasion to detail the uses of them. But, before we describe the processes for extracting oxygen gas, it will be proper to premise something on the general methods of obtaining gases. For this purpose the pneumatic chemical apparatus must be employed; as

as represented at fig. 9, in the second chemistry plate. It consists of a cistern of wood, lined with sheet lead, or tinned copper about two feet long, sixteen inches wide, and thirteen deep; at one end of which must be placed a shelf, having several holes in the nature of funnels, over which the jars and other vessels are to be placed in pneumatical experiments. When this apparatus is used, the tub is to be filled with water to such an height as to rise about one inch above the upper surface of the shelf. The glass jars are to be inverted with their mouths downwards upon the shelf. If these, or any other vessels open only at one end, be plunged under the water, and inverted after they are filled, they will remain full, notwithstanding their being raised out of the water, provided their mouths be kept immersed: for in this case, the water is sustained by the pressure of the atmosphere, in the same manner as the mercury in the barometer. It may without difficulty be imagined, that if common air, or any of the gases, be suffered to enter these vessels, it will rise to the upper part, and the surface of the water will subside. If a bottle, a cup, or any other vessel, in that state which is usually called empty, though really full of air, be plunged into the water with its mouth downwards, scarcely any water will enter, because its entrance is opposed by the elasticity of the included air; but, if the vessel be turned up, it immediately fills, and the air rises in one or more bubbles to the surface. Suppose this operation to be performed under one of the jars which are filled with water, the air will ascend as before; but, instead of escaping, it will be detained in the upper part of the jar. In this manner, therefore, we see that any of the elastic fluids may be emptied out of one vessel into another by an inverted pouring, in which the air or gas is made to ascend from the lower to the upper vessel, in which the experiments are performed, by the action of the weightier fluid, exactly similar to the common pouring of denser fluids, detained in the bottoms of open vessels, by the simple action of gravity. To this apparatus, at A, is affixed a glass bottle, whose bottom is blown very thin, that it may support the heat of a candle suddenly applied, without cracking. In its neck is fitted, by grinding, a tube, curved nearly in the form of the letter S. This kind of vessel is very useful in various chemical operations, for which it will be convenient to have them of several sizes. In the figure, the bottle is represented as containing a fluid, in the act of combining with a substance that gives out gas, which passes through the tube into the jar B, under whose mouth the other extremity of the tube is placed. At C is a retort of glass, or earthen-ware, whose neck being plunged in the water, beneath the jar B; is supposed to emit the elastic fluid, extricated from the contents of the retort, which is received in the jar. At D is a brass cock, to let off the water when needful.

In order to expel the gas from solid substances by means of heat, a gun-barrel, with the touch-hole screwed up and rivetted, may be used instead of an iron retort. The subject may be placed in the chamber of the barrel, and the rest of the bore may be filled with dry sand, that has been well burned, to expel whatever air it might have contained. The stem of a tobacco-pipe, or a small glass tube, being luted in the orifice of the barrel, the other extremity must be put into the fire, that the heat may expel the gas from its contents. This gas will of course pass through the tube, and may be received under an inverted vessel, in the usual manner. But the most accurate method of procuring gas from divers substances by means of heat, is to be put them, if they will bear it, into phials full of quicksilver, with the mouths inverted in the same, and then throw the focus of a burning lens or mirror upon them. For this purpose, their bottoms should be round and very thin, that they may not be liable to fly with the violent application of heat. Many gases combine with water, and therefore require to be treated in an apparatus in which quicksilver is made use of. This fluid being very ponderous, and of considerable price, it is an object of convenience as well as economy, that the cistern should be smaller than when water is used. But, as wood is permeable to mercury, it is to be feared, if the cistern be made of wood, that the junctures may separate, or the mercury escape through the crevices; if glass, earthenware, or porcelain, be used, there is a risk of its breaking. After several trials of different materials, Lavoisier found marble to be the best substance for constructing the mercurial cistern, which is perfectly impenetrable by mercury, and not subject to any of the inconveniences attending the other substances we have just mentioned. One of these small mercurial cisterns is delineated at fig. 10, in the plate. Fig. 11, a section of the same, to shew the retort and receiving jar.

Gases are either extracted by the action of fire, or by means of acids. When disengaged by means of fire, a retort is always used: a bent tube is also to be adapted to the orifice of this retort, whose extremity is plunged into the water or the mercury of the pneumatic cistern, under a jar filled with the same fluid, as shewn in the figure. When gases are separated by means of acids, we make use of phials or bottles, with one or with two necks, having tubes adapted to them. To this end, perforate a cork with a round file, and insert a bent glass tube; lute the joints well and close. This apparatus is not expensive, and it is easily prepared.

To transmit gases from one vessel to another, it is necessary, 1. That the latter be full of water, or some fluid heavier than air. 2. That the aperture of the vessel be turned down, and cover the hole in the shelf of the cistern, as represented in the plate, at fig. 9. Things being thus disposed, reverse also the vessel which contains the gaseous fluid, and plunge it perpendicularly into the water of the cistern, as shewn in the pneumatic apparatus at E; then, supposing this vessel to be corked like a bottle, uncork it in the water, and slope it so that its neck may stick under the excavation of the shelf. The gas presently escapes from the bottle, and passes into the jar destined to receive it; there it rises in the form of bubbles, which burst at the top of the vessel, and drive out a proportionable quantity of the liquid contained therein. In whatever manner the operation is performed, the necessity of the excavation under the shelf must be evident: it is destined to receive the gas which escapes from the immersed jar, and to direct it towards the vessel which is to contain it; otherwise the gas which escapes from the jar would be spread over the whole cavity of the cistern, instead of being carried to the place of its destination. Lavoisier and others have contrived instruments for measuring the volume of gases, to which they have given the name of *gasometer*; of which we shall hereafter give a figure and description.

The first of the elastic fluids which ought to engage our attention, is oxygen gas. To extract oxygen gas from super-oxygenated muriat of potash, put a quantity of this muriat into a glass or earthen retort; adapt a bent tube, the other end of which is to be plunged into the pneumatic cistern, under the jars or decanters. When the apparatus is in proper order, heat the retort, and increase the action of the caloric by degrees. The oxygen gas is thus disengaged; and is commonly very pure. There is another very simple method of procuring this gas. Put into an apothecary's phial three parts of oxyd of manganese in powder; pour in two parts of concentrated sulphuric acid, or rather as much as is necessary to make a soft thin paste; cork the phial; the cork is to be perforated in the middle, and one end of a hollow bent tube is to be introduced, while the other end opens under the excavation in the shelf of the cistern. When the apparatus is thus prepared, expose the mixture in the phial to a gentle heat. Then heat, effervescence, and disengagement of oxygen gas, takes place of the water contained in the jar placed for that purpose. To obtain oxygen gas from the leaves of plants, fill a bell-glass with water, pass the leaves underneath, and place this glass in a vessel containing

ing water also. Expose it to the contact of the sun's rays, and very pure oxygen gas will be produced. The emission of vital air is in proportion to the strength of the plant, and the brightness of the light; but a direct emission of the rays of the sun is not necessary to the production of this gas; it is sufficient that it is placed in a good light, for it to respire oxygen gas. The general properties of this gas are—It is heavier than atmospherical air; it is the only air proper for respiration, as is proved by experiment. Fill a tube with oxygen gas, and put therein a lighted taper; the flame will spread at the instant of immersion, and it will burn with such brightness as the eye can hardly endure; a strong and active heat is also produced under these circumstances The same effects will be produced if a lighted coal be introduced into the tube; or, if bits of wood, lighted and extinguished, be plunged suddenly into the jar, they will flame again.

The lovers of chemistry have endeavoured to exhibit this experiment in different ways; we are indebted to Ingenhouz for having presented it in a manner at once striking and agreeable: take a very small piece of very thin iron wire twisted spirally; stick one end of it into a cork intended to stop the bottle to be made use of; fasten to the other end of the wire a little bit of tinder. Then fill the bottle with oxygen gas; light the tinder, and introduce it into the bottle with the wire, which, having the cork with it, presently closes the bottle. As soon as the tinder gets within the oxygen gas, it begins to burn very bright; it communicates inflammation to the iron, which burns and throws out bright sparks, that fall to the bottom of the bottles in round globules, which become black as they get cool. The iron thus burnt is more brittle than glass itself; it falls entirely to powder. When a lighted taper or other body is plunged into a tube filled with oxygen gas, a substance is brought into contact with it, which has more affinity with the base of this gas, than that base has with caloric. Lavoisier and Erhman exposed almost all known bodies to the action of fire, aliments tated by oxygen gas only; and obtained effects from them which even the burning lens could not produce. For this purpose, a bladder is filled with this gas; and it is directed, by means of a metal or glass tube, against a lighted coal which had been previously hollowed that it might contain the substance to be wrought upon.

Oxygen gas is more salubrious than atmospherical air. Take two birds of the same kind, and of the same degree of strength; place one of them under a jar containing two measures of oxygen gas; put the other at the same time under another jar, full of atmospherical air, of the same capacity as the first: it will be found, that the bird placed under the jar filled with oxygen gas will live about three quarters of an hour, and after it is taken away the air will still be sufficiently pure; but the bird confined in common air dies in a quarter of an hour, and the air will be found quite contaminated, and unfit for respiration.

We shall not now examine the various opinions relative to the nature of this gas. Modern chemists suppose every aeriform fluid to be composed of a *base*, and of caloric. The base then is what ought to draw our attention at present. Every combustible matter may serve as a means to come at this knowledge; but we shall prefer phosphorus, which more particularly possesses the property of extracting from caloric whatever substance is united with it, in order to form oxygen gas. For this experiment, take a bell-glass or jar of about 350 cubic inches capacity, and fill it with oxygen gas over water; place it over the mercury bath by means of a slider; then place under the jar a case containing phosphorus; raise the mercury in the jar to a certain height by means of a glass syphon passed under the jar; that this may not fill in passing through the mercury, twist a bit of paper at its extremity; then, with a piece of bent red-hot iron, light the phosphorus. The combustion of the phosphorus is very rapid, accompanied with a large flame and great heat. In the first moment of combustion, the oxygen gas is considerably dilated by the heat; but, soon after the mercury rises above its level, and there is a considerable absorption; as the combustion proceeds, the inside of the jar is covered with light snowy flakes, which are nothing but concrete phosphoric acid.

For Seguin's experiment, pass a little phosphorus under a jar filled with mercury; the phosphorus, being lighter than the mercury, rises to the top of the jar; it is heated, by passing a burning coal round the jar. When the phosphorus is melted, put in the oxygen gas. A rapid inflammation takes place; and, if the gas be very pure, there is no residue, and the mercury rises to the top of the jar. This is a good process to try the purity of air; and Seguin calls it the eudiometer. If the experiment be made with impure oxygen gas, or mixed with azotic gas or any other elastic fluid not favourable to combustion, the mercury will not rise to the top of the jar; there will be a residuum. What has been said of phosphorus may be said equally of sulphur, carbon, &c. The greater part of combustible bodies which are burnt in oxygen gas is always converted into acid. In short, oxygen gas has considerable share in all the great phenomena of nature, such as combustion, respiration, and vegetation. It is the only air proper for combustion.

OF COMBUSTION.

It is very difficult to define combustion: it is an aggregate of effects produced by combustible matters, heated with the concurrence of air, and whose principles are heat, motion, flame, redness, and a change in the burnt matter. 1. In all combustion, there is an absorption of the base of oxygen gas; of which the experiment with phosphorus affords an evident proof. In the oxydation of metals by acids, in the reduction of metallic oxyds by carbon, in the combustion of sulphur, phosphorus, carbon, &c. by nitric acid; in all these cases certainly there is no oxygen gas; but concrete oxygen exists in one of the bodies composing the mixture; and it is on the passage of the oxygen more or less solid from the body which contains it into that which is destitute of it, that combustion depends.

2. The residuum of the combustion is always heavier than the body was previous to its being burnt. Metals in general acquire greater weight when combined with oxygen: 100 parts of lead yield by combustion 110 parts of oxyd; sulphur yields more sulphuric acid in weight, after combustion, than it weighed of itself. It has been erroneously said, that there existed substances, such as oils, alcohol, wood, and ether, which lost a considerable part of their weight by combustion. It is certain that combustible bodies, whose inflammable parts are volatile, present to our senses much less of their weight by combustion; but this loss only takes place in appearance: it is easy to be satisfied of this, if we consider, that what remains fixed after combustion, is not the only residue of the combustible body, and that all those which are volatile, change by combustion into aeriform fluids which dissipate, and are not seen. Ether and alcohol are examples of this truth.

3. The increase of weight acquired by the burnt body is equal to the weight of the absorbed oxygen gas. When the residue of the combustion is fixed, this is easily ascertained. Lavoisier has demonstrated, by accurate experiment, that, if calcination or oxydation of metals be made, either under bell-glasses, or in closed vessels, with known quantities of air, the oxygenated part of the atmospherical air is absorbed during the oxydation, and that oxyded metal gains as much in weight as the atmospheric air loses by the oxydation of the metal.

4. In all combustion, there is a disengagement of caloric and light. When combustion is made by the contact of air, the body which burns has more affinity, or elective attraction, towards the base of the oxygen gas, than that base has with the caloric. In consequence of this

this attraction, the base fixes and combines with the ignescent body; it quits, therefore, the caloric; and the caloric, becoming free, produces heat, and seeks to combine with the substances it meets on its passage. If combustion be made without air, the oxygen produced is not then melted into an aeriform fluid by the caloric and the light; there is scarcely any disengagement of these fluids: these combustions also are generally wrought without flame, and the heat produced is never considerable.

From these four principles it is easy to form an idea of what is to be understood by combustion. Combustible bodies are those which have the property of decomposing oxygen gas. Hence it appears, that the heat resides particularly in the oxygen gas which promotes the combustion; that, the more of the oxygen is absorbed in a given time, the stronger will be the heat; the mode of producing a great heat is to burn bodies in the purest air; that the fire and heat will be the more intense, as the air is more condensed; that streams of air are necessary to maintain and hasten combustion. On this last principle is founded the theory of cylindrical lamps: the current of air through the tube renews the air every moment; and, by feeding the flame continually with fresh oxygen gas, it acquires a heat sufficient to burn and destroy the smoke. See the section on fixed oils.

Respiration is a phenomenon very analogous to combustion. Like combustion it decomposes the air: it can only be carried on in proportion to the quantity of pure or vital air which is present, and, when all that air is destroyed, animals perish in the mephitic air which remains. It is a slow combustion, in which part of the heat of the vital air passes into the blood, which circulates through the lungs, and is with it dispersed through all the organs: thus it is that the animal heat is repaired, which is continually carried off by the atmosphere and by surrounding bodies. The maintenance of the heat of the blood is therefore one of the principal uses of respiration; and this happy theory explains why animals which do not respire the air, or which respire it very little, have cold blood. Messieurs Lavoisier and De la Place have discovered a second use of air in respiration; namely, to absorb a principle which exhales from the blood, and appears to be of the same nature as charcoal. This body, reduced into vapours, combines with the oxygen of the vital air, and forms carbonic acid, which issues out of the lungs by the expiration. This formation of carbonic acid which takes place in atmospheric air respired by animals, at the same time that the mephitis is separated, clearly shews the dangerous consequences which result from too great a number of persons being included in close places, such as theatres, hospitals, &c. and the noxious effects, which air vitiated by respiration produces on persons of delicate constitutions, are no longer to be wondered at.

OF ATMOSPHERICAL AIR.

Air is one of those natural objects upon which modern physics have made so many and great discoveries. The physical properties of air, are, 1. Its fluidity, which renders it susceptible of those frequent and rapid motions of its parts, which are called winds. It is not, however, of that subtlety, as to pass through the pores of many bodies. Transparent substances, through which light passes with extreme facility, are not penetrable by air. Water, saline solutions, oils, and spirit of wine, pass through a great number of bodies, whose texture is not penetrable by air. Nor has it that property by which liquids insinuate themselves into the pores of certain bodies, and cause them to expand. 2. Its invisibility, as not being obvious to our sight. 3. Its insipidity: this opinion, however, is not universal: some allow this property in air, others deny it; but, if we attend to the consequences of this fluid touching any bare nerve of an animal, as is the case in wounds and other similar circumstances, we may conclude that it has a kind of sapidity, which habit has probably rendered insensible. In fact, the exposure of wounds to the air is often attended with very acute pain. It is sufficiently ascertained, by the experiments of Dr. Beddoes, that these effects of air depend upon its oxygen, which probably combines either with the matter discharged from the ulcerated or raw surface, or combines with the surface itself. It was long ago suggested by Berthollet, that the causticity of metallic oxyds depended on the affinity of their oxygen with animal matter; and the truth of this opinion was confirmed experimentally by Fourcroy; *Annales de Chimie*, tom. 7. An infant, at the instant of its birth, sufficiently shews, by its cries, the disagreeable impression this contact occasions. This acrimony in the air appears to be the cause of that difficulty with which wounds cicatrize, if not kept covered; atmospherical air also prevents cicatrization in vegetables which have been deprived of their bark; and the production of this membrane is known to take place only when the external air is excluded.

4. The air, according to Fourcroy, is perfectly inodorous; who says, that, in those cases in which a sort of fetid smell is perceived, it is easily accounted for, by attention to the foreign bodies interspersed through it, as mists or vapours: but this account does not appear to be strictly accurate, since the purest atmospheric air that has yet been found contains a mixture of carbonic acid gas. Caustic alkalis become mild, lime-water acquires a pellicle on its surface, and metallic oxyds become effervescent in acids, after exposure for a sufficient length of time to atmospheric air. These changes take place in every situation in which the experiments have been properly tried. Even upon the summit of Mont Blanc, there was a sufficient quantity of carbonic acid gas in the atmospheric air to produce, in seven quarters of an hour, a pellicle upon the surface of lime-water, and to communicate, in an hour and a half, the property of effervescing to caustic potash. It farther appears, that this small quantity of carbonic acid gas adheres so strongly to the atmospheric air, that the latter does not produce the slightest cloud when agitated with lime-water. It was this, and other effects of the same kind, which induced Mr. Kirwan to conclude that the quantity of carbonic acid gas in atmospheric air is absolutely inappreciable. Morveau has pointed out the circumstances which occasioned the failure of Mr. Kirwan's experiments, and has shewn that atmospheric air contains a small quantity of carbonic acid gas, even when it is unable to produce the smallest cloudiness in lime-water. Atmospheric air also contains water; the quantity of which varies according to the temperature and density of the air, and according to the nature and qualities of the substances to which it has been recently exposed. It appears from the accurate experiments of Saussure, that a cubic foot of atmospheric air, having the temperature of 65°, dissolves about eleven grains of water, in passing from extreme dryness to extreme humidity. Consult upon this subject Saussure's *Essais sur l'Hygrometrie*, § 97, 180.

5. Its weight; which is one of the most valuable discoveries in natural philosophy. It was not well established till about the middle of the seventeenth century, though it is affirmed, that Aristotle knew that a bladder is heavier when full of air, than when empty. The ancients had no idea of the weight of the air; but attributed all the phenomena arising from that weight to an occult quality which they called the *horror of a vacuum*. The impossibility of raising water by the common pump to a greater height than thirty-two feet, engaged certain workmen to consult the famous Galileo, who was much surprised at the fact. Death, in all probability, prevented his sagacity from discovering the true cause of this, which was reserved for his disciple Torricellius. He was led to it by the following reasoning: the water appeared to him to rise in the sucking-pump solely in consequence of an exterior cause, which, by pressure, obliged it to follow

follow the piston. The action of this cause is evidently limited, as appears by its sustaining a column of no more than thirty-two-feet of water. If, therefore, it were to act on a fluid specifically heavier than water, it ought to raise and sustain to a height inversely as its specific gravity. From these reflections he was induced to take a tube of glass hermetically sealed at one end, and thirty-six inches in length. He filled this with mercury, the closed end being downwards; then, closing the extremity with his finger, he raised the other end uppermost, and plunged the unsealed end beneath the surface of a vessel of mercury. Upon removing his finger, he observed the mercurial column to descend, till after several oscillations its upper surface remained at twenty-eight inches above the surface of the mercury in the bason: and hence the invention of the barometer. By comparing this height with the height of thirty-two feet, to which water is raised in pumps, he found it corresponded accurately to the inverse ratio of the weights; for the specific gravity of mercury and water being in round numbers, as fourteen to one, the mercury was found to stand in the vacuum at only one-fourteenth of the height of the water. It was not till after much meditation, that he suspected the weight of the air to be the cause of the suspension of water in pumps; and this doctrine was not incontrovertibly established until after the ingenious experiment of Pascal. This celebrated philosopher imagined, that if water were sustained at the height of thirty-two feet in pumps, and mercury at twenty-eight inches in the Torricellian tube, by the sole gravity of the air, the heights of these fluids ought to vary with that gravity; that they ought not, for example, to be the same on the top of a mountain and in a valley, because the length of a column of the atmosphere must be shorter, and consequently its weight less in the former than in the latter case. In pursuance of this idea of Pascal, M. Perrier, on the 19th of September, 1648, at the foot and at the summit of the mountain Puits de Dome in Auvergne, made the famous experiment, which has for ever fixed the opinion of philosophers on this subject. The barometer, or Torricellian tube filled with mercury, and fixed to a scale of thirty-four inches, shewed a fall or diminution of the mercurial column equal to four inches, in ascending from the foot of the mountain to its summit, which is five hundred toises higher. By this it was ascertained, that the mercury varies about an inch for every hundred fathoms; and this instrument has since that time been very successfully applied to measure the height of mountains.

The weight of the air has great influence on a number of physical and chemical phenomena. It compresses all bodies, and opposes their dilatation. It is an obstacle to the evaporation of fluids. The water of the sea is, by this cause, preserved in its liquid state, without which it would take the vaporous form, as we see in the vacuum of the air-pump. The pressure of the air on our bodies preserves the state both of the solids and fluids; and from the want of this due pressure it is, that on the summits of lofty mountains the blood often issues from the pores of the skin, or from the lungs, and occasions hemorrhages.

6. Its elasticity, by which it is capable of being very much condensed, and suddenly regains its former state when at liberty. A great number of facts prove the truth of this assertion. We shall here mention one or two of the most obvious and conclusive. If mercury be poured into a tube in the form of the letter U, and closed at one end, the air in the closed end will contract in its dimensions, in proportion as the quantity of mercury by which it is compressed is greater. The foot-ball of children, consisting of a bladder filled with wind, and enclosed in leather, shews the same elasticity, by its rebounding when it falls on hard bodies. The fountain, by compressed air, shews the same thing. This is a vessel half filled with water, and air is strongly compressed into its superior part: the re-action of the air on the water forces it out to a considerable height through a tube. A withered apple, put under the receiver of an air-pump, and the air sucked out, becomes plump and looks fresh; but, when air is re-admitted, it becomes as before. Fishes and birds shew the elasticity of the air: the fish has received from nature different modes of action; its physical means are the bladder, which it has the power of compressing or dilating, to rise in the water or to descend; its tail, which is very muscular, forms a point of resistance against the water. It is estimated that air may be compressed into the 128th of its usual volume.

Heat producing a contrary effect to that of compression upon air, serves to shew, that its volume may be exceedingly augmented by the increase of its spring. When a bladder full of air is exposed to the heat of a furnace, the air is dilated so as to burst the bladder with an explosion. This phenomenon is partly the occasion of the bursting of chemical vessels, which often happens where due precautions are not taken to prevent it. The absence of the pressure of the atmosphere, or the total abstraction of the circumambient air from beneath the receiver of an air-pump, causes a bladder enclosed therein to burst by the spring of the included air, which then acts without opposition.

From this account of the gravity and the elasticity of the air, it may be readily inferred, that these properties are the leading causes of the numerous atmospherical changes, and the variations in the mercurial column in the barometer. In fact, the inferior strata of the atmosphere must sustain the weight of the air above them, and are therefore in a state of compression, which diminishes with the greater elevation of places: and the continual change of temperature must also greatly affect the gravity of the air, by augmenting or diminishing its elasticity. Thus, as we have already noticed, the air is lighter, keener, and more agitated on the tops of mountains than in lower regions; and it is only from the consideration of the combined effects of the heat, gravity, and elasticity, of the atmosphere, that the barometrical changes can be accounted for. M. de Luc and M. de Saussure have paid great attention to this important subject for some years past: and the barometrical measurement of elevations has been well treated of, both practically and scientifically, by sir George Shuckburgh and colonel Roy, in the 77th vol. of the Philosophical Transactions.

The chemical properties of air, come next under consideration. Van Helmont, Boyle, and Hales, having perceived that air, or at least a fluid possessing all its apparent properties, was obtained from many natural substances, adopted the opinion that this element combines with, and becomes *fixed* in, bodies. Such is the origin of the term *fixed air*, which was given to the elastic fluids obtained in chemical operations. The early philosophers supposed these fluids to be air; but the discoveries of Dr. Priestley have shewn, that there are many bodies which have the physical properties of air, though they differ from it essentially in many respects. It is, therefore, necessary to attend to those other properties, in order to distinguish air from other aeriform fluids, which resemble it in invisibility and elasticity. These properties are chemical; and the experiments which confirm the chemical properties of air, are those which are made for analysing this fluid.

Take a bell-glass of a given height; turn it down in a saucer half full of water, in the middle of which fix a taper on an iron-wire; the flame presently shrinks, turns blue, and goes out; the water in the saucer rises near one-fourth up the glass. This experiment will be more curious, if we place in the saucer several lighted tapers of different heights; they will be extinguished in succession, beginning with the tallest. These experiments prove at once, that atmospherical air is composed of two elastic fluids, one of which maintains combustion, and another which cannot.

Sulphure of potash has also the property of decomposing atmospherical air. Put two or three bits of sulphure, as big as a pea, into a retort, which fill with water, taking care to slope it so as to let all the air which might be in the globular part pass into the neck; stop the orifice with your finger, and put its neck downwards into the pneumatic cistern, to let in the gas for trial in the ordinary way. By inclining it again, with care, different ways, all the water will be displaced, and the sulphure remain in the bulb. This done place the retort in a vertical position, insert the end of it into a glass tube under water. and put a small lighted taper under the bulb. The first impression of the heat dilates the gaseous fluid; and, as the sulphure begins to bubble up, the water rises rapidly; and if the air is pure, there is a total absorption; if it be common air, only a certain quantity of water rises into the retort, which represents exactly the volume absorbed. Upon this experiment is founded the utility of Guyton's eudiometer.

If chopped vegetables, flowers, or fruit, be placed under jars filled with atmospherical air, they consume the oxygen, and there remains an elastic fluid improper for combustion or respiration. The same result takes place with phosphorus, sulphure of potash, &c. That respiration, as well as combustion, decomposes common air, the following experiments will prove: 1. Pass the gas which comes from the lungs through lime-water, and a precipitation takes place. 2. Draw the same gas through tincture of turnsole, it will turn red; if pure alkali be substituted for the tincture of turnsole, it becomes effervescent. All these differences prove, then, that air is decomposed, since, on the one hand, a gas improper to combustion is produced; on the other, a fixation of oxygen gas in the bodies brought into contact with common air; and, lastly, by the act of respiration, a peculiar gas is produced, which forms fresh combinations. Atmospherical air is composed of twenty-seven parts of oxygen gas, and about seventy-two of azotic gas.

OF COMBUSTIBLE BODIES.

Azotic gas.—This elastic fluid, which forms more than two-thirds of the air of the atmosphere, was at first called *mephitis* by Lavoisier, because it extinguishes bodies in combustion, and destroys animal life; but as all the gases, except vital and atmospherical air, are equally noxious, and as the name of mephitis is a general expression which belongs to them all alike, and has always been given to elastic fluids, which are not respirable, the name of *azotic gas*, is now given to this aeriform fluid; and this denomination admits the name *azot*, as the substantive, to the base of this gas, which, like that of vital air, or oxygen, becomes fixed by combining with various substances. To give in this place some information respecting the nature of this azotic gas, we shall describe some of its properties. It is somewhat lighter than atmospheric air, and occupies the upper part of rooms in which the air is altered by respiration and combustion. Though it is very noxious to animals in its state of elastic fluidity, yet its base, or azot, is one of the component parts of their bodies, from which it is obtained in very great quantities. It is one of the constituent parts of volatile alkali, or ammoniac, and of the nitric acid. It is absorbed by vegetables, and perhaps by animals. It is likewise very probable that it forms one of the principles of all the alkalis, and that it may be considered as the true alkaligen, oppoled to the base of vital air or oxygen. The atmosphere would be then, according to these considerations, an immense reservoir of the acidifying and alkalifying principles, without being itself either acid or alkaline.

There are several modes of obtaining azotic gas. 1. By sulphure of potash exposed under a bell-glass in a quantity of atmospherical air. 2. By Berthollet's method of treating muscular flesh, or the fibrous parts of blood well washed in weak nitric acid. For this purpose, cut the flesh in pieces; put it either into a retort, or into a phial or matrass; pour thereon weak nitric acid; adapt a tube to the retort or phial, and lute it; place the apparatus over a sand-bath, and pass the tube under a jar in the mercurial pneumatic apparatus: the water cistern may serve also when the experiments are not required to be very exact. 3. Fourcroy observed, that the air-bladders of the cask contained azotic gas. To obtain it, nothing more is necessary than to bruise them in jars filled with water. 4. It may be obtained by exposing a mixture of iron and sulphur beat up in water, over mercury, in atmospherical air. 5. By the oxydation of metals, the rancidity of oils, the combustion of phosphorus, &c. 6. By the decomposition of animal and vegetable substances, the leaves of plants, &c. All these substances decompose atmospherical air; and the residue is azotic gas.

Its properties.—This gas is destructive of combustion and respiration: it is easy to prove this by plunging a lighted taper into a cylindrical tube filled with this gas; the light goes suddenly out; and animals die in it. This gas is not acid: if it be put in contact with water, lime-water, and tincture of turnsole, the nature of these bodies is not changed; the azotic gas still remains pure. By mixing azotic gas and oxygen gas, a re-composition of atmospherical air is produced. Put under a bell-glass filled with water, three parts of azotic gas and one of oxygen gas; in the fluid which is the result of this experiment, put a light, and it will burn as in atmospherical air. The base of azotic gas is not sufficiently known.

Hydrogen gas.—This is always best obtained by a decomposition of water: for this purpose pass a gun-barrel through a furnace, observing to slope it towards the narrowest end. In the upper extremity insert a bent tube, as shewn at A, fig. 12, in the engraving; while the other extremity is terminated by a tube, B, which is passed into the pneumatic cistern, under a jar. The apparatus being thus disposed and well luted, make the gun-barrel red-hot: when the barrel begins to be very hot, put water, drop by drop, into the tube A: the water will run through; and, as soon as it comes in contact with the gun-barrel, it is decomposed; the iron takes up the oxygen, and the hydrogen is disengaged in a gaseous state through the tube B.

This gas is obtained also by pouring sulphuric acid upon iron-filings or zink. Take an apothecary's phial, or a small matrass containing iron-filings or zink; pour over it weak sulphuric acid, whose specific weight to that of water shall be only as eleven to ten; adapt thereto a bent tube, which is to be passed under a bell-glass. As soon as the sulphuric acid is in contact with the iron, it excites a brisk effervescence; the water which serves as a vehicle to this acid is decomposed, the oxygen strikes upon the metal, and the hydrogen is disengaged. This gas is likewise furnished by the simple distillation of vegetable substances, animal putrescence, and vegetable fermentation.

Its properties.—It has a disagreeable smell; is invisible, elastic, and twelve times lighter than atmospherical air; on the lightness of hydrogen gas, or inflammable air, depends the theory of the air-balloon. This gas is not proper for maintaining combustion, as will appear from the following experiment: Having introduced hydrogen gas into a bell-glass filled with mercury, put in a small saucer with some tinder and a little phosphorus; touch the phosphorus with a red-hot bent iron-wire thrust through the mercury, and the phosphorus melts immediately, but there is no flame.

Hydrogen gas and atmospherical air.—Fill a bell-glass with hydrogen gas, draw it out of the pneumatic cistern, and put to it immediately a lighted taper; the gas lights, and the flame is seen successively to descend in the bottle. There are several other ways of producing this effect. Put iron-filings into a bottle with two necks, as represented at fig. 13, in the plate. To one of the necks adjust a tube of glass terminated by a capillary

lary tube; pour weak fulphuric acid in at the other neck. At the inftant the gas is difengaged, prefent a lighted taper, the gas catches flame, and forms what is called the philofophic candle, which burns as long as there is any difengagement of gas.

This experiment may be made in a different way. Fill a large bell-glafs, as fhewn at fig. 14, with hydrogen gas; at the neck put a ftop-cock, fuftaining a copper tube either ftrait or bent; comprefs the gas by putting the bell-glafs below the level of the water in the pneumatic ciftern; then turn the cock, and prefent a lighted taper to the extremity: the gas takes fire immediately. Or a bladder may be tied to a ftop-cock, or, more fimply ftill, to a fmall glafs tube; drive out the gas by preffure, and the effect will be the fame. From thefe experiments it appears, that hydrogen gas, which is not inflammable of itfelf, only enjoys this property when in contact with atmofpherical air.

Hydrogen gas, mixed with atmospherical air.—Fill a bottle with atmofpherical air and hydrogen gas, fo that the atmofpherical air forms about two-thirds of the mixture; and apply a lighted taper. The flame is not then feen to defcend by degrees into the bottle: the inflammation is fudden, and accompanied with real explofion or detonation.

Hydrogen gas and oxygen gas.—Pafs under an inverted jar two-thirds of hydrogen gas, and one-third of oxygen gas; apply a light to the mixture; the inflammation is total and inftantaneous, and the detonation very loud. The mixture of thefe two gafes is called *thundering air*. If hydrogen gas alone be blown through a bladder into foap-fuds, and a lighted taper be brought in contact with the bubbles thereby raifed, the combuftion is fucceffive and without noife; but, if the fame experiment be made with a mixture of hydrogen gas and oxygen gas, there will be a ftrong explofion. The loudnefs of the detonation arifes only from the due proportion of the mixture, which is totally burnt. Hydrogen gas is improper for refpiration. Take a bell-glafs and fill it with hydrogen gas, put in a bird or other animal, and cover it over to prevent the fluid from efcaping: the animal is immediately feized with violent convulfions, and foon dies.

Of CARBON.

Carbon, or coal, the bafis of animal and vegetable fubftances, is prefent almoft every where. Five fpecies may be diftinguifhed: vegetable, animal, and foffile, coal; wood charred in the earth, wood charred in water. The two firft fpecies arife from the diftillation of animal and vegetable fubftances: but pure carbon is not produced this way; it is previoufly neceffary, by proper wafhings in clear water, to extract all the falts which are mixed and confounded therewith; then the carbon is to be dried with a violent heat in clofed veffels; this is a neceffary precaution, for the laft drops of water adhere fo ftrongly as to be decompofed, and furnifh hydrogen gas and carbonic acid.

Carbonic acid produces alfo, by decompofition, very pure carbon. Put into a glafs tube, clofed at one end, one part of phofphorus, and over that five parts of calcareous carbonat in fine powder; let the tube end in a point by means of a capillary point; place the tube in the middle of a furnace, fo that the fuel can only heat the carbonate, the end of the tube containing the phofphorus being then in the afh-hole, as reprefented in the plate, at fig. 15; faften the tube with a wire, and heat it; when the falt is very hot, raife the tube that the phofphorus may burn. At this temperature the phofphorus feizes on the oxygen of the carbonic acid, and becomes phofphoric acid, which unites with lime to form a calcareous phofphat, while the carbon is left to itfelf. By wafhing the refult of this operation in water, the carbon is feparated.

Expofed to the air, carbon burns, reddens, and gives out light, but no flame. If the experiment be made under a bell-glafs filled with atmofpherical air, the combuftion of the carbon abforbs only about fifteen parts of the oxygen, becaufe the azot which is difengaged, furrounds the charcoal, and leffens the combuftion. If charcoal be burnt under a bell-glafs, or in a jar filled with pure oxygen gas, the combuftion is complete; the carbon takes up all the oxygen, and makes a frefh combination: this is called carbonic acid. If water be paffed under the glafs, and it be put in motion, the gas is diffolved in the water, and the refult is liquid carbonic acid, which is known by its properties.

Charcoal is very greedy of air. If a piece of charcoal, well dried, be put under a jar, in a mercurial bath, filled with that metal, the charcoal will be feen to abforb the air, and the mercury to rife pretty quick; but, if aqueous gas be paffed under the jar, then the charcoal abforbs the humidity in preference: it takes the water and leaves the air, and the mercury finks again.

Carbon melts in hydrogen gas: if carbonated hydrogen gas be burnt with oxygen, water and carbonic acid are the products. The hydrogen gas, which has diffolved carbon, acquires a greater fpecific gravity. Carbonated hydrogen gas is difengaged in general in all diftillations of vegetable and animal fubftances; for the hydrogen exifts in a folid ftate in plants, and goes off in gas only by means of the caloric communicated to it by the fire employed in the diftillation; and it diffolves charcoal.

Of PHOSPHORUS.

Phofphorus was originally obtained from urine. According to Leibnitz, the difcovery of phofphorus is due to an alchemift named Brandt, a citizen of Hamburg, who difcovered it in 1667. Kunckel affociated with a certain perfon named Krafft, to purchafe this fecret; but the latter having purchafed it, and refufing to communicate it to Kunckel, he refolved to make a feries of experiments on urine, from which he knew it was extracted, in order to difcover it. His inquiries were attended with fuccefs, and therefore he ought to be regarded as the true inventor. Some perfons likewife attribute the honour of this difcovery to Boyle, who in fact depofited a fmall quantity, in the year 1680, in the hands of the fecretary of the royal fociety of London; but Stahl affirms that Krafft told him that he communicated the procefs of making phofphorus to Boyle; Boyle communicated his procefs to a German, named Godfried Hanckwitz, who had a good laboratory at London, and was for a long time the only perfon who made phofphorus, and fold it to all the philofophers throughout Europe. Notwithftanding a great number of receipts for making phofphorus, and among others thofe of Boyle, Krafft, Brandt, Hoffman, Teichmeyer, Frederic Hoffman, Neiwentyt, and Wadelius, have been publifhed, fince the year 1680, to the commencement of the prefent century, no chemift fucceeded in preparing it; and the procefs was in reality a fecret, till a ftranger, in 1737, offered at Paris to communicate a fuccefsful method of making it. The academy nominated four chemifts, Hellot, Dufay, Geoffroy, and Duhamel, to attend this operation in the laboratory of the royal garden. The procefs fucceeded very well, the minifter rewarded the foreigner, and M. Hellot defcribed it very accurately, in a memoir inferted among thofe of the academy for the year 1737. The operation confifts in evaporating five or fix hogfheads of urine, till it is reduced into a granulated, hard, black, and fhining, fubftance; this refidue is calcined in an iron pot, whofe bottom is heated red-hot, till no more fumes arife, and a fmell like that of peach-bloffoms is perceived; the calcined matter is lixiviated with about twice its weight of hot water, and is dried after the water has been decanted off. Three pounds of this matter are then mixed with one pound and a half of coarfe fand, or pounded ftone-ware, and four or five ounces of the powder of charcoal of beech,

beech. This mixture being moistened with half a pint of water, is introduced into a Hessian retort; the matter is assayed, by making a portion red-hot in a crucible: if it emit a violent flame, with a smell of garlic, it is a proof that phosphorus will be afforded. The retort is placed in a furnace built on purpose, and a large receiver is adapted, one-third full of water; the receiver must have a small hole pierced in it; and M. Hellot considers this as one of the most necessary circumstances to ensure success. Three or four days after the apparatus has been put together, a fire is made so as very gradually to dry the furnace and the lutes. The fire is raised by degrees to the most extreme heat, and kept up in that state from fifteen to twenty hours; the phosphorus does not come over till about fourteen hours after the commencement of the operation, which in the whole lasts twenty-four hours. A large quantity of ammoniacal carbonat first rises, which is partly dissolved in the water of the receiver: the volatile or aeriform phosphorus, first passes in luminous vapours; the true phosphorus next comes over, in the form of an oil, or resembling melted wax. When no more passes over, the apparatus is left to cool for two days; the receiver is then unluted, and water is added to loosen the phosphorus adhering to the sides; the phosphorus is then melted in boiling water, and cut into small pieces, which are introduced into the necks of matrasses, cut towards the middle of the body in the form of a funnel, and plunged in boiling water; the phosphorus melts, is purified, and becomes transparent, by the separation of a blackish matter, which rises to the top; it is afterwards plunged in cold water, by which it is rendered solid.

Modern chemists obtain phosphorus by decomposing calcareous phosphat with sulphuric acid, &c. When the phosphat is very pure, it is transparent, and of a consistence like wax. In order to mould the phosphorus into sticks, take a long-necked funnel, or tube; stop the orifice with a cork or bit of wood; fill it with water, and put in the phosphorus; plunge the tube into boiling water, and the phosphorus will melt and run; then plunge the tube into cold water; and, when the phosphorus is congealed, take away the cork, and push it out of the tube or mould with a small stick or rod. Pelletier contrived the following method: Take a tube about seven inches long, with an aperture not too large to be closed with the top of the fore-finger; melt the phosphorus in boiling water, then immerse one end of the tube, holding the other end in the mouth; make a slight inspiration, that the phosphorus may rise in the tube, but stop the moment the phosphorus is within an inch of your mouth; then stop the end of the tube with your finger, and plunge it into an earthen pan full of cold water; the phosphorus will soon congeal, and, by a slight shake, may be driven out of the tube.

In breaking a stick of phosphorus, the elements of crystallization are sometimes apparent; but, to obtain it crystallized in octahedrons, it must be dissolved in water of 31 or 32° temperature; as it congeals, prick it, and let the still-liquid phosphorus run out: the result is a mass of crystals in needles. Pelletier also obtained crystallized phosphorus from its solution in a volatile oil, by cooling only, or in adding alcohol to the solution; and at length a precipitate was formed, which was of eight sides with the upper and lower angle blunted. The phosphorus should always be melted under water. By putting it under water for melting, the temperature of its fusion may be estimated. To preserve phosphorus, it should be kept under water and without light; for, when exposed to the light, it becomes covered with a red pellicle; this is a beginning of combustion or oxydation. In preserving phosphorus under water, care must be taken that it be not aerated.

Phosphorus, when extracted from the substances which contain it, is commonly dirty and impure; it contains charcoal-dust and phosphorus half burnt, which gives it a red or brown colour. To obtain it pure, it should be melted, and passed several times through chamois-leather in hot water: the leather can serve only once, as the second parcel of phosphorus put into it would be coloured by it. Phosphorus volatilises easily in distillation with water; it becomes liquid, and rises in vapour, with the heat of boiling water. It may be distilled by filling the vessels previously with carbonic acid, or any other gas not proper for maintaining combustion.

The various colours under which phosphorus is obtained, arise from the greater or less quantity of oxygen it has absorbed, but yet not to become acid: this is oxyd of phosphorus. To separate the phosphorus from its oxydated part, put a given quantity of it into a tube, which plunge into hot water; the phosphorus melts, and the oxyd floats on the surface, provided the oxydated portion is not soluble in the same degree of heat. This, therefore, exhibits another mode of purifying phosphorus.

If phosphorus be exposed to atmospherical air, it burns slowly, and exhales smoke all over its surface; this vapour, which gives out a strong smell of garlic, is phosphorus acid. Put each cylindrical stick of phosphorus into a little glass tube, whose extremity is closed funnel-fashion, with a small aperture for the passage of the little drop of acid which is produced: prepare several of these tubes, and put them into a large funnel under a bell-glass or jar, as represented in the Chemistry Plate II, fig. 16. Place this in a dish containing water, and cover the whole with a large glass dome, with apertures at the sides, that the dust may not fall upon it, and also to keep the air moist, which greatly forwards the decomposition or insensible combustion of the phosphorus.

Take a tube of glass, closed at one end, about sixteen inches long and half an inch thick, widened at bottom that it may stand firm. Introduce into it a smaller tube, at the end of which fasten a stick of phosphorus. Place the apparatus over water. The phosphorus takes up all the oxygen of the air; and the azot, which melts the phosphorus, does not unite with it, but holds a part of it in solution, which even catches fire at once, if not kept in a proper temperature. This is Berthollet's eudiometer. The presence of the phosphorus, thus held in solution by the azot, may increase the volume so as cause some mistake in experiments with the eudiometer, if you only verify the volumes without proving also the weights.

Take a tube of glass or crystal, of an inch in diameter and six inches long, closed at its upper end, and widened at the lower extremity. Fill this with mercury, and put in a little phosphorus, which, having less specific gravity, rises to the upper part of the tube; melt the phosphorus by means of a lighted coal applied on the outside of the tube; then introduce into the tube the small portions of air to be wrought upon, which have been previously gaged in a jar graduated for that purpose. The combustion continues till the end of the operation; but, for greater exactitude, heat the residue very strongly; and, when cold, pass it into a little jar gaged at the same time with the first: the difference in the two volumes shews the quantity of oxygen gas which the air contained that was used in the experiment. This is the whole artifice of Seguin's eudiometer.

Humboldt has lately proved, by a great number of experiments, 1. That phosphorus, whether it be burnt or nearly made lucid in contact with atmospherical air, is an eudiometrical substance extremely irregular and uncertain, since oftentimes it absorbs only 0·15 to 0·20 of oxygen, instead of 0·27; and the same gas essayed in different tubes gives different results. 2. That nitrous gas discovers almost constantly some hundredth parts of oxygen in the residuum of the phosphoric eudiometer. 3. That all azotic gases, in which phosphorus throws out no light, and which do not decrease in volume with nitrous gas, cannot be considered as devoid of oxygen. There are cases where 0·13 of oxygen remain concealed in

in a gas, in which phosphorus, at the temperature of 50°, melts without light, and on which nitrous gas works no alteration. 4. That phosphorus dissolves equally in azotic gas and in oxygen gas, forming oxyds with double bases of phosphorus and azote, oxydated azotic phosphures, which the nitrous gas decomposes but in part.

If the experiment be made with the pneumatic apparatus before-described, the result of the combustion is always phosphoric acid. It is concrete, if water be not passed under the jar; to obtain it liquid, water is put in, and also upon the partitions; then the phosphoric acid is dissolved with ease. Pelletier has pointed out another method: his apparatus is a lengthened cylinder, in which the phosphorus is put with water. This cylinder is put into a vessel, containing boiling water, to keep the phosphorus in a liquefied state; then there is a bent tube, one of whose apertures is plunged into the phosphorus, and the other is adapted upon a large jar, which has a second neck or aperture, by means of which a funnel is mounted, furnished with a stop-cock, as delineated in the same plate, at fig. 17. Things being thus prepared, pour water into the funnel; then, by turning the cock, the water runs into the jar and drives the air into the tube: the water, passing through the phosphorus, combines with, and produces combustion in, the phosphorus, which is thereby changed into phosphoric acid. When the jar is full of water, it is drawn out by a cock in the lower part, and adapted for that purpose.

Phosphorus dissolves in all oils, and renders them luminous. Spielman has discovered that it dissolves in alcohol, and that this solution emits sparks when it is poured into water: part of the phosphorus is precipitated in a white powder during this operation. Phosphorus is as yet very little used either in medicine or in the arts. Menzies, Morgenstern, Hartman, &c. affirm, that they have experienced very happy effects in malignant and bilious fevers, when the strength has been exhausted, and in the biliary fever; others have recommended it in the scarlet fever, the peripneumony, rheumatic pains, epilepsy, &c. but though several dissertations have appeared in Germany on the medicinal virtues of phosphorus employed internally, nothing can yet be established concerning it, till experience has ascertained its virtues with greater certainty.

The most authentic information relative to the medical properties of phosphorus, seems to be that of M. Leroi, professor of the Medical School in Paris, published in 1798. His observations are as follow: 1. Phosphorus administered internally in consumptive diseases appears to give a certain degree of activity to life, and to revive the patients, without raising their pulse in the same proportion. The author relates several instances that occurred to him in the course of his practice, one of which is as follows: Being called to attend a woman, at the point of death, who was quite worn out by a consumptive disorder, with which she had been afflicted for three years, in compliance with the earnest desire of her husband, who requested him to give her some medicine, he composed one of a portion of syrup diluted with water in which a few sticks of phosphorus had been kept. Next day the woman found herself much better. She was revived for a few days; and did not die for about a fortnight after.

2. He himself, as he acknowledges, was so imprudent as to take two or three grains of solid phosphorus combined only with treacle, and experienced the most dreadful symptoms. At first he felt a burning heat in the whole region of the stomach. That organ seemed to be filled with gas which escaped by the mouth. Being dreadfully tormented, he tried to vomit, but in vain, and found relief only by drinking cold water from time to time. His uneasy sensations were at length allayed; but next morning he seemed to be endowed with an astonishing muscular force, and to be urged with an almost irresistible impulse to try its energy. The effect of this medicine at length ceased, adds the author, *à la suite d'un priapisme violent*.

3. In many cases the author employed, and still employs, phosphorus internally, with great benefit, to restore and revive young persons exhausted by excesses. He divides the phosphorus into very small particles, by shaking it in a glass filled with boiling water. He continues to shake the bottle, plunging it into cold water, and thus obtains a kind of precipitate of phosphorus, exceedingly fine, which he bruises slowly with a little oil and sugar, or afterwards employs as liquid electuary, by diluting the whole in the yolk of an egg. By means of this medicine he has effected astonishing cures, and restored the strength of his patients in a very short time.

4. In malignant fevers the use of phosphorus internally, to check the progress of gangrene, has succeeded beyond expectation. The author relates several instances.

5. Pelletier told him, that having left, through negligence, some phosphorus in a copper bason, that metal was oxydated, and remained suspended in the water. Having thoughtlessly thrown out the water in a small court in which ducks were kept, these animals drank of it, and all died. *Mais le male*, says the author, *couvrit toutes ses femelles jusqu'au dernier instant de sa vie*. An observation which accords with the effect experienced by the author.

6. The author relates a fact which proves the astonishing divisibility of phosphorus. Having administered to a patient some pills, in the composition of which there was not more than a quarter of a grain of phosphorus, and having had occasion afterwards to open the body, he found all the internal parts luminous; and even the hands of the person who had performed the operation, though washed and well dried, retained a phosphoric splendor for a long time after.

7. The phosphoric acid, employed as lemonade, has been serviceable to the author in the cure of a great number of diseases.

8. Leroi assures us that he oxydated iron with phosphorus, and obtained, by the common means, a white oxyd, almost irreducible, which he thinks may be employed with advantage in the arts, and particularly in painting with oil, and in enamel, instead of the white oxyd of lead. This white oxyd of iron occasioned violent retchings to the author, who ventured to place a very small particle of it on his tongue. He does not hesitate, therefore, to consider this oxyd as a terrible poison. He was not able to reduce it, but by fixed alkali and the glass of phosphorus.

9. The author asserts, that by means of phosphorus he decomposed and separated from their bases the sulphuric muriatic and nitric acids; that, by help of the phosphoric acid, he transmuted earths; and that, with calcareous earth, he can make, at pleasure, considerable quantities of magnesia. He declares that to his labours on phosphorus he is indebted for processes by which he effects the dissipation *(opère la frite)* of rubies, the fusion of emeralds, and the vitrification of mercury.

PHOSPHORATED HYDROGEN GAS.—There are various modes of producing this gas, of which we shall only mention the principal. Fill a bell-glass or inverted jar with pure hydrogen gas; place it over mercury, and introduce the phosphorus at the bottom of the vessel; bring the sun's rays, by means of a burning lens, in contact with the middle of the jar, as shewn in the Chemistry Plate III. fig. 1. The hydrogen gas will be presently changed into phosphoric hydrogen gas, which exhales an insupportable smell of stinking fish. It takes flame as soon as it comes in contact with the air: the inflammation gives birth to water and phosphoric acid, and circular crowns of smoke are formed from its bubbles. When the hydrogen gas has burned, the bubble of water which encompassed it is combined with the phosphoric acid which is produced; and hence the smoke rises in a circular

cular form. This gas is more combustible than phosphorus with oxygen gas; phosphorated hydrogen gas burns with great rapidity; insomuch that the experiment is even dangerous. Attempts have been made to substitute this fluid, instead of other combustible matters, for the ordinary purposes of life; to give light and heat, to charge fire-arms, &c. Volta has considered it in this last point of view, and has proposed several methods of applying it. Neret, in the *Journal de Physique*, has given a description of a chafing-dish heated by inflammable air. Messrs. Furstenberger of Basil; Brander, mechanic at Augsburg; Ehrmann, lecturer in natural philosophy at Strasburg; have described lamps which may be lighted in the night by the electrical spark. Very pretty artificial fires are also made by means of this gas, with glass tubes, bent in different directions, and pierced with a great number of small apertures. The inflammable gas is introduced into these tubes, from a bladder filled with that fluid, and fitted with a copper cock. When the bladder is pressed, the inflammable air, being made to pass into the tube, issues out of all the small apertures, and is set on fire by a lighted taper.

Water absorbs phosphorated hydrogenous gas; it is then decomposed. It is the air which is in the water that burns it, and the phosphorus sticks against the sides of the vessel. This gas is very injurious to respiration: animals put into it expire immediately.

Of SULPHUR.

Sulphur is a combustible, dry, very brittle, body, of a lemon yellow, which has no smell, unless heated, and whose taste is very weak, though sufficiently perceptible. It becomes electric by friction; if a piece of a considerable size be exposed to a sudden, though gentle heat, it breaks to pieces, with a crackling noise. Sulphur is found naturally in great quantities, sometimes pure, and sometimes in a state of combination. We shall in this place speak only of the first: the following are the varieties of form in which it is found pure. 1. Transparent sulphur, crystallized in octahedrons, whose two pyramids are truncated: it is deposited by water, most commonly upon the surface of calcareous spar. Such is that of Cadiz. 2. Transparent sulphur in irregular pieces; from Switzerland. 3. Whitish pulverulent sulphur, deposited in siliceous geodes: flints filled with sulphur are found in Franche Comté, &c. 4. Pulverulent sulphur, deposited at the surface of mineral waters; such as those of Aix la Chapelle, of Enghien near Paris, &c. 5. Crystalline sulphur, sublimed; it is transparent, and found in the neighbourhood of volcanos. 6. Pulverulent sulphur, sublimed by volcanic fires, without any regular form, and often interposed between soft stones, as is observed at Solfatara, near Naples. 7. Stalactites of sulphur, formed by volcanic fires.

Besides these seven varieties of pure mineral sulphur, this combustible substance is found combined with different matters. It is usually combined with metals, which it converts into pyrites, or metallic sulphurs and ores. It is sometimes united to calcareous earth, in the form of a sulphuric or an earthy liver of sulphur. The hepatic calcareous stones, the fetid spar, and swine-stone, appear to be of this nature. Later discoveries have added to the foregoing varieties. Sulphur seems to be continually formed in vegetable and animal matters which begin to putrefy. Though these species of sulphur do not appear essentially to belong to the mineral kingdom, yet we think it proper to join them with the preceding varieties, to render its natural history more complete. 8. Crystallized sulphur, formed by the slow decomposition of acumulated animal matters, such as that which has been found in the ancient lay-stall, or dunghill, near the gate of St. Antoine. 9. Pulverulent sulphur, formed by the vapours disengaged by animal substances in a state of putrefaction. It is collected on the walls of stables, privies, &c. 10. Sulphur obtained from many vegetables, especially the root of the bastard rhubard (Lapathum), the spirit of cochlearia, &c. This discovery, as well as the following, was made by Deyeux, member of the college of pharmacy, and lecturer in chemistry. 11. Sulphur, obtained in the analysis of animal matters, particularly white of egg, by Deyeux. 12. Sulphur obtained from horse-dung. This combustible body has been found at the instant of its being emitted. It is probable, that subsequent inquiries will discover this body in a great number of animal substances.

None of these sulphurs are used in the arts. The sulphur of commerce is extracted, by distillation, from metallic substances, called pyrites. In Saxony, and in Bohemia, this mineral is put into earthern tubes, placed on a long furnace; the ends of the tubes, which issue out of the furnace, are received in square iron vessels, containing water; the sulphur is collected in these receivers, but is very impure. In order to purify it, it is melted in an iron ladle; the earthy and metallic parts subside to the bottom. It is then poured into a copper boiler, where it makes another deposit of the foreign matters which contaminated it. After having been kept a certain time in fusion, it is poured into cylindrical wooden moulds, which give it the form it usually has in commerce; that which is precipitated to the bottom of the boiler during the fusion, is grey, and impure: it is very improperly called *sulphur vivum*. In other countries, as at Rammelsberg, the sulphur is extracted from pyrites, in a more simple manner. The sulphur, which is found melted among the masses of pyrites, roasted in the open air, is taken away with ladles, and purified by a subsequent fusion.

Sulphurated matches are commonly nothing but threads of cotton dipped in melted sulphur; the same thing is done with little bits of wood, then called *matches*, and likewise pieces of straw.

Action of Caloric upon Sulphur.—Put sulphur into a crucible; place it upon burning coals, it soon enters into fusion. This first fusion is liquid; but, keeping the sulphur a few moments longer on the fire, it acquires a much firmer consistence. While in this state, pour it into an earthern pan full of water; it will be found to have acquired a red colour, and to be as soft as wax; it yields to the touch, instead of being dry and brittle like common sulphur. In this state, it is successfully used for taking impressions of seals or engraved stones. Sulphur may also be easily reduced to gas and volatilised; but this gas is not permanent, it becomes solid in a cooler temperature: this property serves to its purification.

Common sulphur in powder is put into a cucurbit of glass, or glased earth, to which aludels are adapted, which mutually cover each other. These are all perforated at the bottoms, except the last, which is terminated by an inverted funnel. Place the cucurbit in a sand-bath, and put on the head; lute the joinings with strips of paper dipped in starch; add a receiver to the neck of the vessel merely to prevent communication with the external air; then proceed to sublimation with a moderate heat. As soon as the sulphur begins to melt, it sublimes rising in a white thick smoke, which is condensed, and adheres to the inside of the head in form of a powder. When a sufficient quantity is obtained, let the fire out, leave the vessels to cool, unlute the head, and collect the sublimed product with a feather: this is called sulphur in flowers, or *flowers of sulphur*. Then proceed to a fresh sublimation, and so continue till you have sublimed all the sulphur. Sublimed sulphur contains oftentimes a little sulphuric acid, formed by the combustion of a small portion of the sulphur by means of air contained in the vessels. It is thoroughly purified by washing. Sulphur ought to be prepared in this way for all medical, and the nicer chemical, purposes.

If, instead of taking the sulphur in a state of thickness or congelation, it be drawn from the fire immediately after it is melted, and left to cool slowly, its parts take a symmetrical

The Modern Chemical Apparatus, &c.

fymmetrical arrangement, difpofed in needles; which forms a cryftallization of fulphur. If fulphur be melted in oil, it is fuper-faturated, and holds in folution more than it can diffolve; when cold, it gives over the excefs in the form of eight-fided cryftals.

Slow combuftion of fulphur.—Take a large bell-glafs, and put beneath it a little cup with flowers of fulphur lighted; fet this in a difh, and furround it with water. A white fmoke will arife, which diffolves in the water, and becomes acid; this is *fulphureous acid.*

Rapid combuftion. Take a great balloon with a large aperture; fufpend in the infide an iron fpoon, containing a mixture of fulphur and nitrat of potafh compofed of feventy-two parts of fulphur to feven of the nitrat. Set fire to the mixture, and ftop the aperture of the balloon. Or, put lighted fulphur into oxygen gas; it burns with extreme rapidity. In both cafes, a little water muft be put in the bottom of the balloon, to abforb the acid which is produced: this is *fulphuric acid.* It appears, therefore, that, according to the manner in which the fulphur is burned, it abforbs more or lefs oxygen, and becomes more or lefs acid. With fulphur and azot there is no action or effect.

SULPHURATED HYDROGEN GAS.—This may be obtained in various ways, which we fhall explain as we come to treat of thofe bodies from which it may be drawn. The only method we can defcribe in this place is, to pafs hydrogen gas through fulphur in fufion; at the moment that the hydrogen gas is difengaged, throw in fublimed fulphur, and under the gas will be found fulphurated hydrogen gas. The beft method is to put into a gun-barrel fome fulphur in powder; pafs the barrel through a furnace; fix at the lower extremity a bent tube which is to go under a jar in the mercurial apparatus; fix on at the upper extremity the apparatus for producing hydrogen gas itfelf, as reprefented in the Chemiftry, Plate II. fig. 21. Melt the fulphur with a gentle heat; when it is melted, let the hydrogen gas run through it; and under the jar will be found fulphurated hydrogen gas.

Properties of this gas.—It is an elaftic fluid, very light, quickly volatilifing in the atmofphere; it kills animals very quickly; turns fyrup of violets to a green colour; extinguifhes a taper; mixed with atmofpherical air or oxygen gas, it flames, and detonates by the electrical fpark; it burns with a reddifh blue flame, and lets fall fome fulphur. Atmofpherical air deftroys this gas, as may be perceived by placing them in contact under a jar. Oxygen then has more attraction for hydrogen than fulphur has for oxygen; the oxygen and hydrogen combine and form water. It is remarkable that this experiment cannot be made at a high temperature, becaufe the fulphur would burn, and that a low temperature is infufficient to make it burn; this fulphur fpreads itfelf on the furrounding bodies. Hence arifes the fulphur which we fee about mineral fprings; and why the gas difengaged from thofe fources turns filver of a black colour. Nitrous acid and fulphureous acid decompofe it. It is abforbed by water. Sulphurated hydrogen diffolved in water, reddens the tincture of turnfole, the paper ftained therewith, and the tincture of radifh; it combines with alkalis, barytes, lime, and magnefia; and with thefe fubftances it forms combinations, which, mixed with metallic folutions, change the bafes. It decompofes foap, and takes the place of oil, in alkalis; it precipitates, in a great meafure, the fulphur in the folutions of fulphure of potafh or of lime, and tends to form a triple combination with the remainder. It precipitates metallic diffolution: yet fulphur and carbon have no action.

Combination of phofphorus with fulphur.—Put in a matrafs one part of phofphorus with an eighth of its weight of fulphur, and thirty-two parts of diftilled water; in a gentle heat the phofphorus liquefies, and diffolves the fulphur. The new combination affumes a yellow colour and remains fluid under the water till the 20th degree above 0 in Reaumur's thermometer; after that it congeals. One part of phofphorus, with half its weight of fulphur, give a product which remains fluid under water at 8° above 0. One part of phofphorus and two of fulphur combine very well in a gentle heat, and always under water; this combination is fluid at 10° above 0; but it forms a cryftallization, fo that one portion appears fluid, the other concrete. One part of phofphorus may alfo unite with three of fulphur: put into a matrafs one part of phofphorus with fome diftilled water; heat the matrafs till the phofphorus melts; then add the fulphur, which muft be divided into three parts: the firft part is prefently diffolved by the phofphorus, fome bubbles of air are difengaged alfo in the moment of combination: then add the fecond part of the fulphur, and afterwards the third, which are diffolved in like manner; and the new product remains fluid under the water as long as it maintains 30° of heat; but, as the water gets cold, the combination becomes concrete and friable.

Some of the more remarkable properties of alkaline fulphures, have been recently inveftigated by the fociety of Dutch chemifts. By expofing two equal quantites of frefh fulphur of potafh to equal volumes of atmofpherical air, the one confined by mercury, the other by water, thefe chemifts obferved, that at the end of a few days the volume of the air over the mercury was not diminifhed, while that of the air over the water in the fame fpace of time was diminifhed nearly one fourth. This air, on examination, was found to be completely deprived of its oxygen gas. Effects quite fimilar were produced by ufing fulphure of barytes. The abforption of oxygen gas took place alfo in the air over mercury when the fulphure had been previoufly moiftened with a little water. A confiderable difengagement of caloric was produced at the moment the water came into contact with the fulphure.

In expofing nitrous gas to alkaline fulphures this gas was deprived of its oxygen in the fame manner as atmofpherical air. The dry fulphures, however, had no action on this gas, but as foon as a little water was added, an abforption of oxygen gas immediately began to take place. Thefe facts were fufficient to fhow that the attraction of the fulphure for oxygen, in thefe experiments, was not exerted directly, but only through the intervention of water. With a view to difcover the fhare which water has in producing this abforption of oxygen gas, a quantity of aqueous vapour was made to pafs through hot alkaline fulphure, and it was found that fulphurated hydrogen gas alone paffed over into the receiver. When muriat of barytes was added to a folution of the fulphure ufed in this experiment, a copious precipitation of fulphat of barytes took place. This experiment fhowed that it was the water which had been decompofed, and that it was the oxygen of this fluid which had united with the fulphur of the fulphure to form fulphuric acid. Sulphure of lime, through which aqueous vapour had been paffed, afforded the fame refults. Thefe chemifts, however, were not able to effect the direct combination of fulphur with hydrogen, by paffing this gas through alkaline fulphures in a high temperature. Sulphurated hydrogen gas was quickly abforbed by the cauftic folutions of ammoniac, foda, and potafh. Lime water produced the fame effect, but with lefs rapidity. The fulphurated hydrogen gas could be feparated from the alkali by the addition of an acid in a quantity equal to that which had been abforbed. Alkalis, in their dry ftate, did not abforb this gas; but the addition of a little moifture occafioned an immediate abforption. When fulphurated hydrogen gas was brought into contact with ammoniacal gas, a combination took place, and the gafes were deprived of their elafticity. The fulphurated hydrogen gas could be difengaged by adding an acid, which united with the ammoniac. By expofing the fulphurated hydrogenated ammoniac

ammoniac to a strong fire, the smoking liquor of Boyle was produced. Carbonic acid seemed to destroy the affinities of alkalis for sulphurated hydrogen gas.

The fixed alkalis also, saturated with sulphurated hydrogen gas, were found to possess the property of absorbing oxygen when exposed to the atmosphere; the sulphur, in combination with the alkali, forming with this oxygen a sulphat. The oxygen of the water seemed to be attracted in preference to that of the atmosphere. In this case the hydrogen of the water has a tendency to combine with the other portion of the sulphur, and to form sulphurated hydrogenated gas. An alkaline sulphure dissolved in water contains therefore alkaline sulphure, properly so called, or the simple combination of sulphur with alkali; 2dly, Sulphat of alkali; and, 3dly, Sulphurated hydrogen gas dissolved in the alkaline sulphure. It is this sulphurated hydrogen which absorbs oxygen from the atmosphere. When exposed to that fluid, the hydrogen has a tendency to resume its oxygen, and to form water, while the sulphur which had been united to the hydrogen remains in combination with the alkali. But the water thus formed is decomposed in its turn; and these operations go on alternately till every particle of the sulphure is converted into a sulphat. *Journ. de Phys.* 1792, Vol. I. p. 409.

Berthollet distinguishes the combinations of sulphurated hydrogen with alkaline or earthy bases by the name of *hydro-sulphures*. The hydro-sulphures of potash and soda are procured by receiving sulphurated hydrogen gas in a solution of these alkalis in water. The alkali is allowed to absorb an excess of the gas, which may be afterwards dissipated by heat. The hydro sulphures of lime and magnesia are prepared in the same manner. When preserved carefully from the air, these hydro-sulphures are colourless; but contact with that fluid gives them immediately a yellow tinge. In exposing a solution of sulphure of potash to the action of sulphurated hydrogen, Berthollet observed that a great part of the sulphur was precipitated. Water impregnated with sulphurated hydrogen produced also the same effect.

The affinities of the earthy and alkaline bases for sulphurated hydrogen have been but very cursorily examined. Berthollet thinks that barytes has the strongest affinity, alumine little or none. When hydro-sulphure of potash or of ammoniac is mixed with an acid solution of lime, magnesia, or barytes, no precipitation takes place, either because there is no exchange of bases, or because the results of the new combinations are all soluble in water. The solution of alumine is precipitated, and Berthollet proposes this as a convenient method of separating alumine from other earths dissolved in acids.

In order to determine whether sulphurated hydrogen be formed at the moment water is added to a sulphure, or whether the action of an acid contributes to its formation, Berthollet made the following experiment. Dry sulphure of potash was dissolved in alcohol, and sulphat of potash was formed. On mixing the liquor, which was of a very deep colour, with distilled water, it became muddy, and deposited a considerable quantity of sulphur. To this liquor, after it had been allowed time to settle, he added muriatic acid; by which a large quantity of sulphurated hydrogen gas was disengaged, and the remainder of the sulphur precipitated. A solution of muriat of barytes, poured into this liquor, did not disturb its transparency; a proof that neither the sulphuric nor sulphureous acids are formed when a sulphure is decomposed by muriatic acid. From this experiment, Berthollet concludes that the sulphurated hydrogen is produced from the decomposition of the water furnished by the alcohol, and that the action of the acid consists merely in giving a gazeous form to the product, by the caloric which it disengages.

A solution of hydro-sulphure of alkali dissolves sulphur in the cold. If oxygenated muriat of potash be added to a solution of sulphure of potash, sulphur will be precipitated. The sulphurated hydrogen, in this experiment, is destroyed by the oxygen of the muriatic acid and the sulphur precipitated, because the alkali has a greater attraction for the water than for the sulphur. The union, therefore, between a sulphure and water is produced solely through the intermedium of sulphurated hydrogen. To the combination of the hydro-sulphure of alkali with sulphur, Berthollet gives the name of *hydrogenated sulphure*. The combination of alkalis, therefore with sulphur, according to this nomenclature, are either *sulphures*, *hydro-sulphures*, or *hydrogenated-sulphures*.

In the distillation of sulphure of ammoniac, it is only the liquor which comes over first that is smoking. Berthollet added some muriatic acid to equal portions of the smoking and of the unsmoking liquors obtained in this distillation, and of hydro-sulphure of ammoniac; very little sulphurated hydrogen was evolved from the smoking liquor, and only a small portion of sulphur deposited. The acid disengaged more of the sulphurated hydrogen gas, and of sulphur, from the unsmoking liquor. A much more considerable quantity of sulphurated hydrogen gas was disengaged by this acid from the hydro-sulphure of ammoniac; but this disengagement was unaccompanied by any deposition of sulphur. By mixing nearly equal parts of ammoniac with the unsmoking liquor, and with the hydro-sulphure of ammoniac, these two liquors immediately began to fume, and to resemble, in their colour and other qualities, the smoking liquor which comes first over in distillation. Berthollet, from this experiment, is inclined to ascribe the smoking quality of the liquor to the presence of a portion of uncombined ammoniac.

Sulphure of ammoniac is capable of dissolving a considerable quantity of sulphur in the cold. In the fuming state, it dissolves a quantity of sulphure sufficient to saturate the excess of ammoniac, and ceases to be fuming. The sulphure of ammoniac, saturated with sulphur, has a deep colour and oily consistence. Sulphurated hydrogen does not produce in it a precipitation of sulphur; but this substance is deposited by the contact of air, which acts immediately on the hydrogen The solution of sulphur in sulphure of ammoniac forms, then, according to the nomenclature of Berthollet, an hydrogenated sulphure of ammoniac. When muriatic acid is added to an hydrogenated sulphure of alkali, a small quantity of sulphurated hydrogen gas is produced; but while the greater part of the sulphur is separated, there is another portion of it which combines with the sulphurated hydrogen, acquires an oily appearance, and sinks to the bottom of the vessel in which the experiment is made. This combination Berthollet terms Hydrogenated Sulphur. It was Scheele who first observed the formation of this hydrogenated sulphur; but since his time it has not been mentioned by any chemist

Hydrogenated sulphur gives out sulphurated hydrogen gas when exposed to the action of a greater heat. Contact with air also speedily disengages this gas. In both these cases, the hydrogenated sulphur gradually loses its fluidity, and is at last changed into pure sulphur. A small degree of heat is produced by mixing potash with hydrogenated sulphur, and a small quantity of sulphurated hydrogen disengaged from that portion of the hydrogenated sulphur which does not combine with the alkali. The remainder combines with the alkali, and forms an hydrogenated sulphure of potash. Sulphurated hydrogen gas is not decomposed by oxygen gas in the ordinary temperature of the atmosphere. It is the same when this gas is dissolved in water. In the latter case, the air attracts it from the water in which it is dissolved; it is not so with the hydro-sulphures. When pure, these substances have no colour, but they receive a yellow tinge from the action of air.

If to a colourless hydro-sulphure, sulphuric, muriatic, or

or any other acid, be added, which has no action on hydrogen, sulphurated hydrogen gas will be disengaged, without any deposition of sulphur; but, if the hydro-sulphure has become coloured, a deposition of sulphur will take place in proportion to the changes which the sulphurated hydrogen has already undergone. It is the hydrogen, therefore, which is first diminished in the decomposition of sulphurated hydrogen.' In combining with the oxygen of the atmosphere to form water, it quits the sulphur, but a portion of the sulphur is soon changed into an acid; and when the sulphurated hydrogen has been reduced to a certain point, the oxygen acts equally in decomposing it upon the hydrogen and the sulphur.

If an hydrogenated sulphure be exposed to the action of the air, it absorbs oxygen, which acts on the hydrogen and sulphur. In proportion as hydrogenated sulphur is decomposed, there is a deposition of sulphur produced; but in the decomposition of a hydro-sulphure, no deposition whatever takes place. It is the sulphuric and not the sulphureous acid which is formed, when water is decomposed, to produce sulphurated hydrogen, but it is the sulphureous acid which is formed by the spontaneous absorption of oxygen from the atmosphere. In the former case the oxygen is more completely deprived of its caloric, and consequently disposed to enter into a closer union.

Sulphureous acid, in contact with sulphurated hydrogen, yields its oxygen to the hydrogen; and the sulphur contained in the sulphureous acid, as well as that in the sulphurated hydrogen, is precipitated. Nitric acid also decomposes sulphurated hydrogen, by yielding its oxygen to the hydrogen. But this action of the nitric acid is destroyed, or, at least, greatly weakened, by diluting it with water. *Ann. de Chem.* tom. xxv. p. 233.

Of METALS.

Metals are a peculiar class of combustible bodies. Metallic oxyds are nothing more than combinations of metals with oxygen. Some of these oxyds even pass into the acid state; such are, arsenic, tungsten, molybdena, and chrome. A certain quantity of oxygen deprives metals for a time of their metallic brightness; a larger quantity destroys that brightness entirely; and the proportion of oxygen may be increased so as to give the oxyds a complete earthy appearance.

Metals have not the same elective attraction for oxygen. In a general view they may be divided into two classes, acidifiable metals, as arsenic, &c. and oxydable metals, as copper, tin, &c.

Metallic acids may be obtained in two different states, namely, arsenious acid, and arsenical acid. There are also different states of oxydation in metals, as, grey oxyd of zink, and white oxyd of zink. Metals present also two sorts of combustion, the slow and the rapid: zink may furnish an example of each, the slow being performed by fusion in an iron spoon with air, the rapid by inflammation in a crucible. The peculiar properties of metals will be hereafter described.

Of WATER.

Water is to be considered as presenting itself, in three forms; the solid, as ice; the liquid, as common water; and the gaseous, as steam or vapour.

Ice, *or* solid Water.—Ice seems to be water in its natural state; for the natural state of a body, chemically considered, is that in which it has the strongest possible aggregation. But, as water is most abundantly found in the liquid state, this last has been constantly regarded as the natural state of water. The formation of ice is attended with several concomitant circumstances, which well deserve to be considered. A heat of some degrees of Reaumur's thermometer is produced in the water by the act of freezing, as is always the case when a liquid body is changed into a solid. This thermometer, plunged into the water beginning to freeze, will indicate a temperature some degrees above zero; though another thermometer, placed in the surrounding atmosphere, sufficiently cold to freeze water, will remain at this point, or even sink below it. It follows, therefore, that a portion of the heat which was fixed in the liquid water is disengaged when it becomes converted into a solid; and accordingly we find the specific heat of ice inferior to that of water. The same heat is observable in the crystallization of salts. The access of air favours the production of ice. Water in a well-closed vessel freezes very slowly; but if the vessel be opened, it freezes much more quickly, and sometimes in the instant of exposure to the contact of the air. This phenomenon is similar to that which happens in the crystallization of salts. Solutions of salts in closed vessels frequently exhibit a sudden crystallization when uncovered, and exposed to the contact of air. A slight degree of agitation likewise accelerates this formation; in which respect, also, we find a similitude between this and the crystallization of salts. By agitating certain saline solutions which do not usually afford crystals, it is sometimes found that they are by that means produced. We have often seen this in solutions of calcareous nitrats and muriats. These analogies between the formation of ice and of saline crystals prove that the former is obtained by a true crystallization.

Ice seems to have a greater bulk than the water had before it was frozen, and even breaks, by its expansion, the vessels in which it is formed. This expansion of water, while converting into ice, is so great, as to be almost incredible. Several philosophers have endeavoured to measure the degree of this force; and from their computations it would appear, that the expansion of a cubic inch of water, during its conversion into ice, is sufficient to raise a weight of 2700lb. The knowledge of this fact affords a ready explanation of the manner in which trees are often split, and even the hardest rocks rent asunder, during intense frost. Fourcroy says, it is not the water which acquires a greater expansion in this case; but the air, which is separated from the water during congelation, that is the true cause of the increase of bulk. But this explanation is by no means adequate to account for the phenomenon. The force with which the ice expands is greater than what can possibly arise from the successive disengagements of small portions of so compressible a fluid as air; and besides, it is known that the volume of a given quantity of water, deprived completely of its air by boiling, or by means of the air-pump, is very sensibly increased during its conversion into ice. We are, therefore, inclined to ascribe, with M. Mairan, this increase of bulk to the new, regular, and crystallized, arrangement which the particles of water assume in freezing.

Properties of ice.—1. When slowly formed, its crystals have the figure of needles, crossing each other at an angle of 60 or of 120 degrees. Sometimes its crystallization takes a determinate and regular form. M. Pelletier observed, in a piece of fistulous ice, crystals in the form of flat quadrangular prisms, terminated at the ends by dihedral pyramids, though with great varieties. If, on the contrary, water, in a considerable mass, be frozen suddenly, it forms only an irregular solid, in the same manner as happens when saline liquids are too much evaporated, and cooled suddenly. 2. Its consistence is such, that it may be reduced to dust. In very cold climates the ice is so hard, that it is cut like stones, and has been employed in the construction of edifices. We are assured, that even cannons have been bored out of ice, which have been charged with powder, and discharged several times before they melted. 3. Its elasticity is very strong, and much more remarkable than that of fluid water. A ball of ice, thrown on a hard surface, rebounds in the same manner as other solids. 4. It has a lively taste, approaching to causticity. The impression of ice on the sense of feeling is universally known. Physicians employ it as a tonic or discutient, &c. 5. Its specific gravity being less than that of water, it swims on the surface. The specific gravity of ice is said to be about 1-10th

1-10th less than that of water; but it must obviously vary in proportion to the quantity of air which the water contains, the degree of cold to which it is exposed, the suddenness of the congelation, &c. Hence ice formed from water previously deprived of its air is found to be harder, more transparent, and heavier, than common ice. The property of expansion by freezing is common to many other bodies, such as butter, tallow, wax, &c. And not only water, but some of the metals (iron for example), appear to expand a little in passing from the liquid to the solid state. We have a proof of this in the very strong impressions metals receive from the moulds in which they are cast. 6. Its transparency is less than that of water, in consequence of the bubbles of air which it contains, at least in such masses as are not regularly crystallized. This may be easily seen by an attentive examination of a piece of ice; and, if the cavities be opened under water, the air is distinctly seen to issue out in bubbles. 7. It melts at some degrees of temperature above 0° in Reaumur's scale (or 32° of Fahrenheit), the liquefaction proceeding gradually from the surface to the internal parts. Ice evaporates also at a temperature below that at which it melts into water. This is proved not only by the disappearance of hoar frost from polished plates of metal during their exposure to dry frosty winds, but also by direct experiments, in which the weight of solid pieces of ice was diminished by exposure in the same circumstances. This evaporation or solution of ice in air takes place likewise in situations where there is no current of air, and even in air confined in close vessels. 8. In its passage from the solid to the fluid state, it produces cold in the surrounding atmosphere. Modern chemists think that it absorbs heat in melting; and that this absorption is equal with regard to the quantity of caloric which becomes fixed, and the quantity of heat which is disengaged when it becomes congealed. All bodies capable of freezing and melting, exhibit the same appearance, according to the different temperatures to which they are exposed. Hail and snow are only modifications of ice; hail may be considered as produced by the sudden disengagement of the electric fluid, which tends to render water fluid.

Of Fluid Water.—In this state, water has several peculiar properties, distinct from its other modifications. Its taste is less lively, since some philosophers regard it as insipid. It is elastic. Its state of liquid aggregation, renders its strength of aggregation greater. It unites with a great number of bodies, and even promotes greatly their reciprocal combination. It does not unite with light, which only goes through it. Caloric dilates it, and brings it to the gaseous state: its passage from a state of liquidity to that of an aeriform fluid constitutes its ebullition.

The weight of the atmosphere has a singular influence on the ebullition of water; in proportion as this weight is greater, so much the more does it oppose the tendency in the water to dilate and assume the form of vapour. When the weight of the atmosphere is taken off by means of an air-pump, and water is placed in the receiver heated previously to 40°, we observe it to boil with great violence, and become converted into vapour. And for this reason, liquors easily evaporated and very volatile, as alcohol, ether, ammoniacal gas, &c. lose the greatest part of their strength on high mountains.

If water be heated in closed vessels, with an apparatus proper to receive the vapours, these last, when condensed by cold, form distilled water. By this means, it is obtained pure, and separate from the saline and earthy matters by which natural waters are almost always contaminated, and which do not rise with the vapour. Chemists, who require very pure water for their experiments, procure it by distillation. They put river or spring water into a cucurbit of copper, lined with tin, to which a head of the same metal, with a refrigeratory, containing very cold water, is adapted; and the distilled water is received in very clean glass vessels. It is proper to be observed, that in order to have very pure distilled water, the vessels should be used for no other purpose. The vessels intended to distil quickly, should be made on the new principles; that is to say, the cucurbit and its head should be of a flattened figure, their horizontal being much longer than their vertical diameter. Water obtained by careful distillation, thus conducted, is perfectly pure. Chemists formerly made use of snow or rain water; but it is at present well known, that these waters often contain foreign bodies in solution.

Distilled water has a flat or faint taste, and causes a sensation of weight at the stomach; but by being strongly agitated in contact with air, it acquires a lively taste, and may be drunk without inconvenience. Distillation makes no change in pure water, except that of depriving it of the air it naturally contains, which gives it that fresh and lively taste required to make it potable. Boerhaave distilled the same water five hundred times, without observing any change produced in it. Some philosophers have affirmed, at different periods, that water becomes changed into earth; because, at each distillation, it leaves a certain quantity of earthy matter at the bottom of the vessel. M. Lavoisier has made experiments respecting this fact. Having weighed the vessels he used in distilling water, as well as the quantity of water, and the residue it affords, he has shown that this earth is nothing but the matter of the vessels gradually corroded by the water. In addition to these observations on fluid water, it may be observed, that its temperature ceases to increase when the evaporation has arrived at a certain degree of rapidity; that this stationary point is higher in proportion to the difficulty the vapours find in making their escape; that if the vapours be prevented altogether from escaping, as is done in the digester of Papin, it will acquire, by the application of heat, a temperature approaching to ignition, and will dissolve or act on earths and other bodies, which in other cases it does not sensibly affect.

Of Water in Steam, or in the Gaseous State.—To convert water into gas, Lavoisier and La Place first made the following experiment. Fill a glass jar with mercury, and place it with its mouth downwards in a large saucer or dish filled with the same; pass a little water under the jar, and suspend this apparatus by means of a weight and pulley, so as to give the mercury a heat of 95 or 100° by lowering it into a boiling copper full of pure water of nitre, or of sea-salt, as represented in the Chemistry Plate III. fig. 2. The water quickly rarefies, and fills all the capacity of the jar with the gas.

When water is thus reduced to the state of vapour by the action of fire, it acquires several properties, which it had not in its two former states of aggregation. Dr. Black first discovered that water, in passing from the liquid state to that of an elastic fluid, absorbs a quantity of caloric, which becomes latent, or which does not add to its temperature. It is perfectly invisible when received in the atmosphere, provided the thermometer stands higher than 65°, and the air be not already too highly charged with humidity. If, on the contrary, the atmosphere have a temperature below 55°, and be charged with humidity, the vapour of water forms a whitish cloud, sensibly opake; which arises from the vapour not being absorbed, or dissolved by the humid air, and consequently to a true precipitation. Its dilatation is such, that, from an experiment made by Dr. Black and Mr. Watt, it was found that water in the form of steam occupies a space fourteen hundred times greater than in its ordinary liquid state. Its elasticity is such, as to produce the most terrible explosions when confined. This power is usefully employed in mechanics, of which application the engine for raising water, commonly called the steam engine, is an admirable instance, well known both to philosophers and artists. According to one of the most constant laws of the affinity of composition, it has a stronger tendency to combination in this state, wherein

wherein its aggregation is the most feeble, than in either of the two others. Chemists have frequent occasion to observe with what rapidity water, in the state of vapour, dissolves salts, softens extractive and mucilaginous matters, corrodes and calcines metals, &c. It is perfectly dissolved in air. When it is slowly deposited out of the atmosphere, it constitutes dew. This dissolution is performed in the same manner as those of salts in water. One of the most singular phenomena respecting water in a state of vapour, is the property it possesses of accelerating the combustion of oil when on fire; as is seen in the experiment of the eolipile applied to the enamellers lamp, or to common fires of pit-coal or wood, or fats in a state of inflammation, which cannot be extinguished by water, and even the burning of which it increases. These phenomena induced Boerhaave to conclude that flame is, for the most part, composed of water. Lastly, Water in the form of vapour, and dissolved in the air, is condensed and precipitated in part when exposed to a degree of cold some degrees above the freezing point, it then resumes its liquidity, as is seen in the falling dew. Sometimes, when the cold is beneath the freezing point, it is converted into small crystals of ice. Such is the origin of those ramified incrustations of ice formed on the internal surface of the glass in windows during intense frosts; and the same cause in Siberia, and other very cold climates, converts the moisture of the breath into a kind of snow.

Chemical Properties of Water.—There are six kinds of water presented to our view; rain-water, snow-water, the water of hail, of springs, of lakes, of rivers, and of the sea. Waters are distinguished also from the manner in which they act upon the stomach, upon soap, boiling of vegetables, &c. in hard or soft water. Such are waters which contain saline substances, carbonic acid, clay, iron, extracts of vegetables changed by putrefaction. All these waters are improper to drink.

From the union of water and caloric, the products are, Boiling water, distilled water, and water in vapours. Water unites in two ways with atmospherical air: it absorbs the elastic fluid, and becomes charged with it while in its liquid state; it is even demonstrated, that to this combination with air its fresh and agreeable taste is owing. Water may be deprived of its air either by ebullition or distillation.

To try whether water is aerated or not, put in sulphat of iron well crystallized. If the water be not aerated, the crystal remains transparent; the contrary happens if the water be aerated, for it attracts a yellow dust. Boiling water, and distilled water collected with care, are examples of water not aerated. These waters may also be tried with metallic sulphures: the changes which take place shew the presence of air. The presence of air in water is shewn also by the concentrated sulphuric acid. When the acid is poured out, there is effervescence; the two fluids concentrate, they work upon each other; and the effervescence is only the disengagement of the contained air; but this air is purer than atmospherical air; which proves that water, in dissolving air, has more hold upon oxygen than upon azot. If this experiment be made with a tube, on inverting it, the air will be seen to rise, and then you may weigh and calculate the quantity of air contained in the water; then by stirring the acid, striæ or channels appear, which shews the mixture of the two liquids. But water with hydrogen gas, has no action.

These details on the chemical properties of water, have only shewn it as a very powerful agent in combinations, and capable of uniting with a great variety of substances: but in many of these combinations it suffers a singular alteration, which was not discovered till the year 1784. It had long been known, that water, in certain cases, favours combustion, as in the enamellers' lamp, the inflammation of oil, at great fires, &c. but it was little thought that most of these phenomena were produced by the decomposition of the water; it was reserved for the genius of Lavoisier to carry this point to the degree of certainty and precision to which it is now arrived. That eminent chemist was led to this discovery, by having remarked, with M. De la Place, that, when inflammable gas is burned with vital air in closed vessels, pure water is always produced; whence he concluded, that water was formed in this experiment by the combination of pure and of inflammable gas, which he regarded as its constituent principles. This theory of the nature of water, by which M. Lavoisier deprived it at once of its prerogative as a simple body and as an element, met with such opposition, as convinced him that the decomposition of water was a proof necessary to be added to the synthetical examination of that substance. He therefore endeavoured to decompose this fluid, by presenting to it such bodies as might be expected to separate one of its principles. He associated himself with M. Meusnier for the purpose of making these inquiries; and these two philosophers read a Memoir at the Royal Academy of Sciences, the 21st of April 1784, wherein they established that water is not a simple substance, but is composed of the base of inflammable gas and pure air, or oxygen, which may be easily decomposed, or separated from each other. Messrs. Lavoisier and Meusnier also deduced, that this fluid is composed of six parts of oxygen, and one of the base of inflammable gas; or, more accurately, 0·86 of the former, and 0·14 of the latter of these substances: That iron, charcoal, and oils, having a greater affinity with oxygen than the last has with the base of inflammable gas, seize it, and decompose the water entirely; the inflammable air escaping in an elastic form: that water is recomposed by burning these two kinds of air together, which, if carefully performed, affords a quantity equal in weight to that of the two fluids made use of: that water is thus produced in a great number of chemical operations; as for example, when spirit of wine or oils are burned under a chimney, adapted to the worm-pipe of a still, whose other extremity is adapted to a recipient, a quantity of water is collected, which is almost always greater than that of the inflammable fluid made use of; which is occasioned by the inflammable gas of these liquids combining with the vital air of the atmosphere, by which their combustion is maintained. Water is now therefore defined to be a compound of the base of vital air, or oxygen, and the base of inflammable gas, or hydrogen; and as many bodies are inflammable in the state of elastic fluids, such as alcohol, ether, the volatile oils, &c. we distinguish this principle of water, in the aeriform state, by the term *hydrogenous gas*.

Decomposition of Water.—1. *With charcoal*. The product is carbonated hydrogen gas, and carbonic acid gas. Take a tube of glass or porcelain; pass it through a furnace, giving it a few degrees of inclination; put into the tube some charcoal which has been previously heated in close vessels; to the upper extremity of the tube adapt a glass retort containing a determinate quantity of distilled water; and to the lower extremity a bent tube or worm, which communicates with a doubly-tubulated bottle; to one of the openings or necks of the bottle another tube is adapted, which is to convey the aeriform fluids under a jar. Next, light a sufficient fire to keep the water boiling in the retort; at the same time make a fire in the furnace where the tube is, and make it red-hot. When the operation is finished, only a little ashes remains in the tube; and under the jar is produced carbonic acid gas and carbonated acid gas. This decomposition may be wrought more quickly, but with less exactness; put a red-hot coal underneath a bell-glass filled with water, and the result is the same.

Put over mercury, in a little bell-glass, a given quantity of pure, distilled water, and soft iron in thin plates rolled up spirally: the latter substance soon becomes rusted, and hydrogen gas is disengaged. The iron is also burnt by the water, producing a black oxyd. In the hot way

way, it is obtained cryſtallized. By paſſing red-hot iron, or even bricks, under jars filled with water, the water will become decompoſed.

The following is a very ſimple experiment: Take a gun-barrel and place it in a furnace, as ſhewn in the Chemiſtry Plate II. fig. 12; to its raiſed end adjuſt a funnel to contain the water, and to let it out only in drops by means of a cock; inſtead of a large funnel, a tube bent ſyphon-faſhion, with a ſmall funnel at the end, may be uſed. At the other end of the gun-barrel place a tubulated receiver, or a two-necked bottle, to catch the water which runs out without being decompoſed; to one of the openings adapt the pneumatic chemical apparatus; then make the gun-barrel red-hot, and let in the water drop by drop: hydrogen gas will be the reſult.

2. At the Royal Inſtitute in London, on the 28th of May 1800, Dr. Garnett, in his Lecture on the Compoſition and Decompoſition of Water, made a curious experiment, on which we cannot reflect without thinking that it may lead to ſome important enquiries, and may throw light on ſeveral phenomena of the animal economy.

Decompoſition of water by the Galvanic influence.—A number of pieces of zink, each of the ſize of a half-crown, were prepared, and an equal number of pieces of card cut in the ſame form: a piece of zink was then laid upon the table, and upon it a half-crown; upon this was placed a piece of card moiſtened with water; upon the card was laid another piece of zink, upon that another half-crown, then a wet card, and ſo alternately till more than forty pieces of each had been placed upon each other; a perſon then having his hands well wetted, touched the piece of zink at the bottom with one hand, and the half-crown at the top with the other; he felt a ſtrong ſhock, which was repeated as often as the contact was renewed. See the article GALVANISM. When the pieces were touched with pieces of metal held in the hand, the effect was the ſame, or rather more ſtrong; but when ſealing-wax, glaſs, or any other non-conductor, was uſed, no ſhock was perceived. This apparatus ſeems to form an *artificial torpedo*. A glaſs tube being filled with water, and corked at each end, and a copper-wire forced through each cork, ſo that the ends of the wires were about three inches diſtant from each other in the water, the other extremities of the wires were made to communicate, the one with the bottom piece of zink, and the other with the top piece of ſilver; bubbles of hydrogen gas immediately roſe from one of the points of the wire within the water, which moved upwards in a continued ſtream, and united at the top of the tube, while the other point of the wire was quickly oxydated, the oxyd falling down rapidly to the bottom of the tube.

M. M. Van Trotzwick and Deiman have diſcovered that water is decompoſed by the paſſage of the electric ſpark; and that it is ſeparated into two elaſtic fluids, which inflame and recompoſe water, when this ſpark is excited in them. This beautiful experiment affords a ſufficient anſwer to the greater part of the objections which have been made to the decompoſition of this ſubſtance.

RECOMPOSITION OF WATER.—It is not ſufficient to have decompoſed water into its conſtituent principles oxygen and hydrogen; but it is alſo neceſſary, with a view to bring full conviction of its being a compound body, even to reform the water with the elements which have been produced from its decompoſition: modern chemiſtry enables us to accompliſh this very curious operation. The apparatus which was contrived for this purpoſe by M. Lavoiſier, is exhibited in the Chemiſtry Plate III. fig. 3, deſcription as follows: A is a balloon of glaſs or cryſtal, holding about thirty pints, having a large opening, to which is cemented the plate of copper B pierced with four holes, in which four tubes terminate. The firſt tube H *b* is to be adapted to an air-pump, by which the balloon may be exhauſted of its air. The ſecond tube *gg* communicates by its extremity M, with a reſervoir of oxygen gas, from which the balloon is to be filled. The third tube *d* D *d*, communicates by its extremity *d* N, with a reſervoir of hydrogen gas. The extremity *d* of this tube terminates in a capillary opening, through which the hydrogen gas contained in the reſervoir is forced, with a moderate degree of quickneſs, by the preſſure of a column of one or two inches of water. The fourth tube, G L, contains a metallic wire, having a knob at its extremity L, intended for tranſmitting the electrical ſpark from L to *d*, on purpoſe to ſet fire to the hydrogen gas: this wire is moveable in the tube, that the operator may be able to move the knob L to or from the extremity *d* of the tube D *d*. The three firſt-mentioned tubes are all provided with ſtop-cocks.

That the hydrogen gas and oxygen gas may be as much as poſſible deprived of water, they are made to paſs, in their way to the balloon A, through the tubes M and N, of about an inch diameter; and theſe are filled with ſalts, which, from their deliqueſcent nature, greedily attract the moiſture of the gas: ſuch are the acetit of potaſh, and the muriat or nitrat of lime. Theſe ſalts muſt only be reduced to a coarſe powder, that they may not run into lumps, and prevent the gaſes from paſſing through their interſtices.

Being provided with a ſufficient quantity of the oxygen and hydrogen gaſes (the latter in the proportion of two to one of the former,) and having adjuſted every thing properly, as above-directed, the tube H *b* muſt be adapted to an air-pump, and the balloon A exhauſted of its air. Next admit the oxygen ſo as to fill the balloon, and then by means of preſſure force a ſtream of hydrogen through the tube D *d*, to which ſet fire by an electrical ſpark ſent down the wire contained in the tube G L. By means of the above-deſcribed apparatus, the mutual combuſtion of theſe two gaſes may be continued for a long time, as the operator has the power of ſupplying them to the balloon from their reſervoirs, in proportion as they are conſumed. In proportion to the advancement of the combuſtion, there is a depoſition of water upon the inner ſurface of the balloon A: the water gradually increaſes in quantity, and, gathering into large drops, runs down to the bottom of the veſſel. It is eaſy to aſcertain the quantity of water collected, by weighing the balloon both before and after the experiment. Thus we have a twofold verification of the component parts of water, by aſcertaining both the quantities of the gaſes employed, and of the water formed by their combuſtion: theſe two quantities muſt be equal to each other. By an operation of this kind it was aſcertained, that it required eighty-five parts by weight, of oxygen, united to fifteen parts of hydrogen, to compoſe one hundred parts of water. This decompoſition and recompoſition of water is perpetually operating before our eyes, in the temperature of the atmoſphere, by means of compound elective attractions. The phenomena attendant upon vinous fermentation, putrefaction, and even vegetation, are produced, at leaſt in a certain degree, by the decompoſition of water. It is very extraordinary that this fact ſhould have been ſo long overlooked by natural philoſophers and chemiſts. Indeed it ſtrongly proves, that in chemiſtry, as in natural philoſophy, it is extremely difficult to overcome prejudices imbibed in early education, and to ſearch for truth in any other road than the one we have been accuſtomed to follow.

Another experiment of Lavoiſier's may be offered for the recompoſition of water. Under a large bell-glaſs filled with atmoſpherical air, and inverted over mercury, introduce a lamp containing alcohol; ſtick a morſel of phoſphorus upon the match, and light it with a bent iron-rod, made red-hot, paſſed underneath the glaſs. The mercury ſoon riſes in the glaſs, and ſhews by its riſing, in ſpite of the heat, a rapid and conſiderable diminution of air; after combuſtion, a great quantity of drops of water is viſible on the ſides of the glaſs and on the ſurface of the mercury. This water, gathered with care, always

always exceeds, by about an eighth, the quantity of alcohol consumed during the operation; whence it appears that alcohol contains one of the elements of water, which is hydrogen; and the atmospheric air furnishes the other, which is oxygen. By an experiment similar to this, Lavoisier found that sixteen parts of alcohol furnished by combustion from seventeen to eighteen ounces of water.

An ingenious apparatus for recomposing water by the combustion of hydrogen gas in oxygen gas, has lately been invented by Mr. Cuthbertson, and is evidently an improvement upon that of Lavoisier. The letters ABCD, at fig. 4, in the last-mentioned plate, represent the instrument; and *a b c d*, shew the vessel to which it is affixed. The glass balloon A D, which may contain 1000 cubic inches of water, has a brass-cap which screws off at the top, and is perforated at the bottom, in which the piece *e f* (fig. 5.) is screwed. B and C are two glass receivers, with proper mountings, the tops of which pass through E F, a straight bar of brass, are made fast to the bar by female screws put on these tops, which are perforated perpendicularly, and have also a side-hole corresponding with a hole in the brass-bar and with two holes in *e f* communicating with the large bottle. At *m* and *n* are two stop-cocks in the brass-bar, to shut or open the communication between the receivers and the bottle. F R and E N are two flat pieces of brass made fast to the vessel containing the receivers, and which is nearly filled with water, by means of screws at *a* and *b*. O, a metallic wire, made fast to the brass cap at A: the lower part of this wire is made of platina, and is brought as near as possible to the piece *e f*, but not to touch it. When the instrument is to be used, the stop-cocks being kept shut, the large vessel must be detached from the receivers, by unscrewing the female screws Q Q, filled with oxygen gas by any of the common methods, and again put in its place. The receiver B, which has a hole in its side at *o*, must then be filled with oxygen gas, and C with hydrogen; and, while electric sparks are made to pass from the wire O to the aperture *e*, the cock *n* must be opened, by degrees, till the gas takes fire. Stop the electric sparks and regulate the flame by turning the cock one way or the other. The cock *m*, which supplies the oxygen gas, must be kept quite open, and the receivers be kept supplied, C to its lip and B to the hole *o*, by known measures of the gases, from time to time, while the process is continued. The passage that leads from the hydrogen gas to the large vessel is made smaller than that from the oxygen, that the gas may enter in a very small stream. The hole in the side of the receiver B is for the purpose of preventing more oxygen gas being introduced than will fill it to that point, that the column of water may always be heavier upon the hydrogen gas, which has to force its way through a smaller aperture than the oxygen gas. The same end would be gained by making B only about half the depth of C. Both these receivers are open below, to receive the gas introduced under them. Several other instruments for the recomposition of water have been lately projected; but as they do not seem to possess any advantages over those we have mentioned, it were superfluous to describe them here.

The solubility of water in air is a fact highly deserving the attention of chemists, as this circumstance may often occasion considerable variations in the result of experiments which require great degrees of accuracy. The property of absorbing water does not seem to be confined to atmospherical air, but to be common to most, if not all, bodies capable of assuming the elastic form. Our knowledge of this subject is, however, at present extremely limited; nor has it hitherto obtained that attention which its importance demands. Saussure relates some experiments which prove the solubility of water in hydrogenous gas, and in carbonic acid gas; but he has omitted to mention the quantity these fluids are capable of dissolving. Dr. Hutton has made a very happy application of our knowledge of this subject to explain the production of rain. The dissolving power of the air, he observes, must be either in the same ratio with the increase of temperature, or it must be in a less or in a greater ratio. If in the same ratio, the temperature of two equal portions of air, saturated with water, and mixed together, at different temperatures, will be found to be the arithmetical mean between the extreme temperatures; so there will be no precipitation of water. If in a less ratio, then it is evident that the mixtures of two portions of saturated air, at different temperatures, will produce no condensation of water; but, on the contrary, will be capable of dissolving an additional quantity of that fluid. If in a greater ratio, the mixture of the two saturated portions of air will produce a condensation of water. It is this last case only that can be applied to explain the phenomena of vapour, and the formation of rain. According to this hypothesis, therefore, whenever two streams of air, or two contrary winds, of different temperatures, meet together, vapour or rain must necessarily be produced. For the numerous facts in proof of this ingenious theory, see *Dissertations on different Subjects of Natural Philosophy*.

Count Rumford, lately sir B. Thompson, has made a singular discovery with respect to the non-conducting power of water for caloric. It had always been supposed that caloric was diffused in all directions through water in precisely the same manner as through solids of every kind. From a series, however, of ingeniously-contrived experiments, this philosopher has been led to infer, that although the particles of water receive caloric from other bodies, and communicate it to them again, yet that among the particles of this fluid themselves no communication of caloric whatever takes place. Caloric, according to him, is diffused in water solely by the motion of those particles which have had their specific gravity increased or diminished in consequence of a change in the state of their temperature. This diffusion, therefore, may be obstructed, either by diminishing the fluidity of water, or by mixing with it substances that mechanically retard the motion of its particles. The effect of these causes he has evinced by a number of comparative experiments. Accidentally perceiving the motion of some fine particles of dust in a spirit of wine thermometer, this philosopher was led to contrive the means of exhibiting to view those internal motions of the particles of water which accompany every change in the state of its temperature. To render this motion visible, he mixed a small quantity of amber, finely pulverized, with water, the specific gravity of which had been raised to the same standard by the addition of an alkaline salt. On plunging a glass globe, with a long cylindrical neck, containing this mixture, into boiling water, some very interesting phenomena were observed. Two currents, in opposite directions, began at the same instant to move with great celerity in the liquid in the cylindrical tube; the ascending current occupying the sides of the tube, while that which moved downwards occupied its axis. As the saline liquor grew warm, the velocity of these currents gradually diminished; and at length, when the liquor had acquired the temperature of the surrounding water in the jar, these motions ceased entirely. On taking the glass body out of the hot water, the internal motions of the liquor recommenced, but the currents had changed their directions; that which occupied the axis of the tube being now the ascending current. When the contents of the glass body had acquired the temperature of the air of the room, these motions ceased; but they immediately recommenced on exposing the instrument to any change of temperature. The motions in opposite directions in the liquid in the tube were exceedingly rapid on the sudden application of a strong heat, and afforded a very entertaining sight: but to a scientific observer they were much more than amusing; they detected nature, as it were, in the very act, in one of her most hidden operations, and rendered motions visible in the midst of an invisible

invisible medium, which never had been seen before, and which most probably had never been suspected. It seemed to follow as an obvious conclusion from these phenomena, that caloric cannot be propagated downwards in water while the particles of that fluid continue to be condensed by cold; but the truth of so singular a conclusion required to be confirmed by still more decisive experiments, the result of which led the count to decide "that water is a perfect nonconductor of heat, and that heat is propagated in it only in consequence of the motions which the heat occasions in the insulated and solitary particles of that fluid." See *Count Rumford's Experimental Essays*.

We cannot help thinking this conclusion by far too general. The experiments related undoubtedly prove that caloric is communicated very slowly from one particle of water to another: but it would require more numerous and diversified experiments to establish the fact that no communication whatever occurs.

CARBONIC ACID GAS.

We have shewn that carbon has the property of decomposing oxygen gas, and of taking the base from caloric; but the acid which results from this combustion does not condense into the degree of pressure and temperature in which we live: it remains in the state of gas, and requires a great quantity of water to absorb it. Carbon united with oxygen forms therefore carbonic acid.

Of all the known acids, the carbonic is the most abundant in nature. It is found under three forms: 1. In gas. 2. As a mixture. 3. In combination. There are divers artificial methods of forming it. 1. *By oxygen gas and charcoal*.—The combustion of the charcoal may be performed, like that of phosphorus, under a bell-glass filled with oxygen gas, inverted in mercury; but, as the heat of red-hot iron would not be sufficient to light it, a little bit of tinder and a morsel of phosphorus must be laid on the charcoal: the phosphorus is easily set in combustion by a red-hot wire; the flame communicates to the tinder, and then to the charcoal. Lavoisier says it requires seventy-two parts by weight of oxygen to saturate twenty-eight parts of charcoal.

2. *Extracted from marble by fire*.—Reduce marble to powder, put it in a gun-barrel, which lay across a furnace; adapt a tube which is to be bent at the lower end, and carried under a jar in the pneumatic chemical apparatus: urge the fire so as to make the gun-barrel red-hot, and the carbonic acid gas is disengaged at that temperature.

3. *Extracted from carbonat of lime by an acid*.—When carbonic acid gas is in a state of combination, as in chalk, &c. it is easily obtained by the action of other acids. Sulphuric, nitric, and muriatic, acids, may be used indifferently; but they must be exhibited in water; six times its volume of water should be mixed with the sulphuric acid.

The apparatus for these experiments may be varied in infinitum. The most simple when we wish to obtain it without the pneumatic apparatus, is exhibited in the Chemistry Plate III. fig. 6. Take a large long-necked matrass, perforated at the lower part for adjusting a tube which is to serve the office of a cock. By the side of this place a jar with two necks, commonly called a Woulfe's bottle; which must contain a weakened acid; in one of the openings fix a perforated cork, and through the hole introduce a glass tube about three-tenths of an inch in diameter, terminated by a funnel; the other end of the tube must be drawn to a point, that it may the more easily enter the cork; introduce a smaller tube within this, with some hemp or cotton at the end of it, that it may serve as a piston. From the other neck or mouth of the bottle goes another tube, which is adapted to the large matrass. The apparatus being thus disposed, soak the chalk in water; pour the diluted chalk into the tube, and set the piston to work. As soon as the chalk comes in contact with the acid, a brisk effervescence is produced, and the carbonic acid gas is disengaged: this is to be received into a jar, through the tube or cock placed in the lower part of the matrass for that purpose. As this acid gas may be decanted or drawn off, it is safe and easy to receive it into jars; this arises from its different density from atmospherical air. The gas may also be drawn off through the cock of a lamp for inflammable gas. If you wish to collect it under jars in the pneumatic apparatus, a small matrass is then to be used, or a doubly-tubulated bottle, to which two tubes are adjusted, one for receiving the diluted chalk, the other for carrying the gas under the jars.

4. *By fermentation*, in the manner described under that head.

5. *By the decomposition of metallic oxyds*. The usual proportion is one part of the red oxyd of lead, and three of black flux. For this purpose we use a stone retort, to which a bent tube is adapted, which goes into a Woulfe's bottle with two necks; from the other neck passes another tube, whose extremity goes under a jar in the pneumatic apparatus. The lead is quickly reduced to its metallic state, and carbonic acid gas is obtained. This gas may be produced also by decomposing nitrat of potash with dry charcoal; but it is a dangerous experiment.

Its properties.—It is invisible, elastic, inodorous, heavier than atmospherical air; it is the weakest of acids; it is not altered by light; caloric dilates it, but makes no change in it, not even if put into porcelain tubes made red hot.

This aeriform fluid is truly an acid *per se*. The proofs are these: 1. It is always the same, whether disengaged by acids, or by any other means. 2. It turns tincture of turnsole of a purplish red, not entirely red like other acids; and what is remarkable, the red colour produced by this acid passes of itself into blue or violet, which is a striking characteristic to know this acid from any other which may be in the colouring liquor. 3. It dissolves in air, of which it constitutes a small part, namely one in four. It will mix also with oxygen gas, one part in three.

This gas is not proper to maintain combustion. Take three glass tubes; fill the first with atmospherical air, the second with carbonic acid gas, the third with oxygen gas. Introduce successively and quickly a lighted taper into each tube, in the order we have named them. In the tube filled with atmospherical air, the taper burns as usual; it is presently extinguished in the tube filled with carbonic acid gas; but takes fire afresh in the tube containing the oxygen gas, and exhibits a dazzling brightness. This experiment confirms a truth already established, namely, that oxygen gas is much more favourable to combustion than atmospherical air; and is a complete proof that inflammable bodies cannot burn in carbonic acid gas.

This gas is hurtful to respiration. The epiglottis and trachea arteria of animals are strongly closed by it, respiration is stopped, and the animal dies. The Grotto del Cane at Naples is filled with this aeriform fluid, whence the danger of exploring it.

This gas is hurtful to vegetation. Roots put in water impregnated with carbonic acid, soon perish. Senebier has observed, that plants which are made to grow in water slightly acidulated with this gas, transpire much more oxygen gas, because in that case this acid is decomposed; and the carbonic principle is combined and fixed in the plant, while the oxygen is driven out.

It dissolves in water, but slowly; the colder the water, the more it dissolves: Bergman calls this *aerated water*. There is an apparatus for effecting this purpose, invented by Dr. Nooth, and improved by Parker and Magellan; but its price, and frangibility, have occasioned it to be little used. We have given a view of it, at fig. 7, in the preceding plate. It is constructed of three glass vessels, formed purposely for this use. The lower part, or bell-glass C, contains the effervescent materials; it has a small orifice

orifice at D, stopped with a ground-stopper, at which an additional supply of either acid, or water, or chalk, may be occasionally introduced. The middle vessel B, is perforated both above and below. Its inferior neck is fitted by grinding into the neck H of the lower vessel. In the former is a glass valve, formed by two pieces of tube, with a lens, which is moveable, between them. This valve opens upwards, and suffers the air to pass; but the water cannot return through the tubes, partly because the orifice is capillary, and partly because the flat lens covers the hole. The middle vessel is furnished with a cock E, to draw off its contents. The upper vessel A is fitted, by grinding, into the upper neck of the middle vessel. Its inferior part consists of a tube that passes almost as low as the centre of the middle vessel. Its upper orifice is closed by a ground stopper F. When this apparatus is to be used, the effervescent materials are put into the lower vessel, the middle vessel is filled with pure water, and put in its place; and the upper vessel is nearly stopped, and likewise put in its place. The consequence is, that the carbonic acid gas passing through the valve at H, ascends into the upper part of the middle vessel B, where by its elasticity it re-acts on the water, and forces part up the tube into the vessel A; part of the atmospherical air, in this last, being compressed, and the rest escaping by the stopper, which is made of a conical figure, that it may be easily raised. As more carbonic acid gas is extricated, more water rises, till at length the water in the middle vessel falls below the lower orifice of the tube. Carbonic acid gas then passes through the tube into the upper vessel, and expels more of the atmospherical air by raising the stopper. In this situation the water in both vessels being in contact with carbonic acid gas, becomes strongly impregnated with that fluid, after a certain time. This effect may be hastened by taking off the middle and upper vessels together, and agitating them. The valve is the most defective part of this apparatus; for the capillary tube does not admit the air through, unless there be a considerable quantity condensed in the lower vessel; and the condensation has in some instances burst the vessel.

Progressive improvement has suggested more simple methods of effecting the same purpose. A little cask filled with half carbonic acid gas, and half water, agitated by suspension in the air, may serve the purpose of a slight experiment. But the most complete apparatus for promoting the dissolution of acid gas in water, is the following; which may serve not only to make carbonats of soda and potash, but in general to mix all gases which refuse to unite with liquids, because the surfaces are renewed. This machine is represented in the same plate, at fig. 3, of which the following is the explanation: A, B, are bottles to act alternately; chalk is first put in, and over that pour sulphuric acid weakened with water, by means of a convoluted columnar tube, with a funnel at the top, to pour in the liquor; it is thus constructed to counterbalance the expantion of the gas, and thus force the acid to combine with the water. The tube which goes from G to the jar I, is to saturate with the acid in gas when required. E and F are bottles of equal size. Put the water to be acidulated in E; it might indeed be put into C; however the first bottle may be left to receive the impure acid which passes off; but then the branch which comes from the bottle F must not be plunged therein. When pressure is used in E, it communicates to G and F, and even to D, by means of the syphons; so that the liquor is moved in succession: when all the fluid is arrived, the acid is made to act on the chalk in B, which acts by pressure in its turn, and drives it back to the other side, and so in constant alternate succession, till any quantity of water is aerated that may be required.

Water, thus saturated with carbonic acid gas, differs from natural mineral waters only by the other elements which they hold in dissolution. Hence by adding ten drops of tinctura martis cum spiritu salis, to each pint of water, after it is impregnated with the carbonic acid gas, it will resemble the genuine pyrmont water. But to render it chalybeate, add only one grain of salt of steel, to the same quantity of water. It has the property of being heavier than distilled water; it turns blue paper red. If placed under the receiver of an air-pump, and a vacuum be made, it imbibes faster than simple water; and yet this gas, in its disengagement, takes away some caloric, and occasions cold, which must lessen the action of the fire; the water imbibes also, and the thermometer is far from 60°.

Water, charged with carbonic acid, loses that acid by being exposed for a certain time to the air. Caloric disengages this acid with rapidity, and with a sort of effervescence: but the latter portions adhere very strongly to the water, and must be boiled a long time before they will separate; so certain is it that the last elementary particles of a compound body stick together with great obstinacy.

This liquid acid precipitates lime-water; when the lime is saturated with the acid, the precipitate is insoluble; but by adding more of the acid, the precipitate disappears. It is to be observed, that it is no longer the lime which is dissolved, but the compound carbonat of lime which was formed; this is proved by pouring caustic potash over it, which only absorbs the excess of acid, and the carbonat of lime appears again. With air expired from the lungs, a similar effect is produced. Lavoisier has proved, that respiration is a continual combination of atmospherical air with the hydrogen and carbon of blood. This water appears in vapours during respiration in a cold air, and it is called pulmonary transpiration: carbonic acid gas is disengaged also.

It is certain that carbonic acid gas is composed of carbon and oxygen. The following experiment will farther demonstrate the truth of the assertion. Take a glass tube closed at one end. Put in a bit of phosphorus, and then some carbonat of soda dried and reduced to a fine powder; put one part of phosphorus to five of the carbonat of soda: then close the tube, making it end in a small capillary tube. Place the tube in a furnace, but so that the extremity where the phosphorus lies may not feel the action of the caloric; pass it through the grate of the furnace, and surround the tube with lighted coals; and heat till the carbonat is melted: then raise the tube, and warm the phosphorus. The phosphorus burns, and decomposes the carbonat of soda; phosphat of soda is formed, and the carbon of the carbonic acid is left to itself; a little phosphoric hydrogen gas is previously disengaged. Here then two affinities are employed: 1. The affinity of the oxygen for the phosphorus; 2. Of the phosphoric acid, which has been formed, for the soda. To get at the carbon resulting from the experiment, take the black mass and wash it in distilled water; then strain. The phosphat of soda is held in solution in the liquor, and the carbon sinks. Clouet has a very ingenious and simple experiment, which shews that carbonic acid may be disengaged to form steel. For this we must refer to the section on iron.

Several chemists have observed, that this acid, in its elastic state, possesses the property of preserving animal substances, by retarding putrefaction, and even diminishing its effects after it has commenced. Hence it was, that M'Bride supposed that it unites with the putrid substance, and restores the acid it had lost during the time of putrefaction. This last phenomenon, according to his doctrine, arises from the natural decomposition of organic bodies, and the dissipation of the carbonic acid, which he calls *fixed air*: for which reason he supposed that the application of this acid was indispensably necessary to compensate the loss sustained in the animal economy, and to restore the fluids to their former state when changed by heat and motion. He admits the existence of this acid

acid in fresh vegetables, especially such as are susceptible of fermentation, as the decoction of barley which has been suffered to germinate, or the infusion of raisins, &c. all which he thinks are equally serviceable in septic or scorbutic disorders. Water impregnated with carbonic acid, has likewise, in several cases, been successfully prescribed in putrid, bilious, fevers, in pulmonary complaints, and various disorders of the lungs. It has been strongly recommended as a lithontriptic, or solvent of the stone in the bladder; but we are not in possession of any authenticated facts in proof of its efficacy in that complaint.

The public prints contain accounts of several instances of the cure of the cancer made by the application of the carbonic acid. We can nevertheless assert, that this means has been used several times without success. After the first application, the cancerous ulcer exhibits a more favourable appearance; the sanies, which commonly flows, becomes white, consistent, and laudable; the flesh assumes a lively colour: but these flattering appearances do not continue; the ulcer soon returns to its former state, and passes through the usual changes with unabated violence. It is to the first discovery of this acid by Dr. Black that we must fix one of the most brilliant epochas of chemistry. To determine the influence of this discovery on the science, we shall here offer the following remarks: 1. It has added one to the number of acids. 2. It has shown the cause of the effervescence which mild alkalis, chalk, calcareous spar, and magnesia, produce with stronger acids than itself. 3dly, It has caused a distinction to be made of all alkaline matters into two states, the state of purity or causticity, and the mild state, having the property of effervescence. 4thly, It has greatly enlightened the history of the elective attractions of acids for ammoniac and lime. 5thly, It exhibits the first instance of an acid which prefers lime to fixed alkalis. 6thly, The history of mephitic caverns, in which animals cannot live, is become very clear and simple, in consequence of this discovery. 7thly, The analysis of waters has been rendered more perfect from the accurate knowledge of such as are called gaseous, spirituous, acidulous, and in consequence of that knowledge we have succeeded in perfectly imitating them. 8thly, It has thrown great light on the solution of iron in many waters, and on the means of procuring martial waters entirely similar to those in nature. 9thly, It has exhibited a class of neutral earthy, alkaline, and metallic salts, in which the carbonic acid is a principle part; and which are distinguished in this Treatise by the generic name of *carbonats*. Lastly, It has opened a new field to the researches of chemists, and has excited that ardour to which we are indebted for all the brilliant discoveries made since that period.

The carbonic acid gas is the *choke-damp* of miners, so called from the fatal effects it produces on those who breathe it. The miners are informed of its presence, by the faintness with which their lights burn, or by their total extinction. It is synonymous with the *fixed air* of the English chemists; the *mephitic acid* of M. Bewly; the *mephitic gas* of Macquer; the *aerial acid* of Bergman; and the cretaceous acid of Bucquet. It exists in great abundance in chalk, limestone, marble, calcareous spars, &c. forming nearly one third of their substance. It is also extricated in considerable quantity from putrefying animal matter. According to Lavoisier, its specific gravity is to that of common atmospherical air, in the proportion of 1·8454 to 1·2308.

OF PHOSPHORIC ACID.

It was long supposed that this acid existed ready formed in phosphorus; but Lavoisier has demonstrated that it is a combination of phosphorus with oxygen. He affirms that 100 parts of phosphoric acid is composed of 28½ parts of phosphorus united to 71½ parts of oxygen.

Methods of obtaining phosphoric acid.—1. By the rapid combustion of phosphorus in oxygen gas, it is obtained in white flakes. 2. By passing a stream of vital air thro' phosphorus melted under water. These experiments are already detailed in page 201. 3. By decomposition of bones. 4. By nitric acid. In treating of these two last substances, we shall describe their action and manner of operating.

Its properties.—Obtained, without the addition of water, in vital air, it is in white flakes, snowy, light, deliquescent, and with a taste very strongly acid. Exposed to the air, it attracts its humidity very strongly. In contact with water, it easily melts, furnishing a white fluid, without smell, of an oily consistence, very heavy. Exposed to the action of fire in a close retort, a clear water is produced; the acid concentrates, and becomes heavier that sulphuric acid; it gains consistence and opacity by degrees; by leaving it to thicken still more, it becomes like a jelly. In a violent heat, it vitrifies, melting into a transparent, hard, and very electric, glass. If this vitreous phosphoric acid be exposed to the air, it softens it, and by degrees makes it become entirely liquid.

Phosphoric acid and hydrogen gas.—Put vitreous phosphoric acid into a porcelain tube, and to the upper extremity fix the apparatus already described for obtaining hydrogen gas; the other extremity is to be furnished with a tube, which goes into a two-necked bottle, whence is sent out another tube which is passed under an inverted jar in the pneumatic apparatus. The tube must be made red-hot to melt the phosphoric acid, and the hydrogen gas is to be passed through it. The hydrogen deprives the acid of its oxygen; water is formed; and at the end of the operation phosphorus is found in the tube.

Phosphoric acid and charcoal.—Take phosphoric acid of the consistence of jelly; add powder of charcoal, very dry, about one-fourth of the weight of phosphorus, or as much as will make the mass of a friable consistence; dry the mixture in a melting-pot, until the greater part of the moisture be dissipated. Then put the mixture into a luted earthen retort, and an inverted retort, containing water, is used for a receiver; but Pelletier recommends a receiver of copper, shaped like an inverted retort. Put water into the receiver in such a manner, that the phosphorus, as it passes off, may be stopped, and not come in contact with the air. By this method, a great quantity of phosphorus escapes combustion, since it must pass through a column of water of six inches before it comes in contact with the air. The apparatus thus prepared, bring the retort by degrees to a very strong flaming heat in a reverberatory furnace. In the early stage of the operation, hydrogen gas and carbonic acid are disengaged, arising from the decomposition of the water by the charcoal. When the phosphoric acid begins to be decomposed, the hydrogen gas dissolves a little phosphorus, which gives it the property of shining in the dark by the contact of air; finally, when the heat is strong enough, the phosphorus is converted into an oil, which falls into the water of the recipient, and there coagulates. This experiment shews, that at a high temperature the carbon has more affinity with the oxygen than the phosphorus has; that this last has more than the hydrogen, since water is decomposed before phosphoric acid; lastly, that hydrogen is capable of dissolving a certain quantity of phosphorus. It appears that the water of the receiver keeps the hydrogen phosphorated; for, as soon as it is exposed to the air in the dark, even after filtration, it throws out very bright phosphoric sparks, especially when the surfaces are renewed by agitation.

By heating phosphoric acid over oxyd of phosphorus, the oxyd changes the phosphoric acid into *phosphorous* acid. Sulphur will not decompose phosphoric acid; but it unites with metallic oxyds, and forms salts, as yet but little known.

PHOSPHOROUS ACID.

To produce this acid, which is phosphorus less oxygenated than in the state of phosphoric acid, the phophorus must

must be burnt by a very slow spontaneous combustion over a glass funnel leading into a crystal phial; after a few days, the phosphorus is found oxygenated, and the phosphorus acid, in proportion as it forms, attracts moisture from the air, and drops into the phial. See the section on Phosphorus, p. 200. This acid may be formed also by decomposing phosphoric acid, and a certain quantity of it is always disengaged in the operation for phosphorus.

Phosphorous acid may be regarded as phosphoric acid holding a little phosphorus in dissolution. This acid gives out a fetid and disagreeable odour when rubbed, and especially when heated; one part of it volatilises in white vapour very sharp and pungent; it is therefore more volatile than phosphoric acid. If this experiment be made in a bulbous tube, or in an apothecary's phial, phosphoric sparks arise from the middle, and burn in the air, which does not take place with the phosphoric acid saturated with oxygen. By thus heating the phosphorous acid, it becomes phosphoric acid; it seems that the parts which fly off in vapour by the action of the fire, are more apt to be disengaged by caloric, and are less saturated with oxygen; and that it is when they are disengaged in this manner, that the remainder is phosphoric acid; and even the burnt bubbles, saturating themselves with oxygen, fall down again in part into the phosphorus acid state. This property alone would be sufficient to distinguish this acid from phosphoric acid.

SULPHURIC ACID.

Sulphur, as we have already remarked, burns only in proportion as oxygen gas is united with it. The methods of obtaining *sulphuric acid*, are two: 1. By extracting it from such substances as contain it. 2. By manufacturing it. In the first case, a distillation is made from sulphat of iron, or vitriol of iron, copper, or zink, or even of alumine, or of lime; whence this acid has been called *vitriolic*, and, according to its degrees of concentration, *spirit of vitriol*, *oil of vitriol*, and *concentrated or frozen oil of vitriol*. But, in modern times, it is procured at a much cheaper rate, by the combustion of sulphur.

In the manufactories for making sulphuric acid in the large way, a mixture of nitre and sulphur is burnt in close built chambers lined with lead. Suppose it were required to make 400lbs. of this acid in a day, a chamber of thirty feet long, as many broad, and twenty high, will answer the purpose of obtaining that quantity; for 130lbs. of the acid, there will require about 90lbs. of sulphur, and 7½ of nitrat of potash. Sulphuric acid results from the combustion of the sulphur, which, in burning, combines with the base of vital air, or oxygen, which is contained in the atmospherical air, and in the nitre added to the sulphur; the mixture is set on fire, and the vapours are received in the chamber, which has a little water at the bottom for facilitating the condensation of the vapours. In this second case it is sulphur completely burned; the acid therefore is radically formed.

When taken out of the chamber, the sulphuric acid is black, impure, not concentrated, is mixed with a superabundant quantity of water, and retains the smell of sulphureous acid and somewhat of nitrous acid; by leaving it for some time exposed to the air, the odour of sulphurous acid is dissipated. Yet this is not sufficient; then it is made to evaporate by distillation in large retorts or open vessels, which rectifies it from the nitrous acid. To have it perfectly rectified and pure, it will be necessary, after having separated the first portion, which is weakly acid, to continue the distillation till no liquor remains in the retort; this is called distillation to siccity or dryness. The residuum is a small quantity of alkali which proceeds from the nitre, and which remains combined with the excess of sulphurated acid; this is acid sulphat of potash; a little sulphat of lead is often found also. For this rectification choose a retort not too high, and fix it well in the furnace, that the motion occasioned by the ebullition of the acid may not break it.

It requires but a very small quantity of animal or vegetable substance to give this acid a brown colour.

Sulphur may be converted into sulphuric acid by oxygenated muriatic acid, as will be hereafter shewn. By distilling nitric acid over sulphur, sulphuric acid is produced also. For the experiment, see on *Nitric Acid.*

Properties of sulphuric acid.—It is thick, running in ropes like oil; it is inodorous, it burns, it carbonises, it destroys all animal and vegetable substances; it burns and corrodes the skin, therefore must be handled with caution. It is much heavier than distilled water, and imparts a bright red to blue vegetable colours. It increases in *absolute* weight by being exposed to the air, because it absorbs the humidity of the atmosphere very quickly; but, on the other hand, it becomes weaker, and loses in *specific* weight.

To perform the experiment, place a porcelain tube across a furnace, and adapt thereto a couple of tubes of glass; one must communicate with a machine for obtaining hydrogen gas, as before described; the other with a retort containing pure concentrated suphuric acid; the lower end is to be furnished with a bent tube which goes under a jar with mercury, in order to obtain sulphuric acid gas. Then heat the porcelain tube, and first let in the sulphuric acid boiling; then the hydrogen gas. The experiment is dangerous, as it often happens that there are strong explosions. In the cold way, sulphuric acid is not decomposed by carbon; but by heat it is changed into sulphurous acid; for this purpose, put charcoal in powder, very dry, into a retort; pour sulphuric acid over it, and then heat it. If a tube be adapted to the retort, carbonic acid gas will be obtained.

According to the experiments of Pelletier, sulphuric acid is not decomposed by phosphorus; neither is it decomposed by pure sulphur. By boiling sulphuric acid over red oxyd of sulphur, the sulphuric is changed to sulphurous acid.

Certain metals decompose sulphuric acid; and sulphurous gas is the product. Others, on the contrary, must be burnt before they will dissolve in sulphuric acid; in that case they decompose the water; but, instead of sulphurous gas, hydrogen gas is disengaged; in this manner is generally wrought the dissolution of zink and of iron, by the aqueous sulphuric acid.

Concentrated sulphuric acid has a great affinity with water, and also with caloric. When this acid is mixed with water, the heat rises, and the noise made in the union arises from the air contained in the water. The mixture attains a heat of 120°, so that water may be boiled in it. Four parts of sulphuric acid and one of water give out a very strong heat. At a low temperature, when the acid is pure, it congeals and crystallises in prisms of six sides. It should be left to congeal in a mixture of salt and ice, and be stirred: this was called *frozen sulphuric acid.*

Sulphuric acid is decomposed by all combustible substances. Straws turn black in this acid, because hydrogen, which is the principle of vegetation, combines with the oxygen, and leaves the carbon of the vegetable at liberty; such also is the theory of the carbonization of all vegetables.

The sulphuric acid is used in many of the arts, particularly in hat-making, and in dying. It is one of the most common and most necessary solvents used in chemistry: it is employed in medicine externally, as a powerful caustic; and internally, when diluted with water, so as to be scarce sensibly acid, as a refreshing, cooling, and antiseptic, medicine.

SULPHUROUS ACID.

This is produced by the second degree of oxygenation of sulphur. There are two modes of obtaining it. 1. By combining the sulphur with such a quantity of oxygen only as is necessary to change it into sulphurous acid. 2. By separating from sulphuric acid that portion of oxygen which is over and above the nature of sulphuric acid.

Take

Take one part of mercury, and two of sulphuric acid; put these into a long-necked mattrass, to which adapt a bent tube which goes to the bottom of the water contained in a Woulfe's bottle. The sulphuric acid, which is disengaged at the same time with the sulphurous acid gas, is arrested and dissolved in the water of this first bottle: from this goes a second tube, to conduct the sulphurous acid into jars inverted over mercury, or into bottles filled with water, if it be required to have it liquid.

The second method is by the slow combustion of sulphur. Put sublimed sulphur into a small vessel of earth or porcelain; heat them slightly, and set fire to the sulphur with a coal; when it is well inflamed, cover the sulphur with a jar filled with air: place in a dish, and pour water round it. A white smoke rises, which is dissolved in the water; this water becomes acid: this is sulphurous acid. The sulphurous gas is in form of smoke or cloud under the jar, because it is combined with the water contained in the air in the jar: in a dry air, it is very transparent. This acid was formerly called *spirit of sulphur*.

Sulphurous acid gas is invisible and elastic, with a brisk penetrating smell; it is neither proper for combustion nor respiration; its taste is lively, warm, and pungent. It reddens and discolours most of the blue vegetable tints; it has the property of cleaning and whitening silk, and giving it a gloss. It is employed in dying; and is used to take out spots occasioned by vegetable juices, &c. It is twice as heavy as atmospherical air. In a high temperature, it is said by Priestley, Bergman, and Bertholet, to produce sulphur; but Fourcroy and Vauquelin, after new and careful experiments, deny the fact. It combines slowly with oxygen; but at length sulphuric acid is the result. There is no action between hydrogen gas and sulphuric acid gas when cold; but, by putting into a red-hot porcelain tube, a mixture of three parts in volume of hydrogen gas, and one part of sulphurous acid gas, the last is decomposed; a little sulphurated hydrogen gas is formed; and at the extremity of the tube opposite to that through which the gases passed, a quantity of crystals of sulphur will be found.

With the following apparatus, as delineated in the Chemistry Plate IV. fig. 1. may be exhibited two sets of experiments proper to shew the nature of sulphurous acid: the one with oxygen gas, the other with hydrogen gas. A is the furnace; B, a retort, containing one part of mercury, and two of sulphuric acid: the sulphuric acid is decomposed, and some sulphurous acid gas is disengaged: this last passes through a bent tube C, into the common reservoir G; into which comes also the tube D, to which is fastened a bladder F, pierced by a copper cock E, fixed to the end of the tube D, that, by squeezing the bladder, its contents, whether oxygen or hydrogen, may be injected upon the sulphurous acid gas, which passes into G. In the reservoir G should be put also a little mercury, which in oxydating purifies the sulphuric acid gas. H is a tube to continue the communication: I I, is a pipe of luted glass or porcelain, capable of supporting a strong heat, and placed across the furnace K. L is a bent tube adapted thereto, whose other extremity is plunged into a two-necked bottle M, which contains a little water; from the other aperture of this bottle goes out a bent tube of safety, which goes under the jar at N, inverted over mercury, or in a trough of water, to gather the remainder of the gases. If you press the bladder which contains the hydrogen over the sulphurous acid gas, and make them run together in a porcelain tube made red-hot, at that temperature the hydrogen seizes on the oxygen of the sulphurous acid, and sulphur is precipitated on the tubes and sides of the bottles. The hydrogen combines with the oxygen forming water; and the excess of the uncombined hydrogen gas is set at liberty, and passes under the jar N. If the bladder be filled with oxygen gas, instead of hydrogen, this gas passes with the sulphurous acid gas, combines with the acid gas, and restores to it the oxygen it had lost by oxyding the metal in the retort. Sulphuric acid is formed, which is dissolved in the water of the bottle or reservoir G. This experiment, which will succeed only at a high temperature, shews that at that time the hydrogen has more affinity with the oxygen than with the sulphur, which is not the case when cold. Thus sulphurous acid is changed into sulphuric acid by means of oxygen at a high temperature; and, by means of hydrogen, sulphurous acid is decomposed; then, taking from that the portion of oxygen which kept it acid, the sulphur remains.

Phosphorus has no action with sulphurous acid. By heating sulphurous acid with carbon, sulphur is obtained; and a little sulphurated hydrogen gas is disengaged. In water cooled by ice, the combination is so rapid, that not a bubble rises to the surface; ice from a cellar melts very quickly, which shews a considerable disengagement of heat; the water at this temperature increases 0·15 of its weight, or nearly a seventh part. The specific gravity of liquid sulphurous acid saturated, is to that of distilled water as 1020 to 1000.

Exposed to the temperature of 15+0, this saturated water throws up a vast quantity of little bubbles; this is sulphuric acid gas, which at that temperature can no longer remain combined with the water. If a vessel filled with liquid sulphurous acid be plunged into water, it boils with astonishing rapidity, and the liquor loses a great part of its smell and its acidity. Water saturated with sulphurous acid freezes at some degrees below 0; but not an atom of gas is disengaged, as happens with carbonic acid; the sulphurous acid therefore has more attraction for the water.

If sulphurous acid gas be put into concentrated sulphuric acid, a concrete acid is obtained, which is sublimed in the neck of the retort.

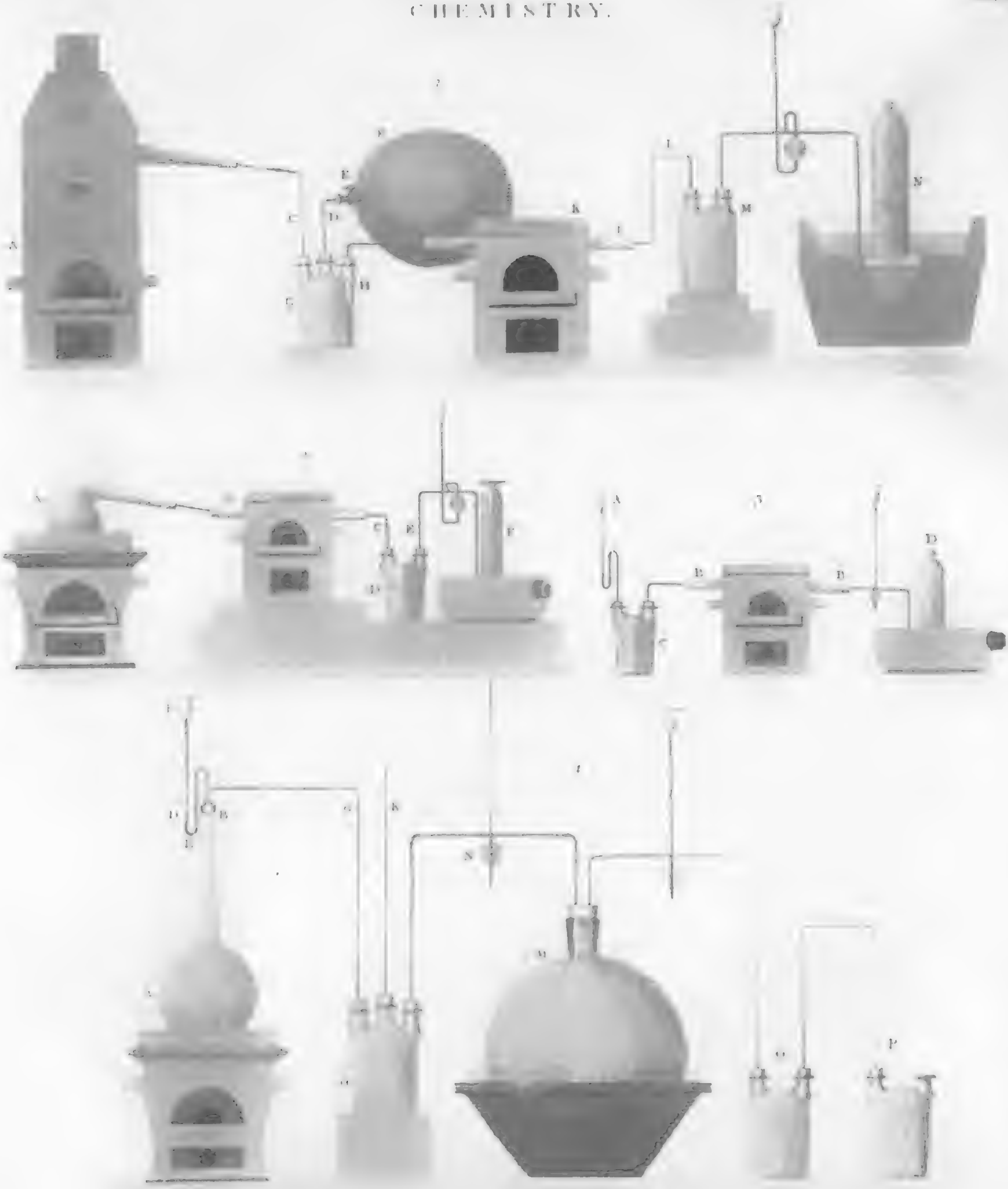
Of Nitric Acid.

Nitric acid is one of the most important in nature, on account of its frequent use and great utility in chemistry. It gives out its oxygen so easily to combustible bodies, that it has been the instrument of many discoveries. The ancient chemists knew no such thing as white nitric acid; they described it as very red, giving out yellow vapours, &c.

Nitric acid is extracted from a salt known in the arts, by the name of *saltpetre*, the method of producing it we shall hereafter describe in speaking of the nitrat of potash. This acid, pure and concentrated, is heavy, with a white smoke. When distilled in a glass retort with the pneumatic apparatus, in a heat sufficient to make it boil, a red vapour is exhaled, which condenses in the receiver into a liquid of the same colour; and a little oxygen gas passes under the jar.

Put coloured nitric acid into a retort; adapt thereto a balloon with a little water in it. Place the retort in a sand-bath, and distil: a red vapour is thrown off, and the acid becomes white. If nitric acid, very much concentrated, be left in contact with atmospherical air, it attracts the humidity of the atmosphere, and is thereby weakened.

If very pure nitric acid be exposed to the rays of light, it may thereby be decomposed. For this purpose put nitric acid, very pure, into a bottle; fix in a bent tube which is to go under an inverted jar in the pneumatic apparatus; be careful that the tube does not touch the acid: in a certain time the acid changes colour, becoming yellow, green, and then red; and some oxygen-gas is disengaged. It is not the affinity of the light for the oxygen which decomposes the nitric acid; it is because there is at the same time a great affinity between nitric acid and the nitrous gas which is formed. The action of light will not proceed so far as to take away all the oxygen from the nitric acid, so as to reduce it to an azot; but, by continuing the experiment, nitric acid may be con-



The Modern Chemical Apparatus No. 2

converted or decomposed into nitrous gas. Nitric acid may be decomposed also by being made to pass through a heated porcelain tube, about two feet and a half long: if the tube be very hot, oxygen passes over, and the residue is azot; but, if not hot enough, much of the nitric acid will not be decomposed; frequently indeed this nitric acid will attract azot, and so form nitrous acid. By this decomposition a sort of atmospheric air is produced; but nitrous acid cannot be decomposed in this way.

Nitric acid may be made by passing ammoniacal gas over oxyd of manganese. This experiment, and the preceding, may be performed with the same apparatus as exhibited in the Chemistry Plate IV. fig. 2; and the following description may serve for both. A is a retort containing eight parts of liquid ammoniac; B, a porcelain tube fixed to the retort, and going across a furnace, and containing three parts of oxyd of manganese in powder; at the other extremity is a bent tube C, which runs into a two-necked bottle D, one fourth part filled with distilled water. It is necessary, to prevent absorption, not to plunge the tube into the water; it need only touch the surface. From the second neck goes out a tube of safety E, which runs under an inverted jar F, in the pneumatic apparatus. Make the tube red-hot, and then heat the ammoniac; red vapour will pass over, then a white smoke, which is azot and water in vapours; afterwards nitrat of ammoniac is formed: if the tube be not sufficiently heated, a little oxygen gas is disengaged at the beginning of the operation. By evaporating the water contained in the bottle, nitrat of ammoniac is obtained, whence the nitric acid may be re-drawn by means of sulphuric acid. Under the jar will be found, 1. Oxygen which comes from the manganese, which is decomposed quicker by the caloric than the ammoniac. 2. Hydrogen gas, which arises from the decomposition of the ammoniac.

This acid sets charcoal in a flame; but it must be very dry and warm, and the nitric acid much concentrated. It disengages nitrous acid and carbonic acid; the red smoke arises from the nitrous gas. To perform this experiment, put the charcoal into a glased earthern pan. Take a stick a yard long; split it at one end, and between the cleft introduce the neck of an apothecary's phial; tie it fast; the operator is by this means free from danger. When you want to set fire to the charcoal, pour the nitric acid into the phial, and with it sprinkle the charcoal, it takes fire immediately.—Phosphorus catches flame in the same manner, and the smoke that flies off is phosphoric acid; which proves, not only that nitric acid contains oxygen, but likewise that the oxygen is in a state ready for disengagement.

Sulphur also decomposes nitric acid, and reduces it to nitrous gas; for only thus far has the sulphur more affinity with the oxygen than the nitric acid, or rather than the azot; for the sulphur does not attack the nitric acid: sulphuric acid and nitrous acid are therefore formed. Put six parts of nitric acid, of 30° to one of sulphur: by distillation the nitric acid will be decomposed, nitrous gas will be disengaged, and sulphuric acid will be formed.—If you would operate with phosphorus, take a tubulated retort with a stopper of crystal; put in nitric acid of 30°; then through the tube introduce some little bits of phosphorus, about one part of phosphorus to six of the acid. Place the retort over a sand-bath, adapt a receiver, and heat the retort gently. The phosphorus is dissolved with effervescence; the nitrous gas escapes at the same time in vapours: then increase the fire so as to drive away the last portions of the nitric acid; and phosphoric acid is found in the retort, partly in a concrete form, and partly liquid.

Water combines with nitric acid in all proportions, and caloric is disengaged during the combination: with two parts of concentrated nitric acid and one of water, the mercury in Reaumur's thermometer will rise to 35°. By using snow instead of water, contrary effects are produced, that is to say, there is an absorption of caloric; and the thermometer may be made to fall from 0 to 22° below, by mixing four parts of snow with one of nitric acid; by cooling in this first mixture some fresh acid and fresh ice, and then stirring them together in the midst of this bath, the temperature may be brought down to 32 or 33° below 0. This property in the nitric acid to produce such extreme cold with ice, arises from the great affinity it has to unite with water; and in some degree forces the base, with which in that state it cannot unite, to take from the neighbouring bodies the caloric of which it stands in need to become liquid. It furnishes to chemists some useful hints, of which perhaps they do not take sufficient advantage, for examining the properties of bodies at a low temperature; it was this which demonstrated that mercury became a solid body at 31 or 32° below 0.

What we call aqua fortis, is nothing but nitric acid diluted with water. When we come to speak of nitrat of potash, we shall give the method of obtaining it by means of potter's clay.

Most metals act upon nitric acid, and occasion a change therein, which, has of late greatly assisted chemists in their enquiries into the nature of its principles. Metals act upon nitric acid in two different ways: 1. Some are completely oxydated, as tin, antimony, &c. and decompose the nitric acid entirely. 2. Some are oxyded, and decompose the acid but in part, as copper, &c. Nitrous gas is produced both ways.

The nitric acid of commerce often contains muriatic acid and sulphuric acid, which are very troublesome in all operations. The method of purifying it is as follows: Put some semi-vitreous oxyd of lead, or litharge, into a glass retort; pour the nitric acid over it: distil to dryness. There will remain in the retort, a muriat and a sulphat of lead, if the nitric acid contained sulphuric acid. Another way is to use nitrat of lead or silver: a precipitate is immediately formed, which is muriat of lead or of silver: then draw off the acid, or rather distil to dryness. This last is a very good method when muriatic acid only is mixed with the nitric acid; but, when there is sulphuric acid, the first method is to be preferred, seeing that a sulphat and a muriat of lead are formed at the same time.

Of NITROUS GAS.

Nitrous gas is the appellation of that aeriform fluid which is disengaged during the action of iron, copper, silver, or mercury, upon nitric acid. To get this substance pure, free from azotic gas, as required for eudiometrical experiments, it is not a matter of indifference what combustible is used; for there are some which act so strongly upon oxygen, that they draw it entirely from some parts of the azot, and then the nitrous gas will be mixed with azotic gas. Silver and copper are the best metals for the purpose; and the density of the nitric acid should not exceed 20 or 25° of Baumé's aerometer; otherwise its action would be too brisk, the nitrous gas would be disengaged too rapidly, and might burst the apparatus; besides, it is not so pure in that case. Humboldt has shewn, by careful experiments, that, by pouring nitric acid upon copper wire, a part of the acid was decomposed entirely, and thereby the nitrous gas was mixed with azot; but, that, by employing a solution of sulphat of iron, the nitrous gas was totally absorbed, and the quantity of azot might be measured, amounting to from 0·07 to 0·67, and even beyond.

To obtain this gas, take clean copper-filings; put them into a phial or small matrass; pour in nitric acid of 20 or 25°, stop the phial with a cork, to which a glass tube is adapted, whose bent extremity is plunged into the water-trough of the pneumatic apparatus; on the shelf of the trough is a bell-glass filled with water, which corresponds to the orifice of the bent tube. Things thus prepared,

pared, expose the mixture in the phial to a very gentle heat; and there will be effervescence and disengagement of nitrous gas. This gas is an elastic fluid, without colour or smell, and does not redden tincture of turnsol. It is hurtful to respiration, neither will it maintain combustion nor forward vegetation; yet it is supposed to prevent putrefaction. It has more affinity with caloric than nitric acid; hence this property is made use of to take away the nitrous gas which injures nitric acid. Exposed to the action of caloric in a red-hot porcelain tube, it undergoes no alteration; for this body is not decomposed by a red heat, while nitric acid by the same means undergoes a total decomposition; it would seem, from this experiment, that it could lose, at the utmost, only that portion of oxygen which was superfluous in the composition of nitrous acid; but this does not appear to be the case. For this experiment the following apparatus is constructed, as shewn in the preceding plate, fig. 3. where BB is a porcelain tube laid through a furnace; A, a glass tube, bent like a syphon, and terminating in a funnel; this tube is adjusted to the bottle C, in which some copper-filings are put, and through the tube the nitric acid is to be poured upon them. At the lower extremity of the porcelain tube, a tube of safety with a bulb, is adapted, which goes under the inverted jar D. The nitrous gas is disengaged, and passes through the hot porcelain tube without being decomposed.

Van Marum asserts, that nitrous acid, if the electric spark be passed through it, is reduced to one third of its volume; no longer becomes red in atmospherical air, but is converted into azotic gas and nitrous acid.

Put pure nitrous gas into a tube, and invert it in the pneumatic cistern, and introducing some pure oxygen gas; the vapour becomes red; it is nitrous acid that is forming, and which is soon dissolved in the water, so that it rises in the tube. If the oxygenous and nitrous gases are pure, not a bubble will remain under the jar; care must be taken to introduce the oxygen gas gently, that too much may not get in. Caloric from 30 to 35°, of the thermometer is disengaged during the operation. If the oxygen be not pure, the bubble remaining at the upper part of the jar is the residue of the azot, of the hydrogen, or of the carbonic acid gas, &c. which the oxygen gas might have contained; for the latter is immediately absorbed by the nitrous gas.

Lavoisier observed, that 0·73 of nitrous gas would obsorb 0·40 of oxygen gas. The acid resulting from this combination is not perfectly white; it throws up red vapours when united with alkalis or lime. But this will be set in a clear light by the following experiments of Humboldt. 1. If nitrous gas be combined with oxygen over mercury, no more nitric acid in a liquid form will be produced, than there was water in the apparatus. The absorption seems very small, because the acid continues dilated in a gaseous state, till the ammoniacal gas is precipitated. 2. Mixtures of nitrous gas and oxygen present different volumes in tubes than in wide vessels; because in the first, the nitric acid, raised from the surface of the water, remains in a gaseous state; this diminishes the quantity in appearance from 2·6 to 1·8, and even lower. 3. These same mixtures of nitrous gas and oxygen, do not exhibit absorptions of an equal volume with the experiments made in atmospherical air; and acids more or less oxygenated appear in this case to be formed. The difference is from 3·2 to 2·8. 4. A mixture of azotic gas and oxygen gas differs from the atmospherical air; because the oxygen of the first is more free, and more inclined to combine with a large quantity of nitrous gas. 5. By taking the residuum, after a mixture of equal parts of nitrous gas and atmospherical air, and analysing it by means of sulphat of iron, it may be found exactly what quantity of oxygen is contained in atmospherical air. 6. Nitrous gas, which acts most uniformly, and which is obtained by acids diluted with water, from 17 to 21° of Baumé's aerometer, contains from 0·12 to 0·15 of azot.

Nitrous gas with atmospheric air.—Under a bell-glass filled with water, and inverted on the shelf of the pneumatic mercurial cistern, pass one measure of nitrous gas and two of atmospherical air. The two fluids combine quickly, and diminish prodigiously. A brisk heat is excited; the water ascends in the bell-glass, and absorbs all the red vapours which arise from the combination of these aeriform fluids.

The property of very pure nitrous gas, (that is, deprived of azotic gas,) of rapidly absorbing the oxygen of atmospherical air, gave Priestley and Fontana the idea of their *eudiometer*, a word which signifies *a measure for air*; and in fact its destination is to measure the oxygen contained in atmospherical air. The proof consists in employing known quantities of these two gases, and to observe how much is necessary to their complete and reciprocal saturation; the less of common air is necessary for saturating the nitrous gas, the more pure is that air, and *vice versa*. Various instruments have been contrived; those of Fontana, Landriani, and Magellan, are the most remarkable. They differ in shape, but their object is the same, namely, to determine the salubrity of atmospheric air, or any other, in different places. Of the most approved of these, a plate and description will be given.

Nitrous gas sets phosphorus in a flame; it loses part of its volume, and the result of the combustion is azotic gas and carbonic acid gas, and sulphurous acid. If a lighted coal be plunged into nitrous gas, inflammation takes place. The same effect takes place with phosphorus: fill a bell-glass with mercury; introduce the nitrous gas, and the inflammation takes place. Mix hydrogen gas with nitrous gas, and bring a lighted taper to the orifice of the jar; the hydrogen gas will burn, and a green flame will be seen. Shake distilled water and nitrous gas together, and nitrat of ammoniac will be formed by a decomposition of the water; the effect of a double affinity. The principle serving to combustion exists therefore in nitrous gas, since it promotes the inflammation of certain combustible bodies which have a great affinity with oxygen, as sulphure of potash, pyrophorus, phosphorated hydrogen gas, iron, &c.

Nitrous gas combines with some acids, and particularly with nitric acid, on which it bestows new properties. By passing nitrous gas into white concentrated nitric acid, it is first produced yellow, then orange-colour, then very dark green. If you take the orange-coloured nitrous acid, and mix it with water, nitrous acid of a green-emerald colour is produced: take the dark-green nitrous acid, mix it with water, and you have blue nitrous acid. Priestley found that 100 parts of nitric acid, of the weight of fourteen, absorbed in two days 90·29 of nitrous gas: he says, that, when about seven parts were absorbed; the acid assumed an orange-colour, a green when eighteen parts were taken up, and that, when the 90·29 were combined, it arose in the form of red vapours.—This succession of colours is uniform and constant; repeated experiments furnish the same results.

Of NITROUS ACID.

It will be seen, from the preceding experiments, that nitric acid when yellow, green, &c. contains less oxygen than when white; for it is evident, that by combining nitrous gas, which has itself been already deprived of a part of this principle, the quantity in the nitric acid must be diminished. As by this modification the acid acquires fresh properties, modern chemists have given it the name *nitrous acid*, to distinguish it from that wherein the azot is completely saturated with oxygen.

Nitric acid, loaded with nitrous oxyd, and consequently more decomposable in that part of its composition, produces also from the same cause, much more effect upon other

other combustible bodies. Hence it is that nitrous acid flames with phosphorus, the volatile oils, some metals, &c. upon which nitric acid has comparatively but very weak effects. When nitric acid, more or less charged with nitrous gas, is put in contact with gold, there are two attractions which act suddenly and together, that of the oxygen of the oxyd of azot for the gold, and that of the nitric acid for the oxyd of the gold. And thus, by charging nitric acid with nitrous gas, Deyeux contrived to dissolve gold therein.

The nitrous vapour is a saturated combination of nitric acid and nitrous gas. Thus, if nitric acid and copper be put together into a bottle, nitrous gas is the product. Pass this nitrous gas into a second bottle containing concentrated nitric acid, nitrous acid is obtained, and a nitrous vapour is disengaged. Draw this nitrous vapour through potash, and collect the gas disengaged thereby, nitrous gas and nitrat of potash will be produced in the bottle. Hence alkalis have more attraction for the nitric acid than this has for the nitrous oxyd; and this is the reason why *nitrits* are not formed, but *nitrats* only, with fixed alkalis and the nitrous vapour, any more than with the same bases and with liquid nitrous acid.

If this nitrous vapour be passed through concentrated sulphuric acid, it is obtained in a crystallised form. Work as follows:—Put filings of copper into a two-necked bottle; one opening serves to pour the nitric acid in order to disengage the nitrous gas. From one of the apertures goes a tube which is sent into another bottle containing concentrated nitric acid; this last bottle is furnished with another bent tube which goes under a jar two-thirds filled with concentrated sulphuric acid. Then disengage the nitrous acid, and it runs into the concentrated nitric acid: the nitrous vapour rises, and, as the sulphuric acid seizes upon it, it appears in the form of small needled crystals.

If nitrous vapour be mixed with oxygen gas, there will be no absorption; but, if this vapour be put into nitric acid, an absorption takes place. Fill a bottle with nitrous vapour, and add water boiled, or deprived of air by any other means; the nitrous vapour will not mix with the water; but with water containing air it will mix.

With respect to the four metallic acids, there are many circumstances in which metals may be united with oxygen; yet in general they seem reducible to three. The first is the contact of air assisted by caloric; the second is by the decomposition of water; the third, by that of acids. There are four metallic substances capable of being completely acidified: arsenic, tungsten, molybdena, and chrome, lately discovered by Vauquelin. As we can only speak of them here as having a name among acids in general, we shall hereafter relate the manner of preparing them, and their properties, under the respective heads of these metallic substances.

Of MURIATIC ACID.

This acid exists abundantly in nature, and is united with different bases, principally soda, lime, and magnesia. Its constituent parts are unknown. It is not found alone; to obtain it therefore, it will be necessary to disengage it from its combinations. It was formerly called *marine acid, spirit of salt, acid of salt*, &c. The manner of extracting it will be shewn when we treat of *muriat of soda*.

Muriatic acid, free from every other substance, is always in the form of a permanent gas, which nothing hitherto has been able to render liquid. Muriatic acid gas may be obtained, 1. By distillation. 2. By separating the muriat of soda by means of sulphuric acid. 3. If it be dissolved and concentrated in cold water, it is disengaged by heat, and the gas is collected under jars with mercury. Put fuming muriatic acid into a phial or retort; to the orifice adapt a bent tube, which is to be plunged into the cistern of the mercurial pneumatic apparatus, under a vessel filled with this metallic fluid. Heat the liquid gently, and an aeriform fluid is disengaged, which drives the mercury out of the vessel, and takes its place. This aeriform fluid is muriatic acid gas. This gas is absolutely colourless when pure; it is so caustic as to corrode the skin, and to cause intolerable itching; it reddens the blue vegetable colours, such as syrup of violets and tincture of turnsol; it destroys animal life, and extinguishes flame. It has been remarked, that the flame of the taper, previous to being extinguished, grows yellow at the disk towards the upper part. Fourcroy says it is enlarged by the addition of a green or bluish circumambient flame, but the cause of this is not known. It is observed also that the flame of the taper, when going out, turns very white: this is because the water, which is disengaged by the combustion of the hydrogen and the oxygen of the taper, combines with the gas, and thus becomes cloudy and visible. Light does not sensibly change it. Caloric rarefies it, and increases its elasticity prodigiously. It is heavier than atmospherical air, in the proportion of 173½ to 100, and to distilled water as 1250 to 1000.

In contact with air, it produces white fumes or vapours, caused by the combination of the gas with the humidity of the air; therefore these vapours are not visible on high mountains, where the air is very dry. This gas melts ice as quickly as if it were thrown upon live coals. It easily dissolves in icy water, but not in warm water; so that it is necessary to preserve the muriatic acid in water at a very low temperature; for, if the bottle be not strong enough to resist the expansion of the gas at a different temperature from that in which it was combined with the water, it bursts the corks, and by its vapour spoils all copper utensils.

This gas in general unites rapidly with water, and constitutes *liquid muriatic acid*. Water, at about 12°, absorbs 0.30 of its weight; in proportion as the gas unites with the water, it loses its elastic fluidity; for the caloric which gave it this property is set at liberty and heats the liquor. The lower the temperature, the more the water dissolves of it, and *vice versa*; so that water which was saturated with it at 0, imbibes at sixty and some odd degrees, and may be deprived of the greater part of this acid at 80°.

The presence of the muriatic acid is easily known, wherever it exists, by its property of decomposing almost all muriatic salts, and especially sulphat of silver, with which it forms a white precipitate, very heavy, which becomes blue in the light; and of giving, with soda, a salt of an agreeable taste known to every one. This acid in general dissolves metals and oxyds in whatever state they may be; for, if they are too much oxydated, the muriatic acid takes away the excess of oxygen and assumes it; and, if the metal is not sufficiently oxydated, the water of the acid will be decomposed, and furnish the necessary oxygen; so that, by this reciprocal action, the oxydation is carried just to the degree necessary that the dissolution may take place.

Muriatic acid put into a long tube with concentrated sulphuric acid, produces a lively effervescence, and a gas which fills the whole capacity of the tube: this gas is no other than the muriatic acid, which the sulphuric acid has taken up from the water of solution, and to which this last has given the caloric, which it lost while combining with the sulphuric acid. This experiment proves, that sulphuric acid has more attraction for water than muriatic acid.

Muriatic acid easily unites with nitric, and some interesting phenomena are produced. If the acids are concentrated, a motion is observed throughout all the liquid; a gas comes over, which produces a brisk effervescence; the liquor heats, and assumes a red colour more or less dark. This gas is found to be oxygenated muriatic acid; hen mixing nitro-muriatic acid with water, it gives tut nitrous gas, and loses its red colour.

This acid is formed by the mixture of two parts of pure nitric acid and one of concentrated muriatic acid.

It is lighter than the two acids of which it is composed; and it has a smell peculiar to itself; its colour is commonly that of a lemon, but sometimes of an orange; by contact with light, oxygen gas is disengaged from it; caloric separates from it oxygenated muriatic acid; it combines with water, and becomes heated in it. It would seem natural to conclude, that the muriatic acid would have more affinity with oxygen than nitrous gas would have; but by the inverse experiment, that is, by mixing gas, or nitrous oxyd, with oxygenated muriatic acid gas, the contrary will soon appear; for, while these gases are in contact, they penetrate each other, lose their elasticity, and give birth to red vapours, which are true nitrous acids. If the proper quantities be used, not an atom of residue will be found. Hence it is only by the help of a double attraction, that muriatic acid can decompose the nitric; namely, that of the oxygen for the muriatic acid, and that of the nitrous gas for the nitric acid.

Though we are ignorant of the existence of oxygen in the muriatic acid, we at least know that it may be combined with that principle by means which we are now going to detail.

The muriatic acid is variously employed in the arts; but more especially in the art of assaying in the humid way. In medicine it is administered in a very diluted state, as a diuretic and antiseptic; and it is the principal ingredient in the celebrated remedy of Chabrieres, for ruptures. It is externally used as an escharotic; and likewise in gangrenes of the throat, aphthæ, &c. Mixed with a certain quantity of water, it constitutes a bath for the feet, which is a great secret with some practitioners, and is used for the purpose of removing the seat of the gout from the nobler to the inferior parts.

OF OXYGENATED MURIATIC ACID.

Scheele discovered that this acid, distilled with oxyd of manganese, takes all at once the form of gas; and that this gas was of a yellow colour, with a smell analogous to nitro-muriatic acid, &c. Berthollet, taking up the experiments of Scheele, found in this acid many properties useful in the arts. The ancient chemists called it *dephlogisticated marine acid*.

The old method of obtaining it was by pouring muriatic acid over oxyd of manganese in powder; but this process was long and expensive, because it was necessary first to extract the muriatic acid, and much of it was lost. The materials used for making it at present are 100 parts of muriat of soda, 0·75 of sulphuric acid in fifty parts of water, and 37·5 of powdered oxyd of manganese. Or, two parts of sulphuric acid, three of muriat of soda, and one of oxyd of manganese.

Put the muriat of soda and the oxyd of manganese into a large long-necked matrass, A, placed on a sand-bath, as exhibited in the Chemistry Plate IV. fig. 5. The matrass is stopped with a cork, B, having two holes or perforations; in one of which is fixed the tube D, bent down to E, ending at the top with a funnel F, by means of which the sulphuric acid is poured into the matrass: the other hole in the cork receives the end of a tube, G, which bends down till it enters the three-necked bottle H, about an eighth part filled with water, into which comes also the tube of safety K, to prevent absorption. This bottle communicates with the balloon M, by means of the tube N, furnished likewise with a tube of safety. This second vessel is half-full of water, and communicates with a two-necked bottle, O, in which is a tube communicating with the bottle P. Close all the joints with fat lute, covered with bits of linen dipped in white of egg and lime: heat the matrass by degrees. As this acid dissolves slowly and with difficulty, a great deal of water must be used, collected in the different vessels, or disposed in a very high column, so that, by compressing the gas, and giving it a long way to run, it may be completely dissolved. The size of the apparatus must vary according to the quantity of oxygenated muriatic acid required. Instead of Woulfe's bottles, depicted in the Plate, casks may be used, or stone receivers, as practised at Jouy, where a great quantity of this acid is advantageously employed in the bleaching of linen.

CONCRETE OXYGENATED MURIATIC ACID.—If the bottles be surrounded with ice, the oxygenated muriatic acid is obtained crystallised at the temperature of 0; it is in yellowish spangles; but it regains its expansion, and would break the vessels, unless care be taken to preserve the same temperature, or to leave room for their expansion. In this state the acid loses its smell; it is fixed; not being volatile, it cannot have any smell. In this operation, the sulphuric acid acts immediately upon the muriat of soda, to the base of which it unites: the muriatic acid, in its turn, attacks the oxyd of manganese; one part combines with the oxygen, and the other to the oxyd returning to the metallic state; hence result, sulphat of soda and muriat of manganese, which remain in the vessel, and oxygenated muriatic acid which passes in the gaseous state into the water of the Woulfe's bottles O and P where it dissolves.

This acid may be obtained in the gaseous state, by making it pass through a small quantity of water. For this purpose, put the mixture before described into a medicine-phial, or small matrass, stopped with a perforated cork; adapt a bent tube, which is to go under a jar, in the pneumatic apparatus.

This gas is distinguished by peculiar properties. It exhales a strong penetrating odour, which affects the throat; it has a styptic taste, provokes coughing, and draws rheum from the brain; it will even occasion the spitting of blood; it dulls the senses; afterwards occasions vomiting, probably by sympathy between the pituitary membrane or throat and the stomach; it causes head-ach. The best remedy for stopping its effects is liquid ammoniac.

This gas is not invisible; it is of a greenish yellow colour. It diminishes and reddens the flame of a taper without extinguishing it; but animals cannot breathe in it. It is heavier than atmospherical air: caloric and light make no visible change in it. It burns and flames with many combustible bodies, as metals, sulphur, phosphorus, alkaline and metallic sulphures, volatile oils, &c. Thus, by throwing iron, antimony, arsenic, or several metals, in fine powder they flame and exhibit a shower of fire very wonderful to those who are not acquainted with these effects. It does not redden tincture of turnsole, nor the other blue vegetable colours; but it has the faculty of destroying them, and rendering them colourless. If any flowers, except yellow ones, be put under a glass filled with this gas, their colour is quickly destroyed; green leaves of plants undergo the same change. This effect can be attributed only to the absorption of the oxygen; this gas, which contains it in excess, gives out a part of it; this the flowers absorb greedily, and this absorption deprives them of colour: then oxygenated muriatic acid gas becomes common muriatic gas again.

This gas combines in small quantity with water, to which it communicates some of its properties, such as its colour, smell, and taste. In this state, oxygenated muriatic acid is not heavier than common water; which shews that it loses no great quantity of caloric in the combination: a proof of it is, that the temperature of the water is little altered by combining with this acid. This liquid acid has a sour astringent taste. Exposed to the rays of the sun in a transparent bottle, oxygen gas is disengaged from it; in proportion as this gas is thrown off, the acid loses its colour and smell, and returns to the state of simple muriatic acid: this is the purest oxygen.

As we said of the acid gas, this liquid gas does not redden blue vegetable colours, but destroys them almost all. This property caused Berthollet to propose bleaching of thread, linen, and cotton, by its means. Take unbleached thread or linen; discharge the colouring principle, by boiling in a ley prepared of twenty parts of water with one of potash, which may be rendered more active by means of one-third of lime; then put the

the thread or cloth into oxygenated muriatic acid. Care muſt be taken to move the ſtuff about, and to wring it; then rince it in clear water, to take away the ſmell it has contracted; it might even be paſſed through ſoap-ſuds. Or dip for a moment into the oxygenated muriatic acid ſome bits of coloured matter, whether linen or cotton, flowers or leaves, &c. and obſerve the effect.

Oxygenated muriatic acid has alſo the property of whitening wax, ſuch as the green wax of America, the yellow wax of Louiſiana, which is an oily vegetable with yellow wax; but it muſt not be drawn out in round ſticks, as is common, becauſe the wax would remain yellow in the middle, as the action of the acid could not penetrate to the centre. The following is the moſt approved method of whitening wax: Cut the wax in pieces, and put it into a ſmall matraſs with water; place the matraſs in a ſand-bath, and heat it ſo as to keep the wax in a liquid ſtate. Adapt to the matraſs the apparatus for collecting oxygenated muriatic acid gas above deſcribed. As ſoon as this gas is put into the liquid wax, it ſeizes every part of it, and whitens it: but the action of the fire under the wax muſt be moderated, and even the action of the acid muſt be reſtrained; for, if it goes beyond a certain point, part of the wax will be burnt and reddened: it is very eſſential to obſerve this. The ſame apparatus will ſerve to thicken oils.

Chaptal uſed the oxygenated muriatic acid gas with advantage for cleaning mildewed paper and old prints: they acquire by this means a very bright whiteneſs, and are cleared of all ſpots and ſtains. Common ink is diſcharged by this gaſeous ſubſtance; but printing ink remains. In ſome paper-mills it is uſed for bleaching the rags; and it is found profitable, though expenſive, becauſe they avoid the loſs by rotting, which was conſiderable in the former tedious ſix-months proceſs; another advantage is, that the workmen are not incommoded by the ſmell of putrefying or rotten rags. This acid is alſo uſed for diſcharging the madder dyed ground from painted cloths, inſtead of cow-dung; but great caution is requiſite for fear of changing the other colours.

This acid burns ſulphur very well at a proper heat; for in the common temperature, the ſulphur has more attraction for the oxygen than the muriatic acid has. Put powdered ſulphur into a medicine-phial; pour the oxygenated muriatic acid over it; then heat them. The ſulphur turns to ſulphuric acid, which is known by the muriat of barytes or the nitrat of ſilver; muriat of ſilver is formed. By heating, the preſence of the ſulphuric acid is ſtill more plain; for the muriatic acid flies off in vapours, and the ſulphuric acid is left naked. The ſame experiment may be made with phoſphorus. If a ſolution of phoſphorus in oxygenated muriatic acid be heated, the muriatic acid is diſengaged, and the phoſphoric acid is fixed.

The oxygen of muriatic acid oxyds metals; the muriatic acid formed by the diſengagement of this oxygen, ſeizes upon the oxyd of the metal thus oxydated: in fact, muriatic acid is one of thoſe which has the greateſt attraction for metallic oxyds.

Oxygenated muriatic acid will diſſolve gold. Put leaves of beaten gold into water ſaturated with this aeriform fluid; they will preſently diſſolve. M. le Sage produced a gold precipitate under the form of ſmall threads or flakes, which appeared at the bottom of a flaſk of this ſaturated water, in little brilliant maſſes, on which were obſerved triangular lamulæ, the elements of the cryſtallization of that metal.

Oxygenated muriatic acid gas is uſed to ſweeten the air of priſons, hoſpitals, &c. ſo as to deſtroy the miaſmata or impurities. It might alſo be uſed for taking away the ſmell of rooms painted in oil-colours, by diſengaging this gas into the atmoſphere. This acid ſhould be preſerved in bottles covered with black paper, to keep out the light, which would decompoſe it.

The oxygenated muriatic acid is of conſiderable uſe in the arts, particularly in bleaching. Berthollet thinks that it may be uſed for the purpoſe of diſcovering, in a few minutes or hours, the effects which expoſure to the air will produce on certain dyed ſtuffs, and that their durability may by that means be aſcertained. Several improvements have been made in the method of bleaching firſt introduced by Berthollet, through the medium of this acid. The principal of theſe conſiſt in combining the acid with alkalis or lime. In this ſtate of combination, it has not been found to corrode, or in any way to injure the cloth. This improved proceſs is now employed in ſome of the moſt extenſive bleaching concerns of this country, and muſt undoubtedly be conſidered as one of the moſt valuable donations which modern chemiſtry has yet conferred on the arts.

OF FLUORIC ACID.

Fluoric acid was firſt diſcovered by Scheele. This name was given it becauſe it is obtained from a kind of earthy neutral ſalt, called *fluor ſpar*, *phoſphoric mineral*, and *fluat of lime*.

As the fluoric acid will corrode and even diſſolve glaſs, and bring it into a gaſeous ſtate with the help of a ſlight heat, it is neceſſary for obtaining it pure, to have veſſels of ſuch metals as are leaſt affected by the action of this, or the ſulphuric acid: lead is the beſt. To obtain fluoric acid free from every combination, put one part of fluat of lime in powder into a leaden retort; pour in three parts of ſulphuric acid, and fix a receiver, of lead alſo, half full of water. This experiment ſhould be made in a water-bath; for which purpoſe the retort is to be put into a veſſel of copper or iron containing water, or into a ſalt-bath. Give a gentle heat, and the fluoric acid will be abſorbed by the water of the receiver as faſt as it is diſengaged. As this acid is naturally in the form of gas in the degree of heat and preſſure we live in, it may be collected in that ſtate: thus inſtead of a receiver, adapt to the orifice of the retort a bent leaden tube, whoſe extremity goes into the quickſilver-trough, in the pneumatic apparatus.

When this acid is to be obtained with an apparatus of glaſs, the thickeſt glaſs ſhould certainly be preferred. Uſe a retort with a tube adapted, which goes into a bottle containing diſtilled water. As this acid has the power of diſſolving glaſs, it preſently ſeizes upon the ſilex, which appears in the form of white flakes. Be careful to employ wide and large tubes when you operate with glaſs; for, unleſs it has ſufficient room to paſs, the gaſeous acid is compreſſed in the retort, its action on the glaſs increaſed, and the retort ſo much the ſooner corroded and deſtroyed. Margraaf, in diſtilling fluor ſpar with ſulphuric acid, ſaw, with aſtoniſhment, that the retort was pierced with numerous holes, and that a portion of the receiver was alſo diſſolved. The ſilex, in this experiment falls down into the water, becauſe the water has more affinity with the acid, than the acid has with the ſilex. If this gas be confined under a bell jar of glaſs, it diſſolves the ſilex. If an extinguiſhed taper be plunged in, it becomes encruſted; becauſe the water which runs from the ſnuff diſſolves the acid charged with ſilex which ſurrounded it, and the ſiliceous earth of this ſolution is driven upon the wick.

This gas is heavier than atmoſpherical air; extinguiſhes flame, deſtroys animal life, reddens blue vegetable colours, and has a penetrating ſmell, ſimilar to that of muriatic acid gas. It corrodes the ſkin; undergoes no change by the action of light; in contact with air, it throws out white fumes.

If animals, moiſtened ſpunges, charcoal, &c. be expoſed to the vapours of this gas in glaſs veſſels, the humidity contained in the ſpunge, &c. will diſſolve the acid, and the ſilex encruſts the ſubſtances under examination. By this mode, an appearance of petrifaction may be given to lizards, moiſt worms, fruits, &c. and theſe ſubſtances, thus covered with a hard caſe of ſilex, will

will keep for a long time. But in vessels of metal, this petrifaction does not take place; so that it is very plain that the earthy substance, or silex, which is precipitated by the contact of the fluoric acid gas and the water, is only a portion of the glass which is attached and actually dissolved by the aeriform acid.

Into a bell-jar filled with fluoric acid gas, and resting upon mercury, sprinkle a little water over the surface of this metallic fluid: heat is produced, and the mercury rises in the jar. It often happens also, when this gas is put into water, that the silex falls down in a quartzous pellicle; each bubble of the acid, as it touches the water, is covered with the silex, leaving in its way, to rise to the surface, a trace in the shape of tubes, which Priestley calls organ pipes, tapering upwards to a point, because the bubble diminishes in proportion as it is dissolved by the water, and that the silex is thus taken away. The silex, which first falls down in the vessels, is soon after re-dissolved by the excess of the acid, in proportion as the water is saturated; for the water, at first imperfectly saturated with the acid, has not strength to hold the silex in dissolution.

Bergman obtained fluat of silex crystallized. When the fluoric acid is manufactured in vessels of glass, silex is thereby thrown down, then dissolved again by the reaction of the acid: this is true fluat of silex, instead of pure fluoric acid. Alkalis may be used to ascertain the presence of the silex. The taste of this acid dissolved in water, is like sulphuric acid diluted with water, or vinegar.

If a solution of fluoric acid in water be exposed to the fire, part of the acid flies off in vapours; but the last molecules adhere so strongly, that the water and the rest of the acid will volatilise if the heat be increased in proportion. The fluoric acid has no action on gold, silver, lead, mercury, tin, antimony, bismuth, cobalt, nickel, arsenic, and manganese, in their reguline state. It dissolves them, however, in that of oxyds. Iron and zink dissolve in this acid; and their solution is accompanied by the evolution of hydrogen gas. This acid should be preserved in bottles coated with wax melted in oil, or in vessels of lead or platina.

The property of the fluoric acid gas for corroding glass, gave M. de Puymaurin the idea of engraving on glass, by using this acid in the same manner as nitric acid is used for copper; but the acid must be very pure, for, if at all containing silex, it will not eat into the glass. For engraving on glass, cover the plate with wax melted in oil; trace the figures to be engraved with a pointed instrument through the wax; then expose it to the vapour of this acid gas. Guyton has availed himself of this property for engraving bottle-labels, especially for those containing acids, which always burnt the paper ones. Thus has a new art been created, which may one day become highly valuable. The elements of this acid are as yet entirely unknown.

Of Boracic Acid.

Boracic acid was first made known to us by Homberg, a German physician: he called it sedative salt, or narcotic salt, and employed it in medicine, as possessing virtues both sedative and narcotic: but the London college has with much propriety rejected it.

This acid is obtained from borax, or borat supersaturated with soda. To extract it from borax, take a saturated dissolution of this salt heated and strained; pour in sulphuric acid by little and little, very gently and carefully, for a brisk disengagement of caloric takes place, which, driving the water suddenly into vapour, makes a report, crackles, and might end in an explosion: take care also to put in enough of the acid, that the liquor may acquire a slight acidity. The sulphuric acid seizes upon the soda, and the boracic acid is precipitated by the cold in little spangles of a very white colour.

The second way is by sublimation. Put into a retort or cucurbit of glass, with a head, some borax, with sulphuric acid and a little water; heat the mixture till it melts; by means of the water, a part of the acid, separated from the borax by the sulphuric acid, rises in vapours, which are condensed and deposited as they grow cold, in the upper part of the apparatus, under the form of very bright thin silvery-white scales. To purify it, dissolve it warm, and it will crystallize. Wash it also in cold distilled water, in order to separate the acid sulphat of soda.

This acid is ductile under the tooth, reddens the blue vegetable colours; is inodorous. It bladders up with heat; the water of crystallization is disengaged; in this state it is called *calcined boracic acid.* In a greater heat it melts, and forms a white solid glass, provided the experiment is made in a crucible of white clay; for, if the crucible be coloured, the glass will be so likewise. This glass, upon exposure to the air, becomes opake, and covered with a light white powder. It is used in the composition of paste jewels. If this glass be dissolved in water, after being reduced to powder, it crystallizes in spangles. It is of great fixity, and is not volatilized by fire; but it changes the crucible, which shews that it is in fusion; it must also be very dry. This fixity has made it supposed that it was an artificial product or composition; for it has been remarked that simple bodies are in general volatile.

The boracic acid is not changed by the action of atmospherical air, whether it be hot or cold, moist or dry; the crystals remain bright, shining like pearls. It is soluble in water, requiring twelve parts of cold water to one of the acid: three or four parts of hot or boiling water will be enough; and this is the method of obtaining it crystallized. It will volatilize by distillation with water; but it must be of a thick consistence, or in an aqueous dissolution it will not volatilize at all. Sublimation cannot take place but in above 80°, which can only be endured by a body almost solid, not one which is liquid, aqueous, or little saturated. This proves that fixed bodies, when pure, become volatile when united with substances which enjoy this property to a certain degree, and that, in such case, the water seems to have a strong attraction for the boracic acid. The specific principles of this acid are not known. It is used in many chemical operations as a flux, under which character we shall hereafter have occasion to mention it.

Of Earthy Substances.

Nature presents to us several kinds of earths. No such thing as *elementary earth* is now admitted; for, instead of one, several earthy substances have been ascertained, which have each an equal right to be called the *element*, since each enters into the composition of several bodies. Among the earths which are known, there are several which approach the alkaline form. Fourcroy calls these salino-terrestrial substances, saline earths, alkaline earths, and terrestrial alkalis.

There are now reckoned eight terrestrial substances, called earths: viz. silex, alumine, glucine, zircone, magnesia, lime, barytes, and strontian.

Each of these earths is distinguished by *specific* characters, besides those which belong to them in common, which Fourcroy terms *generic*. The generic characters are dryness, not being changed by fire, infusibility, not to be decomposed, and in combinations to remain as simple and indestructible substances.

Humboldt discovered, that not only vegetable earth, but also clay, drawn from a great depth, and especially simple earths, have the property, by mere contact with atmospherical air, of depriving it of all its oxygen. Alumine, barytes, and moistened lime, will each set at liberty pure azot; and this is a new method of measuring air more active than phosphorus and sulphuret of potash. Earth seems not to act upon air in the dry state; and hence moistened magnesia and silex do not present the same phenomena as alumine.

SILEX.—This earth is never found pure. To obtain it, therefore, reduce transparent crystals of quartz to powder; put them into a crucible with four parts of potash, and increase the fire till the mixture melts. Then dissolve it in distilled water; add sulphuric acid, which attacks the potash, and the silex is precipitated; wash it in waters till the last water remains insipid. It is necessary to put an excess of acid, to separate all other earths from the silex. Another method of obtaining it very pure, is by separating it from fluoric acid, as described under that article.

Many stones contain silex in great quantity, as rock-crystal, flint, jasper, agate, grit-stone, &c. as shewn in the works of Kirwan, Bergman, Buffon, Daubenton, Port, Bucquet, Fourcroy, De Born, &c.—Pure silex has an extraordinary roughness and asperity to the touch. It is free from viscosity, and its molecules when soaked in water are precipitated with great ease. It has neither taste nor smell; it is always transparent in its very last particles. Its specific gravity is 2·65. It cannot alone be fused in fire; but may be melted with the addition of borax and alkalis; the blow-pipe will not melt it. Air makes no change in it. It cannot be dissolved in water by chemical methods: it absorbs part of it; sticks round it, and takes a regular form: this is rock-crystal. It will unite with the phosphoric, boracic, and fluoric, acids: by fusion, a coloured glass is produced. Muriatic acid holds it in suspension; but, as soon as the acid is warmed, the silex is precipitated. Other acids have no effect upon silex.

ALUMINE.—This name has been appropriated to this substance, because it constitutes the base of alum: some authors call it *argil*, or argillaceous earth: it is never found pure: it is procured in abundance from all kinds of clay, potters' earth, schistuses, steatites, the ruby, sapphire, &c.

To obtain pure alumine, melt common alum, or acid sulphat of alumine, in water; add a solution of potash, or carbonat of potash, or rather liquid ammoniac: a plentiful white precipitate will be the result. Heat the mixture a little. Ammoniac is preferred, because it has not the property, like the other alkalis, to re-dissolve the alumine, if too plentiful. Strain the liquor, and a white mass remains, which must be washed several times, to separate all the saline matters it may retain.

Alumine is white, opaque, soft to the touch, tasteless, but adhesive to the tongue. It dries in the fire, contracts into a less volume than in its natural state, and becomes so hard as to strike fire with steel. This property of diminution, or extreme aggregation, when exposed to the action of heat, has caused it to be used by Wedgewood to construct his pyrometrical instruments, for measuring the expansion of bodies by heat. After it has been well baked, it is no longer capable of being kneaded in water into a ductile mass. Lavoisier has proved, that pure alumine is susceptible of a kind of tenacious fusion by a current of oxygen; after which it will cut glass like a diamond, and is hardly to be touched by a file. It absorbs humidity from the atmosphere, and a little carbonic acid. Alumine makes a paste with water, and may be kneaded very easily. It becomes very hard by mixture with water and silex. It is employed in many of the arts: it forms the bases of potteries, from bricks to the finest porcelain. Its exact nature is unknown.

GLUCINE.—Vauquelin is the discoverer of this earth, and he called it *earth of beryl*, because he first found it in the beryl; he found it also in the emerald of Peru. To extract it, take beryl reduced to powder; melt this powder in caustic potash, and dissolve the product in muriatic acid. Separate the silex by evaporation; and, having washed it, decompose the remaining liquor with the potash of commerce; wash the deposit, and dissolve it again in sulphuric acid; by adding sulphat of potash to this solution, alum is produced. As the combination of this earth does not crystallize so easily as alum, it remains in the clear water: to separate it entirely from the last remains of the alum, decompose this water with an excess of carbonat of ammoniac; the earth is hereby dissolved again, and the alumine is precipitated. Then, evaporating the carbonat of ammoniac by means of heat, the new earth is deposited in the state of carbonat; the quantity obtained is sixteen in 100 of the beryl made use of. Its name, *glucine*, is from the Greek γλυκυς, sweet, on account of its most characteristic property of forming saccharine salts with acids.

This earth is white, insipid, insoluble in water, adhering to the tongue; infusible *per se*. Soluble in fixed alkalis; insoluble in ammoniac, but soluble in carbonat of ammoniac. Soluble in moist acids, except the carbonic and phosphoric, and forming with them saccharine salts slightly astringent. It is very soluble in the sulphuric acid by excess. It is fusible in borax, forming with it a transparent glass. It absorbs one fourth of its weight of carbonic acid; decomposes aluminous salts; is not precipitated by hydro-sulphures well saturated.

It is not yet known of what use this earth may be in the arts. If it should be found more plentiful hereafter, says Vauquelin, in combinations from which it might be more easily obtained, it may be applied to many useful purposes in the arts, in chemistry, and in medicine. It has already been remarked to have a strong affinity for animal and vegetable substances; so that it very probably might serve, like alumine, as a caustic in dying. The saccharine and slightly-astringent taste of its saline combinations, leave little room to doubt but it must possess some valuable properties as a medicine; and it certainly would prove the most agreeable physic that could be taken, on account of its grateful taste.

ZIRCONE, CIRCON, or JARGON.—Klaproth first discovered this earth in the zircon or jargon of Ceylon, and afterwards in the hyacinth, as a predominant principle and peculiar species of earth.

To extract this earth, take hyacinths of Ceylon well pulverized; mix them with eight or nine parts of alkali; put the mixture into a red-hot crucible, a spoonful at a time, suffering each spoonful to melt before another is put in. When the whole is in fusion, make the fire very strong, and keep it so for an hour and a half, or more, according to the quantity of matter in fusion. Afterwards let the crucible get cold, break it, reduce the contents to powder, which boil in spring-water in a leaden vessel: let it settle; decant the clear liquor, and continue thus to wash the earth, till the water used no longer produces any precipitation in a solution of muriat of barytes. The mass, thus purified, is to be diluted with twenty pints of water; and pour in pure muriatic acid till there is an excess sensible to the taste; boil these substances for a quarter of an hour, in a leaden vessel. When the solution is finished, strain off the liquor, and evaporate to dryness, in vessels of the same kind, to separate the portions of silex which the muriatic acid may have dissolved. The salt is to be dissolved once more in water; filtre again, and the zircone is precipitated with pure carbonat of soda. Then the zircone is found combined with carbonic acid, which in drying becomes brighter than pure zircone.

This earth calcined is of a white colour, very heavy, rough to the touch like silex, tasteless, not soluble in water, but forming a kind of jelly therewith. Of itself, it is not to be melted by the blow-pipe; but with borax it melts into a transparent colourless glass. Separated from its solutions by caustic alkalis, it retains, as it dries in the air, a great quantity of water, which gives it a transparency, and the appearance of gum arabic, slightly yellow, and exhibiting even the same vitreous cracks: the water increases its weight about one fourth part. Urged now by a strong heat, it will melt, and assume a faint grey colour; it thereby acquires such a degree of hardness, that it will strike fire with steel, and scratch the hardest glass. It unites with acids, and forms salts,

falts, fome infoluble, fome very foluble. Its action upon filex, alumine, and glucine, has not yet been afcertained. The compofition or component parts of zircone are not known.

Magnesia.—This earth is never found pure and native; fome affirm, however, that it is found in complete maffes in Savoy. It is met with either combined chemically with different acids, or mechanically mixed with terreftrial fubftances, fuch as talcs, fteatites, foap-rock, ferpentines, lapis ollaris, afbeftos, mountain-cork, carbonat of magnefia and of lime, fulphat of barytes, alumine, and iron: this combination forms amianthus, and all the calcareous ftones.

To obtain it pure, diffolve in diftilled water cryftals of fulphat of magnefia, or Epfom falt, which is to be afterwards decompofed by carbonat of potafh. Wafh well the precipitate, and calcine it to difengage the carbonic acid. Pure magnefia is in the form of a very fine white powder, or in little brittle fragments; it has no fenfible tafte, but it dries and leaves a flight fenfation of bitternefs on the tongue. It purges gently the ftomach and bowels. It turns fyrup of violets and mallows of a greenifh colour, and turnfole to a blue. It is not altered by a common fire; but in a very ftrong heat becomes brittle or friable. Heated in a retort, it acquires a phofphoric property. Expofed to the air, it infenfibly takes in carbonic acid, and becomes effervefcent. It requires near 2000 parts of water to diffolve it. With acids, it forms very foluble falts. Guyton has made feveral experiments in the way of combining magnefia with other earths: he produced a kind of vitrification. Magnefia has hitherto been ufed only in medicine: it acts in various manners, according to the ftate in which it is given; whether crude, calcined, or combined with acids.

Lime.—Though lime, otherwife called *calcareous earth*, (from *calor*, Lat. heat,) be met with almoft every where in the bowels of the earth mixed with carbonic acid, it requires a procefs to obtain it pure. For this end, let chalk be wafhed in diftilled boiling water; then diffolve it in diftilled acetous acid, and precipitate it by means of carbonat of ammoniac, wafh the precipitate, calcine it, and the refidue is pure lime.

Another method is to extract it from oifter-fhells, as follows: Wafh the fhells in feveral waters, then boil them to remove the mucilage which generally adheres to them; the water diffolves fome faline particles alfo. Put them into a furnace, and calcine them to whitenefs. After this firft calcination, put them into a retort of earth or porcelain, and make them red-hot. The refult is very pure lime, called *quicklime*. To preferve this, put it in glafs veffels well ftopped, and it will keep without alteration for years.

In preparing lime for ufe in the arts, it often happens that it is burnt; it then has no longer the qualities of quicklime, but is covered with a kind of plafter like an imperfect vitrification.

Calcareous earth, deprived of water and acid, and reduced to a fimple ftate, is a whitifh fubftance; its tafte is urinous, acrid, hot, almoft cauftic; it gives fyrup of violets a deep green colour, and makes no effervefcence with acids. Expofed to the air, it attracts the humidity of the atmofphere as it comes into the ftate of *flaked lime*: this moifture caufes it to fwell, break, and fall to powder; its weight is increafed, and its union with the carbonic acid which it has drawn from the atmofphere makes it effervefcent; it repaffes infenfibly into the ftate of calcareous earth, and from *quicklime* becomes *flaked lime*. The effects are quicker and more remarkable when the atmofphere is very moift. Heat is excited during this flaking in the air, or dry flaking. It is attended with heat; for it contains water in a dry and folid ftate, and the thermometer rifes in it to 120 . The dilatation is fufficiently ftrong to burft cafks or other wooden veffels in which lime is contained.

It is eafy to deprive flaked lime of the moifture and the acid it attracted from the air. To this end put fome flaked lime into a gun-barrel, or an earthen retort; bring it to a red heat, and the lime returns to its original ftate of quicklime.

The action of water on quicklime is very remarkable. When a fmall quantity of this fluid is poured on lime, it is quickly abforbed, the lime appearing as dry as before: after a fhort interval of time, it burfts into pieces, producing a degree of heat fufficient to reduce the water into vapours, with a remarkable hiffing noife. Thefe vapours have a peculiar fmell, and give a green tinge to paper ftained with mallows: the lime foon falls into a white powder; the heat, the agitation, and the vapours, gradually difappearing. If this extinction be made during the night, or in a dark place, many luminous points are obferved on the furface of the lime. All thefe phenomena are confequences of the activity with which this falino-terreftrial fubftance unites with water; but, in order that they may take place, it is required that no more water be ufed than the lime can very quickly abforb, fo as to become immediately dry. It feems that the difengagement of heat from thefe two bodies during this rapid union changes their ftate, and that flaked lime in its pulverulent form, contains water in a dry and folid ftate. This dry ftate of water, which takes place in many combinations, attended with heat, and which produces folid compounds, whofe fpecific heat is lefs confiderable than before, has not been enough attended to by chemifts, or, to fpeak more properly, has been totally unobferved till lately. When lime, in this experiment, has abforbed as much water as it can combine with and remain dry, it is called dry flaked lime; it then no longer produces heat by the addition of water, but is diffolved without any fenfible motion. By mixing with this fubftance the quantity of water neceffary to dilute it, *milk of lime* is produced; if the quantity of water be ftill greater, the lime is perfectly diffolved, and the liquor becomes tranfparent. Mr. Kirwan affirms, that 680 parts of water are required to diffolve one of lime, at the temperature of 60 degrees. This folution, which is known by the name of *lime-water*, is clear and limpid; its fpecific gravity fcarcely exceeds that of common water; its tafte is acrid and urinous; and it readily converts fyrup of violets to a green, and even deftroys the colour. By evaporation in clofed veffels, very pure water is obtained, the quicklime remaining behind; but a red heat is neceffary to feparate the laft portions of water, which are retained with great force: after this treatment, the lime becomes heated by the addition of fmall quantities of water as before.

Lime-water expofed to the air becomes covered with a dry pellicle, which gradually increafes in thicknefs and folidity: if this pellicle be taken away, a fecond is formed, and after that a third, and fo forth, till the whole of the water is evaporated. Thefe pellicles have been improperly called *cream of lime*; it was formerly thought to be a peculiar falt formed by the union of the moft fubtle part of the calcareous earth united to water; and much has been written concerning this pretended falt of lime. But it is now admitted, fince the experiments of the celebrated Dr. Black, that the faline properties of cream of lime are lefs intenfe than thofe of the lime itfelf; and that it is a peculiar neutral falt compofed of lime, and an acid extracted out of the atmofphere. Hence it is that the cream of lime cannot be formed without the contact of the air. The fact is, that the lime draws carbonic acid from the atmofphere, as mentioned before, and forms on the furface, at its diffolution, a cruft of chalk, or of calcareous carbonat.

Lime unites eafily with acids, forming falts, fome infoluble, others very eafily foluble. It combines with filiceous earth in the humid as well as in the dry way. When fand is mixed with lime newly flaked, or with quicklime fprinkled with a fmall quantity of water at the time of mixing, thefe two bodies become confiftent, and form what is called mortar. The ftate and quantity of

of the lime, as it is more or less perfectly calcined; its previous flaking, with a greater or less quantity of water, or the flaking of it at the time of mixture; the nature of the sand with regard to its magnitude, its angular or round figure, as well as its degree of moisture; produce very considerable differences in the several kinds of mortars. Clay baked in bricks, or puzzolana, which is clay baked by volcanic fires, and altered by exposure to air, are likewise added to lime in the making of mortar.

Though lime, as well as siliceous earth, be perfectly infusible alone, yet if they be heated together, the proportion of the former being much the greatest, they melt, as has been observed by Messrs. d'Arcet and Gerhard. Lime likewise serves as a flux to one-third of its weight of alumine: it appears to have a stronger affinity with this earth than with silex, as Kirwan informs us. The mixture of these three substances melts still more easily and completely than lime with either of them singly; so that one part of lime, and one of alumine, will serve to fuse two parts, or even two and a half, of siliceous earth: this fact shews the cause why many hard stones giving fire with steel, and of a quartzose nature, melt when exposed to a strong heat; the combination, or simple mixture, of calcareous earth and clay, is the cause of their vitrescibility. One part of calcareous earth enters into fusion with half a part of magnesia: the glass, formed by this mixture, afterwards dissolves, and completely melts a quantity of siliceous earth equal to the lime it contains: equal parts of siliceous earth, magnesia, and lime, melt therefore by heat into a perfect glass.

The intimate nature of lime is not known. The early chemists, desirous of explaining, by physical reasoning, the phenomena exhibited by lime in its combinations, and more especially in its extinction, referred its cause to the particles of fire fixed in the calcareous stone during its calcination. This was the theory of Lemery. M. Meyer did not admit that pure fire was capable of combining in this manner, and therefore asserted, that it existed in lime united with a peculiar acid: this subtle kind of sulphur was the *acidum pingue* or the causticum of this chemist; but his doctrine, though occasionally brought forward under different names, has been overthrown by a series of experiments, which have completely shewn its fallacy. Many modern chemists believe, that the matter of heat exists in a combined state in lime, and that the light perceived by Meyer and Pelletier, with the ebullition, the evaporation of the water, and the peculiar fatty smell during the extinction of the lime, are consequences of its disengagement. These observations shew, that the principles and composition of lime are yet unknown, and that we cannot, with any certainty, decide whether it is the product of an attenuation, or peculiar preparation of the siliceous or aluminous earths; though that opinion appears probable to some of the greatest naturalists. It seems indeed to be out of doubt, that it is formed by marine animals; that its constituent parts are united and combined in the water during the life of these organic beings; and that azot is one of its constituent parts. But it must be confessed, that this sketch is not yet sufficient for the conviction of modern philosophers, who do not form their opinions decidedly, unless in consequence of repeated and accurate experiments.

Lime is employed in a great number of arts, and especially in building. In medicine, diluted lime-water is administered with success; in the cure of ulcers, &c. it has been esteemed as a powerful lithontriptic; but repeated trials have shewn, that it is not always attended with the desired success; and that its use, long continued, produces an alteration in the animal fluids of a scorbutic or septic nature.

Barytes.—This was first called ponderous earth, *terra ponderosa*, by Gahn and Scheele, two Swedish chemists, who found it to exist in ponderous spar: but Bergman gave it the name of barytes, from *βαρυς*, Gr. *heavy*. It is found always united with sulphuric and carbonic acids, taking a blue or green colour from fire. On its nature and properties we have been pretty full in the article Barytes, in our second volume, page 767. The following is the process of Fourcroy and Vauquelin for obtaining it pure, by decomposing nitrat of barytes by heat: Take nitrat of barytes well crystallized; expose it to the action of fire in a porcelain retort, or rather in a crucible placed upon burning coals. The nitrat melts, swells, furnishes much oxygen and azotic gas, but with hardly any nitrous vapours; when no more elastic fluids are disengaged, there will be found in the broken retort when cold, a grey matter, solid, somewhat porous, of a bitter taste, and hotter than quicklime: this is pure barytes.

This earth melts under the blow-pipe on a coal, boils up, and forms globules, which soon penetrate the coal. In the air it becomes turbid, breaks, bursts, swells, heats, and whitens; melting thus rapidly, it absorbs 0·22 of its weight of water and carbonic acid. It turns syrup of violets of a green colour. It absorbs water with extreme avidity, melts with a hissing noise like lime, heats considerably, solidifies the water, and forms compages like beaten plaster, sticking hard upon glass. A little water changes it into a white powder. Covered entirely with water, it dissolves with a violent hissing; then crystallizes in transparent needles, which lie in heaps together, like the molecules of plashed mortar. Cold water dissolves one-twenty-fifth part of its weight; boiling water more than half, depositing, as it gets cold, beautiful transparent prisms, which become turbid, and pulverize in the air. A solution of barytes is sooner covered with a crust or pellicle by exposure to the air, and is more plentifully precipitated, by carbonic acid, than lime-water is. Phosphoric and phosphorus acids hasten the solution of barytes; and the precipitates are re-dissolved by means of the excess of each respective acid. With sulphuric and sulphureous acid, it forms insoluble salts. It has been endeavoured to combine barytes with some other earths; but a perfect vitrification has never yet been produced.

Strontian, or Strontites.—A great quantity of this earth has lately been discovered in France: M. Lelievre communicated to the national institute at Paris, that sulphat of strontian had been found in a clay-pit at Bouvron, near Toul, in the department of La Meurthe. M. Dolomieu at the same time shewed some which he had brought with him from Sicily; and which, as well as the preceding, had been analyzed by Vauquelin. The name comes from *Strontian*, in Argyleshire, Scotland, where it was first found, united to carbonic acid in a fossil called *gneis*, in the lead-mines at that place.

Sulphat of strontian is converted into a sulphure by the help of charcoal, having previously separated the carbonat of lime from it by means of an acid. Then the sulphure is to be decomposed by nitric acid; and, by heating this nitrat in a crucible, it is entirely decomposed, and the strontian remains pure. Exposed to the air, it becomes turbid, and attracts the carbonic acid from the atmosphere. It is soluble in water, and crystallizes in cooling. It is soluble in 250 times its weight of boiling water; but of cold water it requires more. If the solution be exposed to the air, it becomes covered with a pellicle like barytes, and forms carbonat of strontian. The same effect is produced by letting air into the solution with a blow-pipe.

This earth combines very well with acids; and produces salts, which will be examined hereafter. The strontian which is obtained by the decomposition of the nitrat, combines very well with some combustible bodies, as phosphorus, sulphur, and sulphurated hydrogen. These combinations are produced in the same manner as those with barytes, and possess properties analogous to those combinations.

Of ALKALIS.

Alkalis are bodies either solid or liquid; in taste acrid, caustic, and pungent or lixivial; they are very soluble in water;

water; attract the moisture of the air; give a green cast to blue vegetable colours; and unite strongly with acids. See ALKALI, in our first volume, p. 340. The known alkalis are three in number, *potash*, *soda*, and *ammoniac*.

POTASH.—This salt has never been decomposed; yet there are many facts which tend to shew, that it is not a simple substance. It is of a white colour, and extremely caustic, *i. e.* acting with great power upon animal substances, dissolving them, decomposing them, and forming with them a kind of soap, separating carbon, hydrogen, and azot, in the ammoniacal state. It is by burning plants, which all contain a greater or less quantity of potash, that this substance is prepared, as we shall explain when we come to speak of carbonat of potash; at present we have only to speak of it in a state of purity. The following is the most simple process for obtaining it pure.

The apparatus consists of several shallow troughs of white wood; put at the bottom some river sand, which must be well washed; over that lay another bed of sand finer still, and cover that with a cloth strewed with ashes. Make a hole at the bottom of the trough, and fix a glass tube to draw off the liquor as it filters. Things being thus prepared, take equal parts of quicklime and potash, if the lime be very caustic; if otherwise, put twenty parts of lime to fifteen of potash. Put water into an iron-pot; when it is ready to boil, add the lime, which, as it flakes, causes ebullition; when the lime is slaked, or killed, put in the potash, and make the mass into the consistency of thick soup, which leave to cool a little, then pour the mixture into troughs, and cover it with water immediately; to prevent the water from making holes in the mixture as it is poured in, lay a thin board which will rise with the water. Vessels must be placed, of course, to receive the liquor which runs through the tube; and, in order that the ley may not absorb the carbonic acid contained in the atmosphere, these vessels should be slightly closed, so as to hinder the circulation of the external air. It is necessary to keep water always upon the mixture; and cease to collect it when it comes tasteless through the tube: but observe that the fluid will become insipid all at once, so that the liquor obtained will be nearly of the same strength at the end as at the beginning. Melting-pots may be used for evaporating the waters; begin with the weakest, or last runs, to avoid keeping the stronger ones too long in contact with the air; make a strong ebullition. When concentrated to a certain degree, the sulphat of potash crystallizes and is precipitated.

To obtain the potash caustic, dry, in a solid mass, pour the concentrated liquor into a smaller pot; then finish the evaporation to such a degree, that, as it drops on a plate of iron or marble, it coagulates.

To purify this concrete potash, put it into a bottle, or jar, and pour over it very pure alcohol: the potash only will dissolve; the sulphat and muriat of potash, the portions of earth, and even of carbonic acid, which it holds so strongly, or which it has recovered from the air during evaporation, remain at the bottom of the solution. Draw off the clear liquor, put it into a retort, and distil it. To have it very pure, the solution must be evaporated in a silver-pan: it crystallizes in cooling into white thin plates sometimes four lines long. Instead of leaving it to crystallize, it may be concreted to dryness.

Potash converts the blue vegetable colours to a green. It melts in a moderate heat; in a very strong heat, such as that of a glass-house, it flies off in vapours. In contact with atmospherical air, it soon liquefies, and attracts from it the carbonic acid. In a state of purity, it makes no effervescence with acids. It has a great affinity for water; it draws it from almost all other bodies from which it separates a good deal of caloric.

Potash combines very well with sulphur, forming a combination which long went by the name of *liver of sulphur*, but is now called *sulphure*. These combinations may be made either in the humid or the dry way. In the former method, boil the alkali and the sulphur together in water, but not in metal pots, for these combinations act upon most metals, and dissolve them more or less. In the dry way, melt equal parts of the sulphur and the alkali in an earthen crucibles; the result is a solid mass of a reddish brown colour, resembling the liver of certain animals, whence these *sulphures* had formerly the name of *livers*.

The sulphure of potash is fusible; it is soluble in water, forming sulphurated hydrogen. This sulphurated hydrogen unites in great quantity with the alkaline base, making together a combination which Berthollet calls *hydro-sulphure*. To obtain hydro-sulphure of potash, take potash prepared with alcohol; ensure a perfect saturation, by letting the liquor take up an excess of sulphurated hydrogen; then drive off this excess by heat. It may be known what proportions of sulphurated hydrogen are present in a sulphure, by precipitating, with the solution, a solution of copper.

Alkaline sulphures, or combinations of sulphur with an alkaline base, can only exist in the dry state; when dissolved in water, sulphurated hydrogen is formed: Berthollet calls this combination of sulphur and sulphurated hydrogen with a base, by the name *hydrogenated sulphure*.

Thus we have sulphures, hydro-sulphures, and hydrogenated sulphures: these cannot be considered as in a state of saturation of each of their respective principles, till the superabundant sulphur has been precipitated by sulphurated hydrogen. See Berthollet's Memoire, in the Annales de Chimie, vol. xxv. p. 253. It is the more necessary to point out the presence of the sulphurated hydrogen in the hydrogenated sulphure, as it is by means of this that the sulphur remains united to the alkali and to the water.

Sulphure of potash, like all other sulphures, is decomposed by the action of fire, which drives off the sulphur, and sets the base at liberty. They attract the oxygen of the air. Acids decompose them also, by attacking their bases and precipitating the sulphur; in this case, some sulphurated hydrogen gas is constantly produced, whose rapid disengagement produces an effervescence which is more or less brisk, according to the state of the sulphures and the acids. If oxygenated muriatic acid gas be passed through a solution of sulphure of potash, the sulphure is changed into a sulphat.

Potash combines with silex in the dry way and absorbs it in its fusion, forming a transparent body called glass. The glass has different properties, according to the relative quantities of sand and fixed alkali it contains. If three or four parts of potash be used to one of silex, a soft glass is produced, which attracts the humidity of the air, becomes opake, and at last fluid. This glass is soluble in water, by virtue of the superabundant alkali it contains; and the solution is called *liquor of flints*. To prepare this liquid siliceous potash, take one part of sand reduced to powder, and four parts of potash. Put these into a crucible, which is to be but half filled, and place the crucible in a forge-furnace. When the matter begins to melt, it swells considerably; it continues turbid till the alkali has dissolved all the silex; keep the crucible open as long as the effervescence lasts; then cover the crucible, increase the fire so as to make a complete fusion; then the contents of the crucible are to be poured into a very dry iron mortar, or on an iron plate; the matter condenses as it cools into the form of glass: this matter is to be pulverised and dissolved in water; then it becomes the *liquor of flints*. Acids decompose it: they seize the alkali, and precipitate the earth, called *earth of flints*. In order that this precipitation may be well performed, the liquor of flints must not be too much diluted; for in this case the particles of earth are in a state of such extreme division, that they remain suspended in the liquid, which must be evaporated before any sensible subsidence can take place. Several chemists think that the earth of flints is not similar to siliceous earth, and that it has been

changed

changed in consequence of its union with alkalis; they imagine that it resembles aluminous earth, and is capable of uniting with acids, and forming aluminous salts: this was the opinion of Pott and Baumé; but Scheele has shown, that this soluble portion of the earth precipitated from the liquor of flints, is obtained from the vessel of alumine in which the siliceous earth and alkali are fused. The same experiments may be made with alumine and potash.

The existence of potash in the mineral kingdom has of late been proved by accurate experiments. Klaproth, in the analysis of the substance which he terms leucit, found that it formed about 1-5th of that stone. In the lepidolite he obtained only 4-100ths. Vauquelin has since shown that potash is contained in a large proportion in the white Vesuvian garnet, and in the lava which serves as its matrix. He found also a small proportion of this substance in zeolite from the Ferro Islands; and Dr. Kennedy of Edinburgh has lately discovered potash in an analysis of the pumice-stone.

Potash has the property of separating silex and alumine from lime, when the substances happen to be found together. The true nature of potash, however, still remains unknown. Only a few imperfect experiments have as yet been made to decompose it; and these in vain. Analogy, however, would incline us to believe that it is a compound body. Vegetable physiologists are not agreed whether this alkali be derived from the soil in which plants grow, whether it exists uncombined with any acid in plants, whether it be a product of vegetation, or whether it be not rather generated during the process of combustion. These are queries highly necessary to solve, and well deserving the attention of chemists.

PURE SODA.—This alkali possesses the same general characters as potash; and it is impossible to distinguish them when in a state of purity. It appears, however, that caustic soda attracts the moisture of the air less powerfully, and is not so quickly dissolved in water. It is only by its effects in chemical combinations, and especially with acids, that potash and soda can be known apart.

Soda is produced from several sea plants by combustion. Solid caustic soda, or cauterising-stone, is always found mingled with other saline and terrestrial substances, from which it must be separated; for doing which, the process is the same as already directed for potash. When pure, its taste is as strong as potash; it turns syrup of violets green. It melts on the fire, and volatilizes in a violent heat. It attracts humidity from the air; is soluble in water with caloric; combines well with sulphur whence results a sulphure. Hydro-sulphure of soda is produced in the same manner as that of potash; it combines in the dry way with silex, and forms a kind of glass. Glassmakers have observed that this salt produces a more fusible and solid glass than potash; for which reason they prefer it in the manufacture of that commodity: so that what we have said relative to this art under the article potash, may be equally applied to soda. Like the potash, it combines with acids, and with a great number of bodies hereafter to be treated of. From these observations it is evident, that the difference between the two fixed alkalis, in a state of purity, is not very considerable, and that their respective properties can only be known with certainty from their combinations. When united with the same acid, they produce neutral salts exceedingly different in all their properties; a circumstance which seems the more singular, as it is absolutely impossible to point out any difference between them in their pure and caustic state. Bergman adds, as a distinguishing property of these two salts, that their affinity with acids is not the same, that of the potash being the stronger; so that it is capable of decomposing salts, whose base is soda.

The intimate nature or composition of the soda, is not more known than that of the potash. This substance, however, in combination with carbonic acid, exists in considerable quantity in various parts of the earth. In this state it has been termed native mineral alkali. In some situations it is deposited in beds under the surface of the earth, as in China; in others, at the bottom of lakes, as in Hungary and Egypt. Efflorescent crystals of mineral alkali, are often found on the inside of the walls of houses, in subterranean caverns, and on soils occasionally overflowed by waters holding this salt in solution. The existence of this substance in mineral springs has been known for several years. Dr. Black found it uncombined, as he conceived, in water brought to him from the hot springs in Iceland; but Klaproth, in an analysis which he has lately published, asserts that this mineral alkali is not free, but exists in these waters in combination with carbonic acid. The same chemist found carbonat of soda in considerable quantity in the mineral waters of Carlsbad. The sea and salt mines are, however, the grand reservoir in which this alkali, united to the muriatic acid, is contained. The variety of plants employed for the purpose of obtaining soda, is very considerable. In Spain this substance is procured from the different species of the *salsola salicornia* and *batis maritima*. The *zostera maritima* is burnt in some places on the borders of the Baltic, as is the *anabasis aphylla* on those of the Caspian. In this country we burn the various species of *fuci*. Along with the *salicornia* they burn also the *chenopodium maritimum* in the south of France. It is deserving of notice, that some plants, which in their native soil yield only vegetable alkali, afford also the mineral, when they happen to grow in the neighbourhood of the sea, or in lands occasionally washed with sea-water.

The native mineral alkali found in Egypt and Barbary, is said to be about fifty per cent. stronger than common soda. Mr. Kirwan considers the crystals of soda as a very fit standard by which to try the strength of the other kinds of mineral alkali, as the quantity of alkali in these crystals continues at all times very nearly the same. See *Irish Trans. for* 1790. A ready way to distinguish the mineral from the vegetable alkali, is to drop a small quantity of the acid of sugar into a solution of these substances in water. With the vegetable this acid will form a very soluble salt; with the mineral one difficultly soluble.

The gradual decomposition of the muriat of soda by lime, is one of those anomalous facts in chemistry which it is difficult to explain. It forms an apparent deviation from the laws of chemical affinity, for the muriat of lime is decomposed by the mineral alkali, either in its mild or caustic state. This experiment is the more valuable, as it enables us to account for the presence of mineral alkali in many of those situations in which it is now known to exist.

In this country, various methods of obtaining mineral alkali are followed by different chemists. Some of these methods are carefully concealed, while others of them are but very imperfectly explained in the letters patent which those who practise them have obtained. In preparing this mineral alkali on a large scale, we must often be directed in the choice of our means by local circumstances, by the nature and price of the materials that are within our reach, and by the value and demand, not only for the alkali itself, but also for the other useful substances that may be procured in this interesting process; for in this, as well as in every other mercantile concern, calculations with regard to the expence, and the profits, must necessarily form the basis of every rational enterprise.

AMMONIAC.—The name of ammoniac is given to the salt known by the term *volatile alkali*. It is distinguished from the two foregoing by its strong and suffocating smell, and its singular volatility. Like the fixed alkalis, this salt was not known in its state of purity before the ingenious experiments of Black and Priestley: that which was considered as such, is a species of imperfect neutral salt, in a solid and crystallized form, possessing some of the properties of volatile alkali, but really composed of two saline substances, viz. carbonic acid, and ammoniac: the character or property of effervescing with acids, which was

was formerly attributed to the volatile alkali, belongs only to this neutral salt, of which we shall afterwards treat.

The liquid known in chemical laboratories by the name of caustic, or fluor volatile alkali, and in pharmacy by that of volatile spirit of sal ammoniac, is not pure ammoniac; it consists of this alkali dissolved in water. Dr. Priestley has shewn, that, by the help of a gentle heat, this liquor may be made to give out a permanent gas; and that the water deprived of this gas loses its alkaline properties. This aeriform fluid is ammoniac, and is known by the name of ammoniacal gas. Macquer has well observed, that this body must be examined, in order to arrive at a knowledge of the properties of the volatile alkali.

To obtain this elastic fluid, a certain quantity of the liquid ammoniac is put into a small retort, or matrass of glass. A recurved tube is adapted to this vessel, and the extremity of the tube is plunged beneath the mercury of a pneumatic apparatus; a vessel of glass filled with the same metallic fluid being inverted over its orifice. The bottom of the retort or matrass is then heated, by means of burning charcoal, or the flame of spirit of wine. The first portion of elastic fluid, consisting chiefly of the common air contained in the vessel and tube, is suffered to escape; and when the ebullition of the fluid is strong, the gas is to be collected. The distillation must not be urged, so as to cause the water to pass in the form of vapour; or a small vessel should be affixed in the middle of the tube of communication, which, being kept cool, may serve to condense the aqueous vapour, and cause the ammoniacal gas to pass in a very pure and dry state. The gas obtained by this process resembles air in its transparency and elasticity, as long as it is kept above the mercury. It is rather lighter than the air of the atmosphere, its smell is penetrating, and its taste is acrid and caustic; it readily and strongly changes the blue colour of violets, mallows, and radishes, to a green; but the alteration produced is less than when pure alkalis are used; it destroys animal life, and corrodes the skin, if exposed for some time to its action.

Though it is incapable of maintaining combustion, and extinguishes bodies which are already on fire, yet it increases the magnitude of the flame of a taper before extinction, producing a pale yellow colour round its edge, which proves that alkaline gas is partly inflammable. At last this light flame descends from the top of the vessel to the bottom; if a lighted taper be only held to the orifice of the vessel filled with ammoniacal gas, the yellow flame will rise more than an inch above that of the taper.

Ammoniacal gas is one of the elastic fluids which are the most susceptible of dilatation by heat. Atmospheric air does not combine with alkaline gas, but only mixes with and dilutes it. Water quickly absorbs ammoniacal gas. If the water be frozen, it immediately becomes fluid, and produces cold; whereas, on the contrary, fluid water becomes heated by combination with this gas. Water saturated with gas, or liquid ammoniac, is known by the name of fluor and caustic volatile alkali. We shall hereafter see that the strongest and most pure volatile alkali is produced by saturating distilled water with this gas. *Liquid ammoniac* has the same properties as the gas it holds in solution, but not in so eminent a degree, because the gaseous being much less strong than the fluid aggregation, the tendency to combine will, according to one of our laws of affinity, be much more strong in the gas than in the ammoniac.

The sulphure of ammoniac is produced by a distillation of a mixture of muriat of ammoniac, lime, and sulphur: this is called *the fuming or smoking liquor of Boyle*. Mix in a marble mortar, three parts of lime slaked in the air and sifted, one part of muriat of ammoniac, and one half part of sublimed sulphur. Put the mixture into an earthen retort, and adapt a receiver. Begin the distillation with a gentle fire: the first liquor which passes over is of a light yellow colour, and fumes or smokes; the second is of a deeper yellow, and is not fuming: then increase the fire till the retort is red-hot. According to Berthollet, the sulphure of ammoniac owes its fuming quality to an uncombined mixture of ammoniac; it appears that the ammoniac which does not enter into combination, evaporates while it holds in solution hydro-sulphure of ammoniac; but in contact with air it quits this to combine with the air, which afterwards, if in sufficient quantity, dissolves the very precipitate which was just formed. The sulphure of ammoniac may yet dissolve, in the cold state, a considerable quantity of sulphur; but in the fuming state, that is, with an excess of ammoniac, it dissolves sulphur enough to saturate that excess, and ceases to smoke. Sulphure of ammoniac saturated with sulphur, is of a dark colour and an oily consistence; sulphurated hydrogen precipitates no sulphur even in that state; upon the smallest contact of air acting upon the hydrogen, it grows white, turbid, and gives out sulphur.

Ammoniac alone will not attack sulphur; hence we see that it is by means also of sulphurated hydrogen that the triple combination is formed; that it ought to be called hydrogenated sulphure of ammoniac; and that, while it is fuming; it is sulphurated hydrogen with an excess of ammoniac. Ammoniac unites with acids, and forms salts, some of which do not crystallize.

Experiments to demonstrate the Nature of Ammoniac.—1. Mix two parts of oxygenated muriatic acid gas, with one part by measure of ammoniacal gas, in a vessel over mercury. When these come in contact, a strong detonation is produced, accompanied by a yellow flame: the two gases are so diminished in volume, that scarcely a third part remains; a solid matter is formed which adheres to the sides of the vessel; this is muriat of ammoniac. The gas which remains has neither the smell of ammoniac, nor the colour of muriatic acid; it no longer dissolves in water, nor maintains combustion; it is therefore real azotic gas. It is also observed, that there is a clear transparent liquid condensed on the sides of the vessel, which is nothing but water, with a certain quantity of muriat of ammoniac in solution.

2. Through some ammoniac, liquid or dissolved in water, pass some oxygenated muriatic acid gas: there will immediately be produced, in the midst of the liquor, a multitude of little bubbles of elastic fluid, which rise to the surface, and are collected into a jar filled with water by means of a tube communicating with the bottle which contains the ammoniac. This gas is perfectly similar to that which remained in the preceding experiment.

3. Fill a long glass tube three parts full of oxygenated muriatic acid; fill it up with liquid ammoniac, and invert it in a saucer or bowl full of water: the ammoniac, by its lightness, passes through the oxygenated muriatic acid, but produces a rapid effervescence; the elastic fluid which occasions it collects in the upper part of the tube, and part of it spreads in the bowl. The gas or product is the same as the preceding.

4. Pass ammoniacal gas over oxyd of manganese in powder, and made red-hot in a porcelain tube, communicating by a tube with an empty bottle plunged into ice; red vapours in abundance are presently produced, to which white vapours succeed, which condense inside the bottle into a white transparent liquid, with a saline pungent smell: distil this liquid to dryness in a gentle heat; the product is insipid, and without any sensible odour; it is water. What remains in the retort is of a white colour; it is fusible over coals, and produces vapours of nitric acid with the addition of sulphuric acid, and of ammoniac with lime: therefore it is nitrat of ammoniac. The black oxyd of manganese has changed its colour; it is now of a pale brown, no longer producing oxygen gas by the action of fire.

It is plain that in these experiments the ammoniac is decomposed; that in the three first, one of its principles only, the azot, being set at liberty, is disengaged in the form

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form of gas, and that the oxygenated muriatic acid loses its oxygen, since it forms common muriat of ammoniac; that, in the fourth, nitric acid and water are produced, and that the oxyd of manganese is disoxygenated, since it no longer furnishes oxygen gas with the help of fire. Hence it is very easy to conceive, that ammoniac is composed of hydrogen and azot. Ammoniac may also be decomposed by the oxyd of copper; in this case the metallic oxyd is received by means of the ammoniac: this Berthollet has proved, with this oxyd combined with ammoniac, and heated in the pneumatic apparatus.

To this analysis of ammoniac we may join synthesis, by decomposing simultaneously, or at the same time, according to Guyton's process, nitric acid and water, with the help of tin, zink, &c. then nitrat of ammoniac is formed which results from the re-union of the azot of nitric acid, decomposed with the hydrogen of the water, equally decomposed by the metals. But ammoniac will never be set free by this operation, because, as fast as it is formed, it unites to the portion of nitric acid not yet decomposed, and even stops its decomposition. Priestley has discovered, that the electric spark passing through ammoniacal gas, increases its volume to three times its former quantity, and changes it into hydrogen gas. The cause of this change is not yet well known. It appears only that the alkali is decomposed in this experiment, and that its two component parts are separated, and put into the state of elastic fluidity.

The experiments of Berthollet, as well as those of Priestley, have proved that four measures of ammoniacal gas contained 2·9 of hydrogen gas and 1·1 of azotic gas; or, taking the weights of these two fluids, that of the azotic gas contained in the alkali will be to that of the hydrogen gas in the proportion of 121 to 29.

For the purposes of commerce and medicine, volatile alkali is prepared only from the animal kingdom. Being obtained by distillation from the horns of animals, it has been long known in the shops by the name of spirit of hartshorn. In this state it is very impure, containing some oil and much carbonic acid. In order to obtain it free from these substances, it is necessary to dissolve it in muriatic acid, and afterwards to disengage it from this combination by the addition of a fixed alkali, or of lime. Two parts of burnt lime, and one of the caustic alkaline salt, are the proportions to be added to one part of the muriat of ammoniac. This mixture is introduced into a retort, to which a series of receivers, containing pure distilled water, is to be adapted. The slightest heat is sufficient to disengage it in the state of gas. This gas passes over into the receivers, combines with the water and saturates it. The quantity of gas which the water can absorb has not yet been accurately ascertained. In this state it is preserved in the shops under the name of caustic volatile alkali, or spirit of sal ammoniac with quicklime.

Ammoniac, diluted with water, is used in a great number of disorders; it is aperient, and powerfully incisive. It acts strongly on the skin; it is prescribed as a remedy for the bite of vipers, and for cutaneous and venereal disorders, &c. As this substance is acrid and caustic, it ought not to be used but with particular care. Externally applied, it is found exceedingly serviceable in discussing tumours, especially such as are formed by coagulated milk, lymph, &c. It readily cures burns, and is often and successfully employed in the cure of chilblains. It has been constantly used under different names, as a very active stimulant in syncopes, apoplexies, &c. Its use, in the latter case, ought to be in very moderate quantities; it is not prudent to administer it internally, without previous dilution in a considerable quantity of water. Dangerous excoriations have been produced in the œsophagus, and the membranes of the stomach, by the volatile alkali being given without this precaution. See the article AMMONIAC, in our first volume, p. 478.

GENERAL PROPERTIES OF SULPHATS.

Sulphats are bitter; some are soluble, some not. They melt and volatilize by the action of heat, but are not decomposed. All are decomposed by charcoal, forming sulphures, and carbonic acid. They all precipitate solutions of barytes. There are three simple rules for knowing a sulphat in dissolution in water: 1. By barytes. 2. With the blow-pipe a sulphure is formed. 3. Alcohol precipitates immediately all the solutions of sulphats, and in a crystallized form. The order of attraction of the bases for sulphuric acid, is as follows: barytes, potash, soda, strontian, lime, ammoniac, magnesia, glucine, alumine, and zircone.

SULPHAT OF BARYTES.—The barytic sulphat has long been regarded as a stone; it was called *ponderous earth*, and *ponderous spar*. It is found in large quantities mixed with alumine, and the metallic ores; it is crystallized in rhombs or six-sided prisms; it is often white, semi-transparent, grey, opaque, green, yellow, &c. and is frequently found with sulphure of iron. It has neither taste nor solubility; its weight varies according to its texture, or the foreign bodies it contains. By fire it loses its water of crystallization; but can only be melted by a violent heat, such as that of the porcelain furnace, &c. then it softens and runs, but never in a liquid form; it melts in globules with the blow-pipe.

Take sulphat of barytes in powder; mix with it one eighth of its weight of charcoal; heat the whole in a crucible; the product is a sulphure of barytes, which is to be crystallized: then reduce the crystals to powder, and pour over it nitric or muriatic acid: a nitrat or muriat of barytes is formed, which is to be decomposed with carbonat of potash, the acid of which is driven off by heat, or by a mixture of charcoal. When the nitric acid is poured over the sulphure of barytes, water is decomposed; sulphurated hydrogen gas and nitrous gas are disengaged. The sulphur is almost always mixed with charcoal in precipitation: to be certain that the decomposition is complete, put an excess of the acid.

In preparing the sulphure of barytes, sulphurated hydrogen is formed in a much larger proportion than in the other sulphures; this arises principally from the strong tendency which barytes has for combining with sulphuric acid, and from this arises the brisk odour which is produced in the decomposition of this sulphure more than in others. Hence is seen the reason why, when we dissolve a sulphure of barytes, a considerable portion of sulphat of barytes remains, but it is a regenerated sulphat.

The barytic sulphure is distinguished by particular characters which deserve consideration. If a fresh solution of barytic sulphure be evaporated, a confused but plentiful crystallization is produced. Strain quickly the crystallized part, and press it in paper which may imbibe the moisture, a white crystalline substance is produced, which is hydro-sulphure of barytes; the liquor which is separated is sulphure of barytes, and contains, like all the dissolved sulphures, a considerable portion of sulphurated hydrogen.

The barytic sulphure, as well as the sulphat, if taken into the dark after it has been heated rather strongly, exhibits a vivid blueish light. Lemery says, that an Italian shoemaker, named Vincenzo Casciarolo, first discovered the phosphoric light of the Bologna stone. It is now however known, that this property is common to all the varieties of barytic sulphat. The process consists in heating them red-hot in a crucible, reducing them to powder in a glass mortar, and forming the same into a paste, with a small quantity of mucilage of gum tragacanth, in pieces of the thickness of the blade of a knife. These being dried, are strongly calcined by placing them in the middle of the coals of a furnace which draws well. When the coal is all consumed, and the furnace grown cold, the pieces are cleansed from the ashes by means of a bel-

a bellows. If these be exposed to the light for a few minutes, and afterwards carried into an obscure place, they shine like a burning coal. They even shine when immersed in water. They lose this property by degrees, but recover it on being again heated. Many other substances likewise exhibit this appearance. Magnesia, chalk, calcareous sulphat, and fluat, &c. become luminous after having been heated. Macquer observed the same property in earth of alum, sulphat of potash, Briançon chalk, black flint calcined; which proves, that the presence of an acid is not absolutely necessary for the production of this phenomenon, though it seems in some respect to contribute to its intensity.

This salt is perfectly insoluble in water, and is not acted on by earths or salino-terrestrial substances. Pure fixed alkalis do not decompose it. This last is one of its most singular properties. In fact, the other earthy and salino-terrestrial substances have less affinity than fixed alkalis to the sulphuric acid; but barytes on the contrary, has more. Whence we have observed, after Bergman, that this earth decomposes the sulphats of potash and soda, as it does likewise salt containing ammoniac.

Mineral acids have no action on sulphat of barytes, because the sulphuric acid adheres more strongly than any other to the earth, which forms the base of this salt. Neither do neutral salts produce any change in it, if we except the carbonats of potash and soda, which produce a decomposition by double affinity. The barytes is separated from the sulphuric acid, because it is attacked by the carbonic acid, at the same time that one of the alkalis seizes the former acid. To produce this decomposition, a mixture of two parts of carbonat of potash, and one part of sulphat of barytes reduced to powder, are strongly heated in a crucible. The matter which is semi-vitrified is to be washed in distilled water; and the liquid, after filtration and evaporation, affords sulphat of potash: the substance which remains on the filtre is carbonat of barytes; which, when well washed, is in the form of a very white and fine pulverulent matter, but usually impure, because it always contains a portion of sulphat of barytes, which has escaped the decomposition.

In the preparation of pure barytic earth, Vauquelin prefers the nitric to the muriatic acid. The nitrat of barytes is afterwards decomposed by exposure to the fire. If the earth obtained in this manner be used for the preparation of the muriat of barytes, it is better not to add to it directly the muriatic acid, but rather to decompose by it the muriat of soda. The muriat of barytes will crystallize, and leave the alkali in a state of causticity. The alkali may be crystallized, by adding to it carbonic acid. See *Journ de Phys.* 1794.

Sulphat of barytes is not applied to any considerable use. Phosphoric cakes are prepared of this substance, and the ponderous earth is extracted for chemical experiments. Dr. Withering, in the Philosophical Transactions for 1784, points out a valuable chemical purpose, to which the barytic muriat may be applied; namely, the purification of the marine acid from the admixture of sulphuric acid, by which it is often adulterated. The solution of this salt causes the sulphuric acid to fall to the bottom, together with the earth, in the form of ponderous spar.

Sulphat of Potash.—This substance exists in certain vegetables, whence it is extracted by burning them to ashes. The ashes of some vegetables contain it in great abundance, especially those which grow at a distance from the sea; for those near the salt water rather contain sulphat of soda. Some of the salts met with in commerce contain half their weight of sulphat of potash.

This salt has formerly borne different names, as *vitriolated tartar, sal de duobus, arcanum duplicatum*, and *polychrest salt*.

To prepare this salt, put into an earthen or stone pan, four parts of potash which dissolve in twelve parts of hot water; pour on by degrees sulphuric acid acidulated; a brisk effervescence is produced if the potash of commerce be used, for with pure potash there will be none. Then continue to pour on the acid till the liquor has no longer an alkaline nor acid taste, or till it will not change the colour of paper stained with turnsole: this is what is called the point of saturation; strain the liquor, and evaporate it to a thin pellicle. It crystallizes in cooling into a salt of a solid eighteen-sided shape, terminated at each extremity by a six-sided pyramid.

Sulphat of potash has a disagreeable bitter taste. It is not much altered by the action of heat; when thrown on red-hot coals, it flies into a number of small fragments, attended with noise; this phenomenon, called decrepitation, depends on the sudden rarefaction of the water contained in its crystals. It loses none of its essential properties by this decrepitation. It decrepitates in the same manner, and becomes dry, friable, and even pulverulent, by the loss of its water, when exposed to the action of heat in a crucible. It becomes red-hot before it melts, and is not fused but by the application of a considerable degree of heat. The melted mass, when suffered to cool, is *opaque*, and not at all changed in its principles; for solution in water restores its crystalline and transparent appearance. If it be kept in strong fusion, in an open vessel, it is volatilized without decomposition. The reason why the melted sulphat becomes opaque in cooling, as mentioned above, is because, when a salt is dissolved in water, or by fire, its molecules or elementary particles being divided and separated, the light goes through it; but, as the mass grows cold, they concentrate, or draw close together, so that the light can no longer penetrate, all is dark.

Sulphat of potash is not changed by exposure to the air. It may be decomposed by charcoal. Expose equal parts of charcoal and sulphat of potash to a strong heat in a crucible, and sulphure of potash is the product; the charcoal absorbs the oxygen of the sulphuric acid, and is disengaged in the state of carbonic acid gas. Thus, in the arts, may sulphat of potash be changed into a sulphure with the help of charcoal; and afterwards, decomposing this sulphure by means of lime, an insoluble sulphure of lime is produced, and the potash is set free.

This salt is soluble in sixteen parts of water, some say eighteen, at the temperature of 15° of Reaumur; but boiling water will dissolve near one fourth of its weight; it crystallizes in cooling, provided the water be perfectly saturated with it; otherwise it is necessary to recur to evaporation. It is partly decomposed by nitric acid: put into a glass retort equal parts of sulphat of potash in powder, and nitric acid, at 34°. Adapt a recipient, and place the retort in a sand-heat, and distil. Or, put the mixture into a matrass, and heat it till the salt be dissolved; pour the liquor into a glass vessel; in cooling it furnishes crystals of nitre; still all the sulphat is not decomposed, acid sulphat of potash may yet be obtained. Muriatic acid works the same effect.

Of all terrestrial substances, only barytes decomposes this salt; which happens, according to Bergman, because it has a stronger affinity than potash to the sulphuric acid. If a small quantity of this earth be added to a solution of sulphat of potash, a precipitate is formed, consisting of sulphat of barytes or ponderous spar, which is perfectly insoluble; the potash, in its caustic and pure state, remains dissolved in the liquid.

Sulphat of potash is not used, except in medicine; it is a good purgative, and is sometimes given alone, in the dose of half an ounce or an ounce. It is most commonly administered in a dose of one or two drachms, together with other purgative medicines. It is likewise used as a solvent in chronical disorders, and especially in coagulations of the milk; it is then given in doses of a few drachms, in proper liquids; but its virtue, in this respect, is inferior to that of many other more soluble and less nauseous salts.

Acid Sulphat of Potash.—Sulphat of potash has the property

perty of loading itself with a greater quantity of sulphuric acid than is necessary to constitute a sulphat. If sulphuric acid be distilled, and concentrated over sulphat of potash, this last is impregnated with the acid, and acquires fresh properties. It reddens tincture of violets; it crystallizes climbing up the sides of the vessels in needles; it has been said that they always creep towards the enlightened side of the vessels. Its taste is very sharp, pungent, and bitter. It makes an effervescence with alkalis saturated with carbonic acid. It melts by fire much easier than sulphat of potash; and produces a kind of glass, or white opaque enamel, of a very acid flavour. It is much more soluble in water than neutral sulphat of potash: by adding sugar to the solution, an imitation of a kind of laxative lemonade is produced.

SULPHAT OF SODA.—This salt is more abundant in nature than sulphat of potash; it is found plentifully in sea-water, in salt springs, and in several mineral waters in Lorraine. It has been till now named *Glauber's salt*, from the name of a German chemist who discovered it. To obtain it very pure, put crystals of soda or carbonat of soda into a stone vessel: dissolve it in a sufficient quantity of warm water; pour into the solution, by little and little, weakened sulphuric acid; a brisk effervescence is produced, which arises from the disengagement of the carbonic acid; continue to pour on the acid till the effervescence ceases, and till the mixture is perfectly saturated as remarked under sulphat of potash. Strain the liquor, and evaporate. When left to cool, it affords crystals so much the more beautiful in proportion as the quantity of matter is larger, and the cooling more slow and gradual. When the operation is performed in the large way, six-sided striated prisms are often obtained, of several inches in length, terminated by a dihedral pyramid or roof. In the formation of its crystals, this salt admits more than one half its weight of water. It has a bitter saltish taste.

Fourcroy distinguishes two kinds of fusion of which saline matters are capable. The first, called the *aqueous fusion*, is produced by the water which enters into the formation of their crystals. It obtains only in such salts as are more soluble in hot than in cold water; whence it follows, as a consequence, that the water, which enters into the formation of the crystals, by being so heated, is rendered capable of dissolving the saline matter. The aqueous fusion is therefore merely a solution in hot water. The sulphat of soda, therefore, after this fusion, assumes a concrete form by cooling; but, if the heat be urged, it becomes dry and white, and another fusion ensues, which is called the *igneous fusion*, because produced merely by the fire. Sulphat of potash appears to be as difficult to melt as sulphat of soda; and, like that salt, is volatilized by a violent heat, without suffering any alteration in its principles.

After the escape of the large quantity of water contained in the crystals of sulphat of potash, it becomes converted into a fine white powder by exposure to the air. This phenomenon is termed *efflorescence*, because the pulverulent down of the crystals resembles, in whiteness and form, those matters which are obtained in chemistry under the improper name of *flowers*. As this salt falls into powder when in contact with air, merely from the loss of its water of crystallization, the efflorescence proceeds more rapidly when the air is very dry, and consequently greedy of moisture. The phenomenon of efflorescence is therefore very analogous to the drying of this salt by heat, both depending simply on the evaporation of the water, which is a constituent part of the crystals. But, as the water which enters into the crystals of sulphat of soda, and, in general, of every other efflorescent salt, is truly combined, the efflorescence appears to take place by virtue of a kind of elective attraction between air and water, which is greater than between water and the saline matter. The sulphat of soda loses near half its weight by efflorescence, but its properties may all be restored, together with its crystalline form, by the addition of the water it had lost. Though no medical author has attended to this circumstance, it is certainly of consequence to ascertain the quantity of water which the sulphat of soda loses by efflorescence, that the dose of the salt prescribed may be always of the same strength. It should be given with a deduction of about one third of its weight when in efflorescence, compared with the same weight in fine transparent crystals.

The sulphat of soda may be decomposed by charcoal, phosphorus, &c. in the same manner as sulphat of potash: but it must be understood that this decomposition takes place, not because these substances take away the sulphuric acid, but because they seize upon the oxygen of the base; now, as oxygen is a distant principle, while the soda and the acid are the intimate principles: thus the combustibles act only upon one of the distant principles, and a sulphure is obtained. If then we decompose this sulphure by the aid of carbonic acid, a salt is produced, which, being calcined, gives pure soda. This is the mode which has been proposed for dissolving sulphat of soda; but charcoal alone is not sufficient; a calcareous carbonat must be added; in this case the lime absorbs the sulphur: 1000 parts of sulphat of soda, 500 of charcoal, and 1000 of calcareous carbonat, will be sufficient. Sulphure of lime and carbonat of soda are produced, which may be separated by ley-washing. Scheele observed, that, by mixing quicklime in a solution of soda, and leaving the mixture exposed to the air, carbonat of soda was formed, which crystallized creeping up the sides of the vessel. The same effect takes place with muriat of soda.

Sulphat of soda quickly dissolves in water, and makes it colder; this arises from the sulphat absorbing a quantity of caloric before it will liquefy. At 10° of heat, water dissolves but one-fifth of its weight; but boiling water will dissolve almost its own weight of this salt. Mixed with twice its weight of ice, it produces 2° of cold, the temperature being at the freezing point.

The sulphat of soda has no more action on siliceous and aluminous earths, than sulphat of potash, and does not enter into the formation of glass. Barytes is the only earth which decomposes this salt; but the salino-terrestrial matters have no action whatever upon it. Pure and caustic potash, mixed with a solution of sulphat of soda, decomposes it, because of the stronger affinity of that alkali to the sulphuric acid. To shew this fact, caustic potash must be poured into a hot and saturated solution of sulphat of soda. This solution, which would have afforded crystals of this latter salt by cooling, affords only sulphat of potash by evaporation, and the mother-water contains the caustic soda. All the properties in which sulphat of soda differs from sulphat of potash, shew that the two fixed alkalis, which perfectly resemble each other when considered in a state of purity, are certainly different, since they form very different salts with the same acids. The proportion of the component principles is likewise very different in the two salts we have compared together, a centenary of sulphat of soda containing, as Bergman finds, fifteen parts of soda, twenty-seven parts of sulphuric acid, and fifty-eight of water. This salt is not employed in the arts, but is much used in medicine; it is given as a cathartic medicine, from half a drachm to an ounce and a half, according to circumstances. Its effects are more considerable and speedy than those of sulphat of potash, because it is more soluble in the fluids of the animal economy, and because its taste is more penetrating.

SULPHAT OF STRONTIAN.—This sulphat has been but lately known; the strontian was found in the state of an earthy carbonat in the places mentioned under *strontian*, along with a vein of lead-ore. From the experiments of Vauquelin, native sulphat of strontian is composed of ten parts of carbonat of lime, five of water, and eighty-five of sulphat of strontian, in one hundred.

And the sulphat itself of fifty-four parts in one hundred of strontian earth, and forty-six of sulphuric acid. This sulphat is insipid, insoluble, very white when pure, crystallized, and heavy.

Charcoal decomposes sulphat of strontian, but the carbonat of lime must first be separated by an acid; nitric acid is commonly used; wash the insoluble part in this acid, and treat it with charcoal as directed for sulphat of barytes. Thus a sulphure of strontian is obtained, which may be decomposed by the nitric acid; and then nitrat of strontian is produced. To have pure strontian, heat this nitrat in a retort, or rather in a crucible; the nitric acid is decomposed and thrown off, and the strontian remains pure. This salt, when formed by art, exists in the form of a white powder. It has no taste, and very little solubility in water. Of one grain boiled for some minutes in four ounces of distilled water, only half a grain was dissolved. The solution became turbid, by the addition of the carbonat of potash, and muriat of barytes. Sulphuric acid, when aided by heat, readily dissolves it. An effusion of water, however, causes the acid to part with the sulphat of strontian.

Sulphat of Lime.—This salt exists in large quantities in nature: it is termed *selenite*, *plaster*, and *gypsum*; but ought to be denominated, as Fourcroy remarks, *calcareous sulphat*. There are nine varieties of sulphat of lime discriminated by that author, as follow: 1. Sulphat of lime, or selenite in rhomboidal laminæ. 2. Sulphat of lime, or cuneiform selenite, or of the figure of arrow-heads. It consists of two scalene triangles, joined in the middle, each being composed of triangular laminæ, according to the observation of De la Hire. It is called *lapis specularis, asses mirror*, or *talc of Montmartre*. These two first varieties are fragments of large crystals, and are formed by the hand of man. They are mentioned here only as being specimens for the cabinet. 3. Sulphat of lime, or selenite in decahedral rhomboids. The quarries of Passy afford this sort. 4. Sulphat of lime, or selenite in decahedral prisms. It is formed of hexahedral prisms, terminated by dihedral pyramids, or by a concave angle; it is found in Switzerland, &c. and resembles much the preceding variety. 5. Sulphat of lime, or selenite in cock's combs from Montmartre. It consists of a collection of small lenticular crystals, placed obliquely beside each other, and is formed by the union of the crystals described No. 2. 6. Sulphat of lime, or silky or striated selenite; silky gypsum of China. It is found in Franche Comté, Angoumois, &c. It is formed by the union of slender prisms, which are most commonly brilliant, and of the appearance of satin. It is very difficult to observe the rhomboidal laminæ, which are found in all the other varieties. 7. Sulphat of lime, or common gypsum, or plaster-stone. This substance is white, more or less inclining to grey, interspersed with small brilliant crystals, easily cut with a knife. It is found disposed in strata, and forms most of the mountains in the vicinity of Paris. We shall hereafter find, that it is not pure selenite, but owes its most valuable property, as plaster, to the admixture of another kind of earth. 8. Sulphat of lime, or gypseous alabaster. This is a kind of plaster-stone, harder and more ancient than the foregoing, from which it differs only in being semi-transparent, of a yellowish grey, and in its laminated form or structure apparently consisting of small plates. It is found in great plenty at Lagny, near Paris. This is one of the whitest kinds; but it has sometimes yellow, grey, violet, or black, spots or veins. 9. Sulphat of lime, or selenite, common gypsum, or gypseous alabaster, variously coloured, veined, spotted, clouded, or punctuated. This mixture of colour shews, that the selenite is contaminated by some foreign substance. The colours are almost always occasioned by iron. Calcareous sulphat is likewise found dissolved in waters, as in the well-waters of Paris; it is never pure, but is always combined with some other earthy salt, with base of lime or magnesia. This salt has no apparent degree of taste. It decrepitates if a sudden heat be applied to it; it is then of an opaque white, in which state it is called *fine plaster*, or *plaster of Paris*: by this calcination it loses about twenty in one hundred. It is not decomposable by the contact of the air; it loses, however, some of its transparency, becomes tarnished with various colours, and splits or scales off. Moisture wastes it away. It requires seventy or seventy-two parts of water to dissolve one of sulphat of lime. After the dissolution, the water is heavier, of an insipid taste, and heavy on the stomach. The well-water of Paris holds it in solution; for, when left to settle, sulphat of lime is deposited in very small crystals, or in a grey powder. Vegetables become hard by being boiled in this kind of water. The experiment is easily tried by boiling an equal quantity of some vegetable, French beans for instance, for an equal time, in equal quantities of water loaded with this salt, and of pure water.

Charcoal decomposes sulphat of lime; and, if the plaster is not very dry, carbonated hydrogen gas is produced also. Take an earthen retort; put therein one part of charcoal to seven of plaster; fix to the retort a bent tube, which is to go under a jar in the pneumatic cistern. The sulphat of lime falls to the state of a sulphure, which is found in the retort; and under the jar is obtained carbonic acid gas, and carbonated hydrogen gas. The sulphure of lime contains less sulphurated hydrogen than that of potash; and it is said, that by using sulphure of lime, instead of alkali, at the Irish bleach-fields, on the suggestion of Dr. Higgins, there will be effected a direct saving to the amount of 102,653l. 5s. per annum.

To prepare hydro-sulphure of lime, temper some lime with distilled water, and impregnate it with water charged with sulphurated hydrogen; separate the liquor, and supersaturate it with sulphurated hydrogen gas. Barytes, strontian, and the fixed alkalis, have more affinity with the sulphuric acid than lime has: by pouring a solution of these substances into water charged with sulphat of lime, a precipitate is formed. If impure sulphat of lime be left in digestion with muriatic acid, the sulphat is precipitated in crystals, and the lime is dissolved in the liquor. In calcining plaster for buildings with wood, the flame passes through it; at the same time a small portion of sulphure of lime is produced; and, if water be poured on this fresh-burnt plaster, a strong smell of sulphur arises. But burnt plaster is not pure; some quicklime is contained in it, which, absorbing the water poured on it, causes heat; this heat arises also from the caloric of the solidified water which is disengaged during crystallization.

If an acid be poured upon pure plaster, there is no effervescence; but with plaster-stone there is effervescence, because the carbonic acid of the carbonat of lime is thereby dissipated. Burnt plaster kept a long time, effervesces with an acid, because the lime which it contains has had time to recover the carbonic acid, which it had lost by distillation; so that, to keep it pure, it should be kept as much as possible from contact with the air. If calcined plaster be moistened, it recovers its water of crystallization, which it solidifies. It hardens also, 1. Because the sulphat of lime crystallizes; 2. Because the lime, in absorbing the carbonic acid, purifies itself; and the union of these two kinds causes solidity.

It is the carbonat of lime which is in the plaster, that occasions dry plaster to decay so quickly, when the walls are exposed to moisture and animal substances; for the lime then combines with the nitric acid which is formed. This solubility constitutes the chief difference between plaster and mortar; the sand in this last, which gives solidity, not being attacked by the water. Plaster is not, on this account, used in humid or moist places, nor in any works near or under water.

Sulphat of Ammoniac.—Ammoniacal sulphat, formerly called *vitriolic ammoniacal salt*, or *ammoniacal vitriol*, is produced by a saturated combination of sulphuric

ric acid and ammoniac. It was termed *secret ammoniacal salt of Glauber*, because this chemist was the first who discovered it.

It is said to have been found in a white efflorescence in the environs of volcanos, and in crystals about the mouth of Vesuvius, and that it has been extracted from some of the waters of Tuscany; it has been said also to have been seen on the surface of the earth, like nitre, about Turin; but all this appears doubtful. Bergman found none in the waters which he examined; however, as there is much sulphur and ammoniac in nature, this combination may be formed; but, being very soluble in water, and even attracting moisture, it may by that means disappear.

To prepare this salt, put carbonat of ammoniac into a ballon; let it dissolve in a sufficient quantity of water; into the solution pour sulphuric acid, by little and little, till the mixture attains the point of saturation; a brisk effervescence is produced each time. When the mixture is saturated, strain the liquor; let it evaporate in a gentle heat to a thin pellicle; or this salt may be made to crystallize spontaneously; but it must be at a low temperature, and kept quite still, covering the vessel with gauze, or a paper pricked with little holes.

This salt, when very pure, appears under the form of needles, which, when carefully examined, are flattened prisms with six sides, two of which are very large, terminated by pyramids with six faces, more or less irregular; but this form exhibits varieties which are different from those we have described; it sometimes occurs in the form of quadrangular prisms, and often in square and very thin plates. The form seems to depend, as in every instance of crystallization, on the manner in which the saline particles are deposited, which is either less regularly on each other, or according to the law of their decrease. The taste of this salt is bitter and urinous; it is very light, and very friable. As it contains much water of crystallization, it melts at first with a very slight fire, but it becomes gradually dry in proportion as its water of crystallization is dissipated. With a greater heat it hardens, and the ammoniac is partly disengaged; and, if the heat be kept up, it is sublimed in vapours in the dome of the retort as acid sulphat of ammoniac; this arises from the operation of the double affinity, particularly that of the caloric for the ammoniac. This decomposition shews that sulphat of ammoniac can become an acid sulphat, as well as sulphat of potash.

The acidulated sulphat of ammoniac is not decomposable by water; it crystallizes well, and reddens tincture of turnsole. But the redness of the tincture must not be depended on as a certain sign that the ammoniacal salt is in the acidulated state, for the neutral ammoniacal salts get red with heat. As tincture of turnsole is only a red tincture blued with soda, the ammoniac attracts the soda, and the turnsole appears in its primitive state. The perfect neutrality of these salts may be known by trying them with a solution of carbonat of magnesia: if an acid is present, an effervescence takes place.

Sulphat of ammoniac absorbs the moisture of the air in winter, but scarcely at all in summer. It cannot be decomposed by combustion, like the other sulphats, for only the excessive portion of the oxygen in the sulphuric acid is dissipated, the acid remaining in the state of sulphureous acid; now this sulphuric acid cannot retain all the ammoniac; a great part flies off in vapour. In this experiment the charcoal takes away the excess of oxygen; sulphureous acid and a *sulphit* remain; but, as the sulphit volatilizes very easily, it sublimes; and by this means charcoal escapes in the decomposition, and ammoniac and carbonic acid pass over. Sometimes in this operation there is formed a prussic acid, proceeding from the carbon and the ammoniac.

It is very soluble in water; two parts of cold, or one of hot, water, being sufficient to hold it in solution. It crystallizes by cooling; but the crystals are by no means regular or fine. By dissolution in water it produces cold, and this cold is much more sensible than what is produced from other salts, because it dissolves quicker. It likewise unites with ice which it melts, producing an excessive degree of cold.

Nitric and muriatic acid do not decompose this salt entirely; barytes, however, decomposes it, forming an insoluble sulphat of barytes. Potash and soda form soluble salts with this, the ammoniac being disengaged in the gaseous state. Strontian works the same effect as barytes. Quicklime decomposes it also; the mixture heats, and the ammoniac is disengaged: if the operation be performed in a retort, the ammoniac may be extracted. This salt is decomposed by phosphat of lime in the following manner: Bones calcined to whiteness, pulverised, and well washed in acetous acid, to dissolve the lime, or carbonat of lime, which may exist in the bones, are put into a solution of sulphat of ammoniac. After filtering the liquor, the presence of phosphoric acid may be shown by adding some lime-water, which produces a copious precipitate of the phosphat of lime. It holds also a small portion of the sulphat of lime in solution, as may be seen, by pouring into it a solution of oxalat of potash. But the greater part of the sulphat of lime remains on the filter with the undecomposed bone. This residue, when dried, is found to weigh 0 52 parts more than the phosphat of lime originally employed.

The effects of heat on sulphat of ammoniac have been very accurately observed by Mr. Hatchet of London. In distilling this salt by itself, he remarked, that a considerable quantity of alkaline gas was disengaged. A white cloud of minute glistering crystals was formed, which quickly disappeared, and was followed by a great quantity of sulphureous acid gas and water. In this experiment, the salt was not only decomposed, but also a part of the ammoniac resolved into its constituent principles. A portion of the undecomposed salt was sublimed into the neck of the retort. The sulphureous acid gas, uniting with the alkaline gas in the receiver, formed the sulphit of ammoniac, which appeared in the form of the minute glistering crystals. The gas which remained after this combination seemed to possess all the properties of azotic gas. When sulphat of ammoniac was distilled with yellow oxyd of iron, pure ammoniac came first over, and afterwards some sulphureous acid. The iron was converted to the state of a red oxyd, and mixed with some sulphat of iron. With oxyd of zink, the residue was the sulphat of that metal. Minium triturated with sulphat of ammoniac, immediately decomposed it like lime or alkalis, and, when distilled together, the retort contained sulphat of lead. When native green oxyd of copper was distilled with sulphat of ammoniac, the residue consisted partly of red oxyd, and some sulphat of the same metal. The ammoniac in this experiment came over in a concrete state, by reason of the carbonic acid contained in the green copper. *Philos. Trans. for* 1796. Sulphat of ammoniac is but of little use, though Glauber recommends it strongly for metallurgic operations.

Sulphat of Magnesia.—This is known in pharmacy under the name of *Epsom salt*, from the name of a spring near that town, where it was first obtained. It exists in sea-water, and in the mother-water whence sea-salt has been extracted; also in the waters, of Egra, Sedlitz, and Seydschutz; and in the well-water of Paris; likewise in the martial pyrites, in the composition of alum, &c.

Sulphat of magnesia is purified for sale by dissolving it in water, and leaving it to crystallize. It may be prepared also by saturating pure magnesia with sulphuric acid. The crystallization is in small needles, but very confused. But, by dissolving it in cold water, and exposing it in the air to a spontaneous evaporation, it is obtained in fine quadrangular prisms, terminated by quadrangular pyramids, all the surfaces being smooth and without furrows; its crystals in general are shorter

and larger than those of sulphat of soda; and it likewise differs from that perfect neutral salt in all its other properties.

This salt has a very bitter taste, and on that account has been called *sal catharticus amarus*. All the bitter salt waters are commonly solutions more or less strong of sulphat of magnesia. It is of a greyish-white colour, not very bright. Exposed to heat, it loses almost all its water of crystallization, which reduces it to little more than half its weight: it admits of the aqueous fusion. With an extreme heat it undergoes the igneous fusion, but is not decomposed; if, after being melted, it be poured into a vessel, it recovers moisture from the air, and bursts the vessel which contains it. It is slightly efflorescent in a very dry air. It is so soluble in water, that only twice its weight of cold, and half its weight of hot, water, are required to hold it in solution.

To decompose this sulphat with charcoal, mix it with one-eighth of its weight of charcoal-dust; put this mixture into a stone retort, to which a bent tube is adapted going under a jar in the gas apparatus before described. By the aid of caloric, or heat, the charcoal seizes upon the oxygen of the sulphat, and sulphure of magnesia is produced. The heat must be applied gently, that the sulphure itself may not be decomposed, for the sulphur has but little attraction for the magnesia: carbonated hydrogen gas passes under the jar, which arises from the water of the decomposed substances. By pouring sulphuric acid over this solution of the sulphure of magnesia, sulphat of magnesia is re-produced, and pure sulphur is obtained by filtration. Then the magnesia may be extracted from the solution of the newly-formed sulphat, by adding caustic alkali. The liquor holds the sulphur much divided, and passes through in straining, but becomes flaky in boiling.

By adding to sulphat of magnesia a little sulphuric acid, a sulphat of magnesia is produced with an excess of acid; and, by pouring on ammoniac, no precipitate is formed, because the ammoniac does not decompose this acidified sulphat of magnesia, but forms a triple salt. Barytes decomposes this salt, by taking away the sulphuric acid. If barytes dissolved in pure water be made use of, the sulphat of barytes and the magnesia are precipitated together; but, if an acid solution be used, as muriat of barytes for example, the sulphat of barytes will be precipitated, and the magnesia remain in the liquor in the state of muriat of magnesia.

Sulphat of magnesia is in the same manner decomposed by potash and soda. Caustic potash precipitates the magnesia in very pure white flakes, and sulphat of potash is obtained. Lime precipitates the magnesia from the sulphat of magnesia: a sulphat of lime is produced.

Ammoniac decomposes, cold, part of the sulphat of magnesia; but the precipitate is slight, and all the magnesia is not separated; for if, after filtration, the liquor be tried with potash, another precipitation is produced. If the liquor is left to evaporate slowly, a triple salt is formed, the *ammoniaco-magnesian salt*, or *sulphat*. This salt is bitter, with an urinous taste; is less soluble than sulphat of ammoniac, but more so than sulphat of magnesia; it crystallizes in dodecahedrons, sometimes four-sided. It is decomposed by heat. The presence of the ammoniac in this salt may be known by triturating or pounding it with lime. The magnesia may be discerned by precipitating it with a caustic alkali; by adding afterwards lime and a little water, the odour of ammoniac is disengaged. When this triple salt is urged with a strong heat, the ammoniacal sulphat evaporates, and sulphat of magnesia remains at the bottom of the retort. The ammoniaco magnesian salt may be directly formed, by mixing together the solutions of sulphat of magnesia and sulphat of ammoniac. The liquor immediately grows turbid, and soon after crystallizes.

Sulphat of Glucine.—Glucine combines very well with sulphuric acid, whether free or in the state of carbonat; in the latter case, a brisk effervescence is produced. The salt resulting from this combination is very soluble in water, so that in melting it becomes as thick as a syrup before it crystallizes. Its taste is very saccharine, and slightly astringent. Exposed to heat it swells up like alum; and in a red heat will be entirely decomposed; the sulphuric acid flies off in vapours, and the earth remains pure.

Charcoal decomposes it with the aid of heat, and a sulphure is produced. No acid will decompose this salt; hence it appears that sulphuric acid has a greater affinity for this earth than any other. Alkalis and earths, except alumine, decompose it, by seizing on the sulphuric acid, for which they have a stronger attraction.

Sulphat of Alumine.—There are several kinds of sulphat of alumine: the most common in the acid sulphat of alumine, or the *alum* of commerce. It is found about volcanos, on lavas, and on rocks in several places. To obtain sulphat of alumine, the alum-ore is exposed to the wind and rain, or it may be burnt: the sulphur contained therein forms, by its union with the oxygen which it absorbs, sulphuric acid, and unites with the alumine: combine the whole in water, and heat it, leave it to grow cold, and you have pure acid sulphat of alumine. A little alkali is generally mixed with it, whether ashes, sulphat of potash, or even stale urine; all these salts are necessary to obtain it in the crystallized state, and to take away its viscosity. Hence it is, that, according to Vauquelin, (Annales de Chimie, tom. xxii.) speaking of the different states of the combination of alumine with sulphuric acid, which are at the same time united with different bases, we are to distinguish seven different states of this combination. 1. Sulphat of alumine, or the artificial union of sulphuric acid and alumine. This salt is astringent, it crystallizes in soft plates or leaves, soluble in water; and was not known till lately. 2. Acid sulphat of alumine, or the preceding salt with an excess of the acid, and differs from it only in a reddening blue vegetable colours. It is easily formed, by dissolving the preceding sulphat in sulphuric acid; but it is with great difficulty converted into neutral sulphat of alumine, namely, by boiling it a long time with its earth. This salt has not been hitherto described, any more than the first. 3. Sulphat of alumine and saturated potash: this is the alum of the chemists saturated with its earth. Its properties are, pulverulence, insipidity, insolubility, that it will not crystallize, but is easily converted into true alum by the sulphuric acid. 4. Acid sulphat of alumine and potash. It is easy to prepare this chemically, and it greatly resembles common alum; but Vauquelin only found that of Tolfa to be of this kind. 5. Acid sulphat of alumine and ammoniac. This is easily made in a laboratory; but in commerce it is never met with pure. 6. Acid sulphat of alumine, potash, and ammoniac. This is the kind of alum most commonly used in manufactures: we shall therefore call it *alum*, for distinction-sake. 7. Acidulated sulphat of alumine and potash. Vauquelin proposes this name, because, by adding to the solution a little more potash than is required to obtain eight-sided crystals, it assumes the cubical form.

Of the *alum* of commerce, (or acid sulphat of alumine, potash, and ammoniac, as mentioned at No. 6,) there are several species: 1. Rock-alum, called by La Grange, *alun de glace*, alum of ice, is found in considerable masses; transparent. Bergman thinks that this name is derived from the city of *Rocca*, in Syria, now called Edessa, where the most ancient manufacture of this salt was established, and not because its form resembles a rock, or stone, or because it is obtained from rocks or stones, as several authors have affirmed. This species of alum is very impure. 2. Roman alum, which is prepared in the territory of Civita Vecchia, and obtained from a place, named in Italian, *Aluminiere della Tolfa*. This alum is in pieces of the size of eggs; it is covered with a reddish efflorescence, and is supposed to be pure when that efflorescence is separated. 3. Naples alum, extracted from a peculiar earth at the Solfaterra; it is in larger masses than the

the Roman alum, and one of its surfaces is covered with pyramidal crystals. 4. Alum from Smyrna. The most ancient manufactures of alum appear to have been established near Smyrna and Constantinople. This alum is only found in cabinets of natural history. 5. French alum. It is prepared in many manufactories in France; especially in those of Chaptal, and at Javille near Paris: they mix the acid water which proceeds from the rectification of sulphuric acid, with the clay of Gentilly, in wooden troughs, and expose it to the air for six months then wash the mass with ley. 6. Alum extracted from efflorescent schisti and volcanic products. It is also extracted from earths and stones in many parts of Germany, where there have been manufactories of it since the year 1544; and also in England, Spain, Sweden, and most parts of Europe.

The addition of a certain portion of alkali is now shown to be necessary to the formation of alum. The necessity of this addition had been known for a long time in the manufacturing of this substance; but it was conceived, that the only use of the alkali was to saturate the excess of acid. Bergman, however, had remarked, that the addition of soda or lime did not promote the crystallization of alum when used as substitutes for potash and ammoniac. He did not, however, seem to know that the potash entered into the formation of the alum. This curious fact was fully ascertained by the experiments of Vauquelin. He found, that the addition of the sulphat of potash was equally efficacious in promoting the crystallization of alum with the potash itself, and that the same effect was produced by the sulphat of ammoniac. Bergman had also observed, that not only the common alum, but also the Roman, when decomposed by ammoniac, afforded a small quantity of sulphat of potash. Alum dissolves in five times its own weight of cold water; but boiling water dissolves more than half its weight, eight ounces of water in this state dissolving five ounces of the salt. It crystallizes very well by cooling. Its crystals are triangular pyramids, with truncated angles. When they are deposited on threads in the middle of the solution, very regular octahedrons are formed, whose pyramids are obliquely truncated at the middle, between the vertex and the base. This salt melts with a mild heat, emitting abundance of aqueous vapours, at the same time that it swells up, and becomes converted into a very large light mass, of an opaque white, with a great number of cavities. This phenomenon is produced, as in borax, by the disengagement of water, whose vapour blows up and extends the saline mass. The alum in this state is called *calcined alum*, and weighs little more than half its former weight. It is somewhat altered; reddens the syrup of violets; has a stronger taste; loses its water of crystallization, and a very small part of its acid; for, if the experiment be made in close vessels, the water obtained is acid. Yet calcined alum has always an excess of acid; which happens because the molecules of the alum, having an extreme affinity for each other, let the acid run, which there remains interposed.

Sulphat of alumine slowly effloresces in the air. Several combustible bodies decompose it: we will take charcoal for an example: Mix eight parts of charcoal in powder with one of alum; put the whole into a retort, and adapt it to the pneumatic apparatus. By the help of heat, carbonic acid gas is brought under the jar; and what remains in the retort is a *sulphit* of alumine.

Alum is decomposed also by animal and vegetable substances: this decomposition produces a substance which takes fire on exposure to the air, and is called *pyrophorus*, or *the phosphorus of Homberg*. Take three parts of alum to one of honey, meal, or sugar; either of these will have the same effect. Dry the mixture in an iron ladle, stirring it with a spatula. The mixture first liquefies, then puffs up, and at length subsides into lumps or clods: then pulverise it grossly, and finish the drying of it, which leaves a black carbonaceous powder. It is then put into a small long-necked matrass, which must be only three-parts full; place this matrass in a crucible with sand, and cover the bulb. Heat is applied till a bluish flame appears to issue out of the neck of the phial. After this has continued several minutes, the crucible is taken out of the fire; and when the whole is cool, the pyrophorus is poured quickly into a dry bottle, which is immediately well closed. This is truly a *sulphure of alumine*, mixed with a small quantity of carbon. If a little of this sulphure be poured upon paper in the open air, it takes fire. If the pyrophorus is slow in burning, the combustion may be hastened by any humid vapour, such as that of the breath. The inflammation of pyrophorus only takes place in a moist air; it will not burn in a dry air; the humidity is absorbed by the substance, and the disengaged caloric of this humidity raises the temperature of the substance; then it burns itself; the carbon and sulphur, in this combination, regenerate sulphuric acid and sulphat of alumine, and a little carbonic acid is disengaged. It is so certain that pyrophorus is a composition of a sulphure and of carbon, that, when dissolved in water, there is a precipitation of carbon, and the liquor which remains is a hydro-sulphure.

All the acids decompose this sulphure; nitric acid precipitates a reddish sulphur, because, being oxygenated by the acid, it is in the state of oxyd of sulphur, and nitrat of alumine is formed. Azotic gas and carbonic acid are obtained under the jar, when the experiment is made in close vessels. When the nitrous gas is all decomposed, it gives out its oxygen to the pyrophorus, and burns it, the sulphur is acidified, and a little sulphat of alumine is again found. Concentrated sulphuric acid, and sulphurous acid, flame also with pyrophorus; the same effect takes place with oxygenated muriatic acid gas.

It appears, from the experiments of Scheele, that alum affords pyrophorus only in proportion to the quantity of fixed alkali which it contains, or in proportion to the quantity of alkali obtained from the combustion of the carbonaceous substance employed. Aluminous earth does not appear to be essential to the formation of pyrophorus, for it may also be formed by burning a mixture of equal parts of Glauber salts and meal, four parts of sulphat of potash with five of meal, equal parts of potash and meal with one-fourth of sulphur; or, according to Bergman, one part of mineral alkali with a fourth of sulphur, and one third of charcoal powder; or, according to Scheele, sulphat of potash calcined with three parts of charcoal powder. Pyrophorus, according to the experiments of Lavoisier, diminishes the volume of atmospheric air from 100 to 72½. The diminution of the air by the combustion of this substance, had before this been observed by Hales, and confirmed by Priestley. Oxygen gas was reduced to one-seventh of its volume by combustion with pyrophorus, and when the remainder was washed with lime water, and inflamed anew, only a very small portion of the original volume remained undecomposed.

Alum is decomposed by barytes, lime, strontian, magnesia, glucine, and all the alkalis, which, poured into a solution of this salt, precipitate the alumine. Alum is of very extensive use in medicine and the arts. See vol. i. p. 381, of this work, under the article ALUM.

SULPHAT OF ZIRCONE, OR JARGON.—That the combinations of zircone with acids may act with facility, it is necessary that it should be in a state of extreme division and very moist, such as when just precipitated from these solvents; if it has been dried by fire, or even by the heat of a stove, it unites but difficultly in these combinations. This earth adheres to the acids, but the action of a gentle heat is sufficient to break the combination; this is demonstrated also by alkalis, and all other earths, which separate acids from it.

Sulphuric acid and zircone unite easily; and the salt resulting from the combination is white, insoluble in water, and tasteless. Heat decomposes it, and leaves the zircone

zircone pure. In a high temperature, charcoal converts this sulphat into a *sulphure*. This sulphure is easily soluble in water; and its solution furnishes, by evaporation, crystals of hydro-sulphure of zircone. This salt undergoes no material change with other acids. Earths and alkalis decompose it.

OF SULPHITS.

This is the name given to combinations of sulphurous acids with earths and alkalis. We are indebted for the knowledge of these salts to Vauquelin and Fourcroy. See Annales de Chimie, tom. xxiv.

The artifice of making sulphits in general, is by mixing alkaline or earthy solutions with water loaded with sulphurous acid. Or by passing sulphurous acid on the bases. Or, which is the best method, by putting charcoal in powder, and sulphuric acid, into a retort; gaseous sulphurous acid is formed, and carbonic acid. This is effected by the following apparatus: In the Chemistry Plate V. fig. 1, A, is glass retort, luted, laid across iron bars in a furnace; to its mouth is adapted a bent tube, which is plunged into a two-necked bottle B, containing water to absorb the sulphuric acid which might pass over without being decomposed; from the other neck of this bottle proceeds a tube, which terminates in the three-necked bottle C, containing a solution of carbonat of potash; in this manner there may be placed as many bottles as there are sulphits to prepare; the last is terminated by a bulbed tube of safety, whose extremity runs under the inverted jar D, in the pneumatic apparatus. In the middle opening of each jar, there must be the tubes of safety E E E, one of whose extremities should be plunged a little way into the water, with the upper end open to the atmosphere, in order that, if the heat should fall off during the operation, or after it is finished, it may give a passage to the outward air, in proportion as the gas diminishes in volume by cooling, and thereby hinder the solution of the sulphit from getting into the first bottle, and mixing with the water it contains, by the pressure of the atmosphere. To try whether an apparatus so complicated be perfect in all its parts, blow with the mouth into the first tube of safety E; the air should regularly proceed into the jar D, passing through the opposition it meets from the fluid columns that dispute its passage, which opposition will cause it to escape, if all the joinings are not very close and tight. It is the tubulated bottles, that are very subject to have cracks in the joinings of the necks. When all is in perfect order, heat the retort gently: the sulphurous acid is soon disengaged in the gaseous state, and saturates the potash, soda, &c. and under the jar D, carbonic acid is collected; arising, 1, from the decomposition which takes place in the retort; 2, from the carbonic acid which is disengaged in the decomposition of the liquid carbonats contained in the bottles, which carbonats are decomposed, in proportion as the sulphurous acid drives off the carbonic acid to seize upon the base, and form sulphits.

The above is the most advantageous method of preparing sulphits; as they may thus be obtained crystallized without evaporation. When they are made with liquid sulphurous acid, evaporation is necessary; which, by giving access to the oxygen, sulphuric acid and sulphats may be produced.

Sulphits have no smell. When they are not neuter, they entirely discolour the blue vegetable tints; hence it is that the vapour of sulphur, or sulphurous acid, is used for bleaching silk, linen, &c. They have a strong taste of sulphurous acid; they are decomposed by caloric or heat. Oxygen gas changes them into sulphats. Sulphits may serve for eudiometers, especially that of ammoniac, which of all sulphits passes the most easily into the state of a sulphat, by mere contact with the oxygen of the atmosphere. Some are soluble in water; others not, except with an excess of acid. They are decomposed by acids. They are all, except that of ammoniac, converted into sulphures by charcoal. Alkalis and earths act upon these salts in proportion to their affinities for the sulphurous acid: thus barytes decomposes all the other sulphits; then the order of affinity or attraction is, strontian, lime, potash, soda, magnesia, ammoniac, glucine, alumine, and zircone.

SULPHIT OF BARYTES.—To prepare this salt, mix a solution of sulphit of soda or ammoniac, with a solution of muriat of barytes: the sulphit of barytes then appears in the form of very little needles precipitated at the bottom of the liquor.

This salt has no sensible taste; it is white and opaque. Caloric decomposes it, by driving off the excess of sulphur, and it becomes a sulphat; the sulphur crystallizes in the neck of the matrass. Charcoal decomposes it, and changes it into a sulphat, by separating the oxygen. It is not soluble in water, at least not sensibly; sulphurous acid renders it somewhat soluble. The sulphuric, muriatic, and nitric, acids, decompose it, with violent crackling and great boiling up. Oxygenated muriatic acid converts it entirely into a sulphat. No terrestrial or alkaline substance decomposes sulphit of barytes. It consists of barytes fifty-nine, sulphureous acid thirty-nine, and water two.

SULPHIT OF STRONTIAN.—This is not yet sufficiently known for us to detail its properties; they are doubtless much the same as the sulphit of barytes.

SULPHIT OF LIME.—The best way to make sulphit of lime, is to pass sulphurous acid gas through the midst of carbonat of lime diluted with water. When the liquor is well saturated, it crystallizes on the sides of the jar in transparent needles. It has at first little or no taste, but afterwards resembles sulphurous acid. Caloric makes this salt pass into the state of a sulphat. It loses somewhat of its transparency in crystallizing; but goes very slowly into the sulphat state. The form of sulphit of lime is that of a prism with six planes, terminated by a very long pyramid.

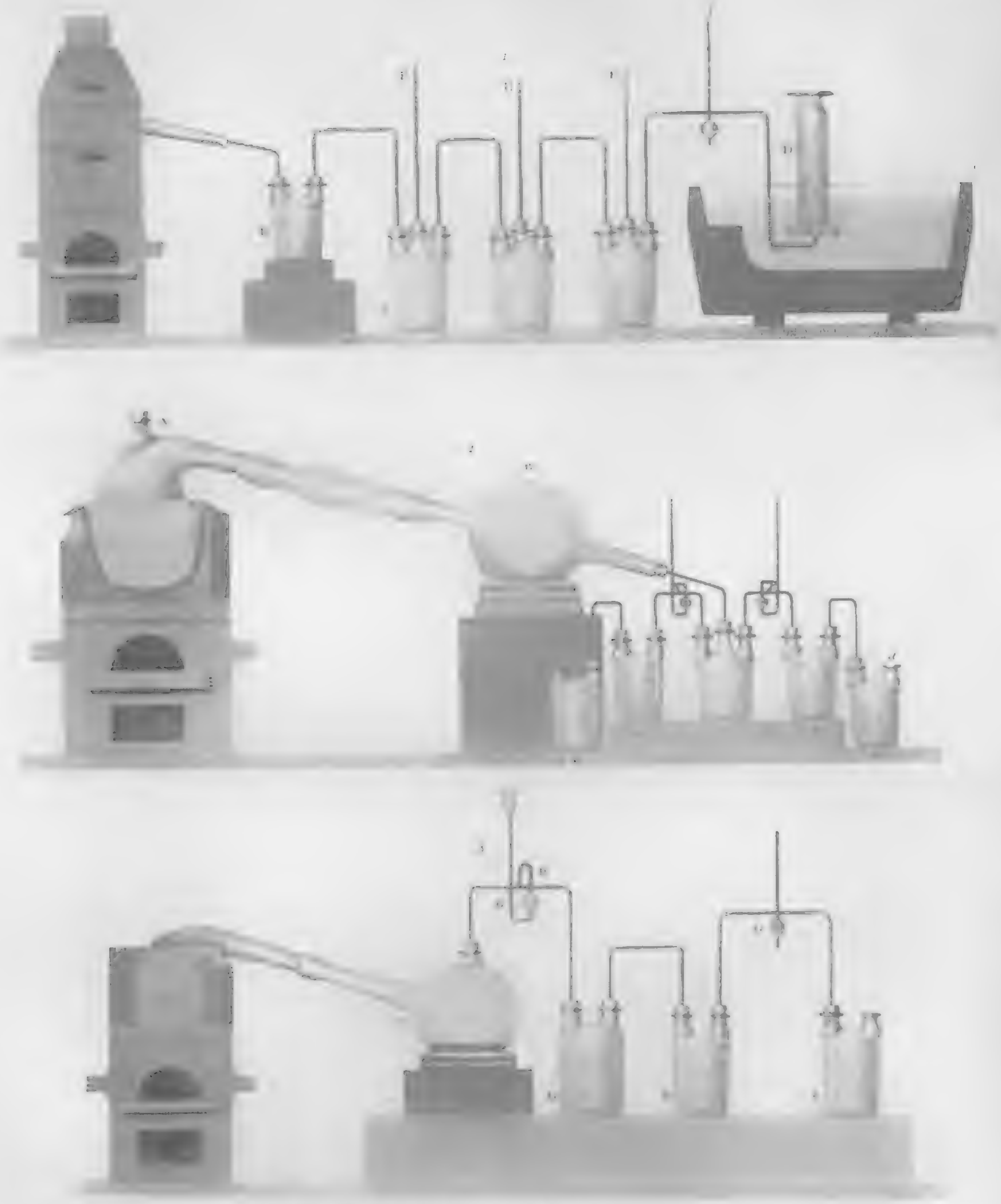
This salt requires 800 parts of water to dissolve it, but an excess of acid renders it more easy of solution; and thus may it be obtained in crystals by exposing its solution in sulphurous acid to the air.

Barytes is the only earth which decomposes sulphit of lime: the acid is dissipated, leaving the salt in a state of purity. This may be tried, by mixing a solution of this earth with a solution of neutral sulphit of lime, which forms a slight precipitate. The mineral acids decompose it; sulphuric acid disengages the sulphurous acid with effervescence: indeed it may be extracted thus in a state of the greatest purity. The nitric acid and oxygenated muriatic acid convert it partly into sulphat of lime. It consists of lime forty-seven, sulphureous acid forty-eight, and water five.

SULPHIT OF POTASH.—To prepare this salt, take very pure carbonat of potash crystallized; dissolve it in three times its weight of distilled water; then pass sulphurous acid gas into the mixture until the effervescence ceases entirely. During this combination, a small quantity of caloric is disengaged, and the solution crystallizes by cooling. This salt is usually white and transparent; sometimes it is slightly yellow and semi-transparent, if its solution has been very concentrated, and the crystallization confused. Its taste is penetrating and sulphureous; its figure that of a rhomboidal plate; its crystallization often presents small needles diverging from a common centre. When exposed to a sudden heat, it decrepitates, and loses its water of crystallization; afterwards, by ignition, it emits some vapours of sulphureous acid. At length a portion of sulphur is separated, and the residue is sulphat of potash, with a slight excess of alkali.

By exposure to air, it slightly effloresces, becomes opake and hard, its penetrating sulphureous taste disappears, and it acquires another which is acrid and bitter. In this state it no longer effervesces with acids.

Take twelve parts of this salt dried, which put into a retort



The Modern Chemical Apparatus. N°.

retort with one part of charcoal in fine powder. Urge it with a violent heat; and the results will be, 1. A small quantity of water. 2. Some carbonic acid. 3. A certain quantity of sulphurated hydrogen gas. 4. There remains in the retort a red mass, very soluble in water, giving out a fetid smell of sulphurated hydrogen, from which the acids disengage this matter in the state of gas, and precipitate some sulphur: hence is produced a true sulphure of potash.

Put some very dry sulphit of potash into a porcelain tube; put the tube into a furnace; adapt to the upper end the apparatus for disengaging hydrogen gas, and to the lower end a tube which is to go into an empty bottle. Heat the tube gently; as the hydrogen gas passes, water is formed; and sulphure of potash remains in the tube.

Sulphit of potash is soluble in a quantity of water nearly equal to its own mass; and this solubility is increased by heat. This salt is decomposed by lime and barytes, as may be shown by pouring lime-water, or water of barytes into a solution of sulphit of potash. A white precipitate is afforded, which is the sulphit of lime; and the potash remains disengaged in the water. The sulphureous acid does not, therefore, follow the same laws of affinity as the sulphuric acid, since this last adheres more strongly to potash than to lime.

Alkalis do not change the nature of the sulphit of potash. Among the acids, some decompose it, by separating the sulphureous acid; others change its nature without driving off its acid, by affording a portion of oxygen, and converting it into sulphuric acid. The first of these effects is produced by the sulphuric, muriatic, phosphoric, and fluoric, acids; the second is effected by the nitric and the oxygenated muriatic acids. The acids of borax and of carbon do not occasion any change in the cold.

Several metallic oxyds act upon this salt. Some are entirely reduced to the metallic state, such as the oxyds of gold, silver, and mercury; others are brought nearer to that state, such as those of lead, iron, and manganese, at the maximum of oxygenation. There are others which change the nature of the sulphit of potash in an opposite direction to that which takes place in the foregoing cases, that is to say, which convert it into sulphat, by depriving it of a certain quantity of sulphur, with which they form sulphurated oxyds, such as the oxyds of arsenic and of iron slightly oxydated. But, in order that this operation may succeed, it is necessary to boil these substances a long time in water, and afterwards to add to the solution an acid which occasions a coloured precipitate, at the same time that sulphurated hydrogen gas is emitted. All the metallic solutions, except the carbonats, are decomposed by the sulphit of potash; and, as most of the metallic sulphits are insoluble, different coloured precipitates are formed, according to the nature of the metal, and its state of oxydation.

Sulphit of Soda.—This is prepared by putting into a Woulfe's bottle one part of crystallized carbonat of soda, and two parts of distilled water, passing sulphurous acid gas, till the effervescence ceases. When the saturation is nearly completed, a portion of crystallized sulphit of soda is found at the bottom of the liquor. This salt is white, and perfectly transparent; its figure a four-sided prism, two of the sides being very broad, and two narrow, terminating in dihedral pyramids. Its taste is cool, and afterwards sulphureous. Its habitudes in the fire are absolutely the same as those of the sulphit of potash; except only that it commences its operations by the aqueous fusion. By exposure to the air it effloresces, and is afterwards converted into sulphat, but less speedily than the sulphit of potash. Mixed with a twelfth part of its own weight of charcoal in powder, and heated in a retort, it furnishes first a little water; then some carbonic acid mixed with a portion of sulphurated hydrogen gas; lastly sulphure of soda remains in the retort.

Mineral acids have the same effect with sulphit of soda as with that of potash. Barytes, lime, and potash, decompose sulphit of soda: the precipitation is sulphit of barytes, of lime, or of potash, according as one or other of these earths has been used. It contains, in 100 parts, 18·8 of soda, 31·2 of acid, and 50 of water.

Sulphit of Magnesia.—For the formation of this salt, put into a Woulfe's bottle one part of carbonat of magnesia, and two parts of distilled water, introducing sulphurous acid gas as before. If no more of the sulphurous acid be used than is just necessary to saturate the magnesia, there will be no perceptible change in the volume of the mixture; and, were we not assured, by the disengagement of carbonic acid, which takes place during the operation, and by the fixation of the sulphurous acid gas, that a combination has taken place, we might be tempted to believe that there was no action between this acid and the carbonat of magnesia. The greater part of the sulphit of magnesia which is produced, remains at the bottom of the liquor; but, by bringing a fresh quantity of sulphurous acid upon the mass of the sulphit of magnesia, when the effervescence has ceased, it is dissolved entirely in the liquor, and part of the salt is separated in transparent crystals as it grows cold. This solution of sulphit of magnesia, exposed to the air in a jar, loses by degrees its excess of sulphurous acid, and deposits transparent crystals.

This salt is white and transparent; its figure a four-sided prism diminishing at the top; its taste is sweetish and earthy at first, afterwards sulphureous. Exposed to heat, it softens, swells up, and becomes ductile like a gum; by continuing to heat, after it has lost its water of crystallization, the sulphurous acid is separated, and the magnesia remains pure. It becomes opaque in the air, and is converted into a sulphat by degrees, but it takes a long time. Powdered charcoal heated in a retort, with twelve parts of sulphit of magnesia, takes away the oxygen, and converts it into sulphure of magnesia. It is but little soluble in water. Mineral acids have the same effect upon this as upon the other sulphits. The terrestrial and alkaline substances already taken notice of, all decompose sulphit of magnesia. The earthy substances form in solution a deposit, composed of newly-formed sulphits and of magnesia. Potash and soda work the same effects; but the magnesia is precipitated pure in that case, because these alkaline sulphits are soluble. This sulphit consists of magnesia sixteen, sulphureous acid thirty-nine, and water forty-five.

Sulphit of Ammoniac.—To obtain sulphit of ammoniac crystallized, pass sulphurous acid gas, in the manner before directed, into concentrated liquid ammoniac. When the water is completely saturated with the ammoniac, there will be a deposition of transparent and very regular crystals, formed by that portion of the sulphit of ammoniac, which the water held in solution on account of its heat. This salt has the form of six-sided prisms terminated by pyramids with six faces. Its taste is cool and pungent, but becomes at length somewhat like sulphurous acid. It volatilizes with heat, but is not decomposed. It attracts the moisture of the air, and soon changes to a sulphat. Charcoal does not convert it into a sulphure, because it volatilizes too fast. It is very soluble in water, and crystallizes in cooling. All the mineral acids, except the boracic and carbonic, decompose this salt: this decomposition takes place with heat and effervescence, and the sulphurous acid may be collected in the state of gas over mercury.

Barytes also decomposes this sulphit: if barytes in powder be pounded with this salt crystallized, dried, or even dissolved in water, the ammoniac will be disengaged. Lime acts in the same manner. Powdered magnesia, heated with sulphit of ammoniac, decomposes it entirely: magnesia will also decompose this salt dissolved in water, if the mixture be exposed to a boiling heat; in a mean temperature, the magnesia does not entirely decompose the sulphit of ammoniac, but a triple salt is produced

produced composed of magnesia and ammoniac. Potash and soda also decompose sulphit of ammoniac. According to Vauquelin, this sulphit consists of ammoniac 29·07, sulphureous acid 60·06, and water 10·87.

SULPHIT OF ALUMINE.—This salt may be prepared in the manner already described. It does not crystallize; it is ductile and soft. Heat separates its sulphureous acid without alteration. It is insoluble in water; but it becomes abundantly so by excess of acid. The mineral acids, earths, and alkalis, decompose it. It consists of alumine forty-four, sulphureous acid thirty-two, water twenty-four.

The sulphits of *glucine* and of *zircone* are not known.

OF NITRATS.

The generic characters of nitrats are, 1. A cool and pungent taste. 2. They furnish oxygen gas by heat, and leave an alkaline or earthy residuum. 3. They catch flame with many combustible bodies when their temperature is sufficiently raised. 4. They give out white vapours with concentrated sulphuric acid. They are as follow:

NITRAT OF BARYTES.—This salt is prepared by decomposing the sulphure of barytes with nitric acid, or by saturating that acid with neutral or artificial carbonat of barytes. It crystallizes in the octagonal shape, according to La Grange; Fourcroy says, in large hexagonal crystals; but d'Arcet says, small irregular ones; so that it is probable the form varies greatly, and indeed it is not obtained at all in the crystalline form, says Fourcroy, without considerable difficulty.

Exposed to the action of caloric in a retort, it is decomposed, and furnishes oxygen gas mixed with azotic gas. From this experiment Vauquelin obtained pure barytes. It requires ten or twelve parts of cold water to hold it in solution; warm water dissolves it much easier, so that the greater part crystallizes in cooling. Several acids decompose this salt: the sulphuric, oxalic, and tartareous, are of the number. Neither earths nor alkalis decompose it. It is decomposed, however, by a multitude of salts, as sulphats, carbonats, &c. This salt serves to shew the presence of the sulphuric acid: it may be made use of to separate this acid, which is sometimes found in nitric acid, and renders it improper for nice experiments. Vauquelin remarks, that the taste of this salt, like most of the combinations of barytes, is piquant and metallic. The decomposition by heat affords barytes in a purer state than by any of the ordinary processes. In this state it is of a greyish colour, and has a caustic taste, much stronger than that of lime. Its solution, exposed to the air, exhibits a pellicle like lime-water. It is rendered turbid by air expelled from the lungs, and forms a very copious precipitate with sulphuric acid.

NITRAT OF POTASH, or COMMON NITRE.—This salt is found native in a great variety of situations. In India and Spain it appears at certain seasons of the year on the surface of particular soils. It has been found on the inside of calcareous caverns in France and Germany; sometimes at the top of walls sheltered from the rain, in the vaults of cellars, under the arches of bridges, &c. then it is called saltpetre, or *nitre de houssage*, because it is collected with a broom.

To extract saltpetre from old plaster, or other earths which contain it, put the rubbish into a cask placed upon rafters; pour in water till the matter is covered about four inches. Let it soak for five or six hours, and then let it strain through holes made in the bottom of the cask into a spout, which lets it into a common repository sunk in the ground. When the saturation is complete, and the earthy parts settled, pour the clear liquid into a copper vessel for evaporation. When the vessel is in a state of ebullition, as the liquor evaporates there is a precipitation of calcareous earth, and then of muriat of soda. To know when the operation is far enough advanced, put a drop of the liquor upon cold iron; if it congeals into a white solid globule, stop the fire, and let the liquor stand four-and-twenty hours: then decant it, and let it crystallize. The mother-waters contain muriat of lime, of magnesia, and of soda, about one-sixth of its weight of salt petre, some nitrat of lime and of magnesia.

This nitrat of potash is very impure; and there are several processes in different refineries for purifying it. Dissolve the whole of this rough saltpetre in warm water; put in eighteen or twenty parts of potash to one hundred, in order to decompose the nitrat of lime; then coagulate, boil, and scum: this is called saltpetre of the second boiling. Dissolve this in 0·8 of its weight of water; make it throw up a few bubbles, then skim it, and let it crystallize: this time all the marine salt is held in solution by the mother-water, and the saltpetre is pure: this is called saltpetre or nitre of the third boiling. The second process differs from the first only in there being added to the rough saltpetre just water enough to dissolve the nitrat of potash warm. The third process is founded upon the principle, that marine salt and the deliquescent salts are more soluble in the cold way than nitrat of potash.

Chemists and apothecaries purify nitre of the third boiling by new solutions and crystallizations, by which means they are certain of having very pure nitrat of potash, uncontaminated by any foreign matter, especially the muriats with bases of soda, lime, and magnesia, which are scarcely ever taken away entirely in the manufactories.

Nitrat of potash is in taste cooling yet sharp; its crystals are commonly six-sided prisms, terminated by six irregular faces. It is decomposed by heat; the first portion which is disengaged is oxygen gas, afterwards it is mingled with azotic gas. The attraction of the potash for the nitrous acid prevents the nitric acid from being completely decomposed at the beginning of the operation; and hence the reason why pure, or almost pure, oxygen gas passes over. By stopping the decomposition of the nitrat of potash at the moment the azotic gas begins to appear, the salt in this state is termed *nitrit of potash*: the residuum makes a brisk effervescence with nitric acid, and throws up reddish vapours, which proves that the nitric acid has changed its state.

If nitrat of potash be put into a crucible, and exposed to the action of the fire, it is quickly melted, and its fusion is of the igneous kind; for it may be kept fluid for a considerable time, and even made red-hot, without assuming the pulverulent form: when suffered to cool, after being melted, it fixes in an opaque mass, called *crystal mineral*, or *sal prunella*, which is as heavy, as fusible, and as soluble in water, as the nitrat of potash itself. The crystal mineral of the shops differs from pure melted nitre, for it contains a small quantity of sulphat of potash, produced by the combustion of the sulphur, which, according to the Paris Pharmacopeia, is in the proportion of a drachm in the pound.

Very pure nitrat of potash is not altered by exposure to the air; sometimes it loses its transparency. It decomposes, by the help of heat, with several combustible bodies, as sulphur, charcoal, metals, &c. Let three parts of nitrat of potash and one of sulphur be heated in a retort; as soon as the mixture begins to be red-hot, a very strong flame is produced; a quantity of gass is disengaged, containing a small quantity of nitrous gas and azotic gas; the residue is sulphat of potash. Sulphur has, therefore, at a high temperature, more affinity or attraction for the oxygen than the azot has. If equal parts of sulphur and nitre be used, instead of having sulphuric acid, as when sulphuric acid is prepared for the arts, sulphat of potash only is obtained, formed by the combination of that acid with potash, the base of nitre. The salt obtained in this way is called *sal polychrest of Glaser*, from him who first made it known. It is on account of the action of nitrat of potash upon sulphur, that it is used in making sulphuric acid in the large way.

Charcoal decomposes nitrat of potash with considerable rapidity,

rapidity, if their temperature be raised: the decomposition takes place with so much velocity as to occasion a considerable and almost instantaneous decrepitation or detonation. The operation in open vessels is as follows: Put a certain quantity of nitre into a crucible, which place in a furnace among burning coals; when the nitre is melted, and the vessel begins to be red, put in a spoonful of charcoal in powder, which will be followed by a loud detonation; then put in another spoonful, and so proceed till the charcoal produces no detonation. A saline matter remains in the crucible; this is to be calcined, and afterwards dissolve the salt in the water; strain, and evaporate to dryness: this was formerly called *nitre fixed by charcoal:* if the liquor, somewhat concentrated, was preserved, it was then called *fixed liquor of nitre*, and *alkaest of Van Helmont*. Modern chemists discern in this operation, only a little potash, more carbonic acid formed by the decomposition of the nitric acid, whose oxygen is driven upon the charcoal.

The following is the mode of decomposing nitrat of potash with charcoal, in close vessels: Two or three large receivers, adapted together, are applied to a retort of earth or iron, in the upper part of which last is an aperture, which may be closed with a cover or stopper. The vessel is heated, and, when its bottom is red, the equal mixture of nitrat of potash and charcoal is thrown in by small quantities at a time, through the aperture, which is immediately closed. During the detonation, the receivers are filled with vapours, part of which condenses into an insipid liquor, not at all acid, but frequently alkaline; the residue consist of potash charged with carbonic acid, and is called *clyssus of nitre*. If a mixture of nitre and lighted charcoal be put in a tube, and plunged into water, the combustion continues; and thus the gases resulting from this combustion may be gathered with the pneumatic apparatus.

To make what is called fulminating powder, put into a marble mortar, which has been heated with boiling water, and well dried, three parts of very dry nitrat of potash, two parts of very dry potash, and one of sulphur, in fine powder: mix these materials well together by pounding with a glass pestle heated and dried in the same manner: put this mixture in a bottle very close stopped. The property of this powder is to produce, on being exposed to the fire, a very strong and loud explosion. Put a little of the powder in an iron-ladle over a very gentle fire; the powder melts; when it has attained a certain degree of heat, it flies off in vapours suddenly, and an explosion is produced as loud as the report of a cannon. This seems to act by double affinity. This phenomenon, which is so much the more astonishing, because its effect is produced without enclosing the powder in any instrument, as is done with gun-powder, may be explained, by observing, 1. That it does not succeed but by gradually heating the mixture, so as to melt it. 2. That, if fulminating powder be thrown on ignited charcoal, it only fuses, like nitre, but with very little noise. 3. That a mixture of sulphure of potash with nitre, in the proportion of one part of the former and two of the latter, fulminates with more rapidity, and produces as loud a report as the composition of sulphur, nitre, and alkali: hence it appears, that, when fulminating powder is heated, sulphure of potash is formed before the detonation takes place; and this fact is sufficient to explain the whole appearance. When crystallized nitre, and sulphure of potash are exposed to the action of heat, sulphurated hydrogen gas is disengaged from the latter, while the salt gives out vital air. Now these two, which together are capable of producing a strong detonation, as we have observed in speaking of hydrogen gas, are set on fire by a portion of the sulphur. But as the thick fluid they are obliged to pass through presents a considerable obstacle, and as the whole takes fire at the same instant, they strike the air with such rapidity that it resists in the same manner as the chamber of a musket resists the expansion of gun-powder. A proof of this is observable in the effect the fulminating powder has on the ladle in which it explodes. The bottom of this vessel is bulged outwards, and the sides bent inwards, in the same manner as if it had been acted on by a force directed perpendicularly downwards, and laterally inwards, though it may be easily conceived that the effect of the explosion should be directed equally on all sides, or circularly.

If iron, copper, or zink, be heated with nitrat of potash, these metals are oxyded, and the potash remains pure. This salt is very soluble, three or four parts of cold water dissolving one part of nitre, and boiling water dissolving twice its weight. It therefore crystallizes by cooling; and on this property is founded the art of extracting nitrat of potash from old plaster or rubbish. In passing from the solid to the liquid state it lowers the thermometer.

A mixture of nitrat of potash with 0·15 of charcoal and 0·10 of sulphur, composes gun-powder, whose terrible effects arise from its great combustibility. This mixture is triturated for ten or twelve hours, in wooden mortars, with pestles of the same substance, a very small quantity of water being added from time to time. When almost the whole of the fluid is evaporated, so that the powder will not soil an earthen plate, it is carried to be granulated. This is effected, by causing it to pass through a number of sieves of skin, which are moved backwards and forwards in a right line. The holes in these sieves are of various sizes, down to that of cannon powder. The dust, or meal powder, is separated from the grains by sifting. The grains are then carried to the drying-house, which is a shed exposed to the south, with glass windows, so as to receive the rays of the sun. Cannon powder receives no other preparation than we have here mentioned. Musket powder is glazed, that it may not soil the hands. To perform this operation, a cask, mounted on an axis, and turned by a water wheel, is half filled with powder. The motion of the cask excites continual friction, by which the grains of the powder are worn smooth.

Baumé has made a very numerous set of experiments on the method of preparing gun-powder, on the respective forces of this compound made with different proportions of the ingredients, and on the analysis of this substance. Out of the many valuable circumstances of information derived from these experiments, we shall only select such as have an immediate reference to chemical theory. 1. Good powder cannot be made without sulphur, as has been proposed by several persons; this substance being found greatly to increase its force. 2. Every kind of charcoal, whether light or heavy, except animal coal, is equally fit for making gun-powder. 3. Charcoal is one of the most useful ingredients, a mixture of sulphur and nitre not producing an effect to be compared with that of gun-powder. 4. The goodness of gun-powder depends entirely on the accurate mixture and trituration, continued till the powder rises in the form of dust about the mortar. 5. Powder has a much greater effect when simply dried, than when grained. The moisture necessary to grain the powder, causes the nitre to separate, by crystallization from the other substances; so that it may be observed, by a magnifier, in the internal part of grains of powder, cut in two. 6. Glazed, or musket powder, is less strong than unglazed powder, because the particles of the former are closer together, and consequently less inflammable. As to the analysis of gun-powder, Baumé performs it in a very simple manner: his process consists in washing the gun-powder, well pulverized, with distilled water, and evaporating the water, which of course affords the nitre in crystals; the residue contains the sulphur and charcoal. Sublimation does not completely separate the former, because it appears to be partly more fixed by the charcoal. Baumé, to separate them, burned the sulphur by a heat not sufficient to burn the charcoal. The latter, however,

however, always retains a small quantity of sulphur, since, according to the observation of that chemist, it emits a sulphureous smell till it is entirely reduced to ashes. He estimates the sulphur, retained by the charcoal, at one twenty-fourth of its weight. Gun-powder may likewise be deprived of its sulphur, by exposing it entire, and without previous washing, to the action of a gentle heat, as Mr. Robins, in his Treatise on Gunnery, has well observed. The persons who steal game have been long in the habit of desulphurating gun-powder, by exposing it in a tin dish to the heat of a bed of ashes. They are persuaded, that the powder in this state, impels the shot to a much greater distance, and does not soil the piece so much.

Chemists and natural philosophers have maintained various opinions respecting the violent effects of gun-powder; some have attributed them to water, reduced into vapour, and others to the sudden dilatation of air. Baumé supposed them to arise from a nitrous sulphur, formed in the instant of combustion. Fourcroy thinks this phenomenon may be very readily explained, by the application of the modern improvements in chemistry. He observes, that all the phenomena, which attend the inflammation of gun-powder, depend entirely on its great combustibility. Sulphur and carbon, minutely divided, are bodies highly inflammable. The intimate mixture, which has so great an influence on the force of gun-powder, as Baumé's valuable experiments have shown, is the only cause of its effects. The nitre is equally dispersed among all the particles of very combustible matter: as its quantity is much the greatest, each particle of sulphur and charcoal is surrounded, and, as it were, covered with nitre. A much greater quantity of vital air, than is necessary for the complete combustion, will be produced; it being well ascertained, that nitre affords that fluid in great quantities, by the application of heat. The same thing happens in this combustion, as is observed, when a combustible body is plunged in a vessel filled with vital air; that is to say, it is burned with great vivacity, and in much less time than in the common atmospheric air. It follows, therefore, that the sulphur and the charcoal must be burned in an instant, because they are really plunged in an atmosphere of vital air. Hence, says Fourcroy, the rapid inflammation of powder, its taking place in close vessels, and the terrible force with which it explodes and drives every obstacle before it, may be easily conceived. But this explanation, as given by Fourcroy, of the explosive effects of gun-powder is rendered extremely doubtful by the late ingenious and difficult experiments which count Rumford has made upon this subject, of which a very minute account is to be found in the volume of the *Philosophical Transactions* for 1797. By contriving to fire gun-powder in an apparatus, in which the elastic fluid generated was made to act with a determined force against a weight capable of being increased or diminished at pleasure, the count was enabled to calculate the force which this fluid exerts with a very tolerable degree of accuracy. In some experiments this force amounted to no less than 412529 lbs. a force 55004 times greater than the mean pressure of the atmosphere. When the weight was increased so as to confine the elastic fluid for a few minutes after the inflammation of the powder, it was found to possess only a very small degree of expansive force; for, on raising the weight, the fluid rushed out with a noise hardly so loud or sharp as the common report of an air-gun. It became obvious from this and similar experiments, that the quantity and force of the permanently elastic fluid generated were by no means adequate to explain the phenomena. Count Rumford was therefore led to search for the cause of these phenomena in the temporary action of a fluid not permanently elastic; and this fluid he conceived to be water, which had been converted into vapour by the caloric evolved during the combustion of the inflammable materials of which gun-powder is composed. Two conditions only seemed to be required to render this supposition probable; 1st, The existence of a sufficient quantity of water in gun-powder; and, secondly, The evolution of a quantity of caloric not only sufficient to convert this water into steam, but also to raise its temperature in that state to a very considerable degree.

The first condition is found in the quantity of water actually contained in gunpowder, which from experiment appears to amount to fifteen grains of this fluid in every cubic inch of the powder. The second condition is to be sought for in the actual degree of heat, which is excited during the inflammation of gunpowder, and the effects which this degree is known to have of increasing the expansive force of aqueous vapour. With regard to the degree of heat, it may be remarked, that brass has been known to melt in the heat generated during the combustion of gunpowder, when this metal was previously reduced to very small particles, and mixed with it. Now, this metal, according to Wedgwood, melts only in a degree of heat equal to 3807. It is also a well known fact, that the elasticity of aqueous vapour is incomparably more increased by any given increase of temperature than that of any other species of elastic fluid. But as the elasticity or expansive force of this fluid at the temperature of 212°, is equal to the ordinary pressure of the atmosphere; and as this elasticity is doubled by every increase of temperature equal to 30° of Fahrenheit, it becomes easy to calculate what the prodigious force of this vapour must be when raised to the temperature of 3807°.

When gun-powder takes fire, azotic gas is disengaged, which expands astonishingly in recovering its liberty; and how far the dilatation may go, cannot be known, on account of the great heat which accompanies the combustion. There is also a decomposition of water, and hydrogen gas is disengaged with elasticity: by the decomposition of water we have carbonic acid gas and sulphurated hydrogen gas, which occasions the smell peculiar to burnt gun-powder.

We shall in this place mention that mixture of nitre and sulphur, which is called *powder of fusion*. It consists of three parts of nitre, one of sulphur, and one of saw-dust. A small quantity of this powder is put into a nut-shell, with a small piece of copper money rolled up; the piece is covered with the same powder, which being set on fire, burns rapidly, and melts the coin, without burning the shell, which is only blacked. It is necessary, however, to plunge the whole in water as soon as the powder has ceased to burn.

Nitrat of potash is decomposed by sulphuric acid; the best method of procuring nitric acid, is as follows: Put into a glass tubulated retort, 100 parts of very pure nitrat of potash, and seventy-five parts of concentrated sulphuric acid; place the retort on a sand-bath, as shewn in the Chemistry Plate V. at A, fig. 2. and fix thereto a balloon, or receiver, with two necks, B; fix to the lower extremity of this balloon a tube, one end of which, forming a right angle with the other, is to be plunged into the centre of a bottle with three necks, C; each of the side openings of this bottle receives a syphon, which goes into another bottle, placed on each side of the first, as at D D; these two collateral bottles are joined by syphons to two similar ones, EE, whose lateral apertures, *a a*, are left unstopped. The first bottle is commonly left empty; the collateral bottles contain a certain quantity of water, in which is plunged the lowermost and longest extremity of the tube, which goes from the one to the other; the upper part of the bottles is left empty, and, when the acid vapour passes above the water of the first bottles, it is carried by the tubes into the succeeding ones. The apparatus must be well luted: the retort is to be heated by degrees; and, at the end of the operation, let the heat be very strong, to prevent absorption.

There is a principal advantage derived from this ingenious

genious contrivance, which must not be passed over in silence. At the end of the operation, when the vessels are suffered to cool, a vacuum is formed within; and the external air, pressing on the surface of the water in the last open bottles, forces it to return by the tubes into the first collateral bottles, and from them into the bottle nearest the receiver. If the first bottle were not empty, and of a sufficient magnitude to contain all the water of the following bottles, the acid liquors would pass into the receiver; and, as the strongest nitrous acid is contained in that vessel, it would be diluted by the addition of the fluid contained in all the bottles. This inconvenience would be still more prejudicial in other distillations we shall have occasion to speak of, where it would not only diminish the force, but likewise alter the purity of the product. During the operation, the heat must be gradually raised till nothing more comes over. The disengagement, and passage of gas through the water in the bottles serve to direct the operator in managing the process. If it be too rapid, the heat must be diminished, lest the whole mass in the retort should swell up and pass into the receiver. If, on the contrary, it be too slow, the fire must be raised, to prevent absorption. This valuable apparatus has therefore the additional advantage of directing the operator to conduct his process to the best advantage.

Nitrat of potash distilled with sulphuric acid, furnishes about 0·43 of its own weight of nitric acid, of a faint orange-colour. It will easily be accounted for why the nitrat of potash should give an orange-coloured acid, although completely saturated with oxygen, if it be considered, that the oxygen is easily separated from the nitric acid by the contact of light, or of a moderate heat; and, by recollecting also, that nitric acid has a strong affinity for nitrous gas. It is, in fact, by the influence of a double affinity, that a portion of the nitric acid is decomposed: the one, between the caloric, the light, and the oxygen; the other, between the nitric acid and the nitrous oxyd. This theory is confirmed by the oxygen gas which is disengaged towards the end of the distillation of nitric acid, and which may be collected with the pneumatic apparatus; and by the nitrous gas, which is separated from the coloured acid when mixed with water. The residue from this decomposition is very acid sulphat of potash; it is commonly in a white mass, opaque, and semi-vitreous.

The acid obtained by this process, never possesses that degree of purity necessary for nice experiments. It is proper, therefore, to rectify it by a fresh distillation with nitre, or nitrat of silver, or nitrat of barytes, or even the semi-vitreous oxyd of lead: if the latter be used, care must be taken to separate the first product. A very pure acid may be obtained in either of these ways.

Another process is used in the arts, for extracting the nitric acid from saltpetre: With two parts of nitre mix six parts of clay, which has been previously calcined to deprive it of the greatest part of its moisture, and to convert the martial pyrites, from which it is scarcely ever free, into sulphuric acid, which remains interposed between the parts of the earth. This mixture is introduced into earthen retorts of a peculiar form, termed *cuines*, which are placed in a row, on long furnaces, called galleries; their necks are inserted in bottles of the same form, and material, which serve as receivers, and which are to be luted with clay. When the retorts are covered, and the receivers properly adjusted, light the fire; increase the heat by degrees; as soon as red vapours begin to appear, unlute the receivers, and take out the liquor they contain, which the workmen call *phlegm*: refix the receivers, and continue the distillation till no more vapours come over.

The decomposition of nitrat of potash does not take place here, as with sulphuric acid, on account of the greater affinity of the clay for the potash, but by a double attraction: one between nitric acid and caloric; the other between the alumine and the potash, with which it forms a kind of semi-vitreous frit. Yet there is a considerable decomposition of nitric acid in this operation, as is proved by the red vapours which get through the lutings. It has been observed, that the presence of pyrites favours greatly the decomposition of nitrat of potash; for, the more of it is contained in the clay, the more acid is obtained from them, and at a much lower degree of heat. The residue from this operation is called *cement* by the distillers of aqua-fortis, and is useful in masonry.

Muriatic acid also decomposes nitrat of potash, but by a different operation from that with sulphuric acid: it is not by separating immediately the potash that this decomposition is effected; it is, on the contrary, by attacking the nitric acid, which it seizes upon, and part of the oxygen, whence arises oxygenated muriatic acid, and nitrous acid in vapours: thus, as the muriatic acid takes up part of the oxygen of the nitric acid, it passes into the state of nitrous acid; and, as this has less affinity with the potash than the muriatic acid, it is driven away, and muriat of potash is formed. It must be observed, that these effects take place only by the aid of heat; and that a good deal of muriatic acid must be used, because one part of it unites with the oxygen, while another part unites with the potash: so that here we observe a double affinity.

Nitrat of potash is of great use in the arts. Burned with different proportions of tartar, it forms the substances called *fluxes*, which are employed in the art of assaying, to fuse and reduce metallic substances. It is frequently used in medicine as a febrifuge diuretic antiseptic salt; it is administered in any convenient liquid, from ten or twelve grains, to the quantity of half a drachm or more; and it daily produces the most happy effects.

Of the CONSTRUCTION of NITRE BEDS.

Of late years, nitre has occupied much of the attention of the French chemists. Considerable light has been thrown on the theory of its formation, and several improvements suggested in the various processes of its manufacture. The result of their inquiries and labours on this interesting subject, are worthy of our utmost regard. A hundred parts in weight of nitrat of potash, consist, according to Mr. Kirwan, of 41·2 of nitric acid, 46·15 of potash, and 12·83 of the water of composition. The acid, as has been fully proved, results from the combination of seven parts of oxygen, with three of azot. The alkali is supposed to be derived immediately and entirely from the vegetable matter employed in the process of nitrification; though there is some reason to suspect, it may in part be formed by the developement and subsequent union of its elementary principles. We can be at no loss to account for the origin of the water.

The principal circumstances to which it is necessary to attend in the construction of artificial nitre beds, are, first, the choice of materials. These, as Fourcroy remarks, are such vegetable and animal bodies as are most susceptible of decomposition, with a proper admixture of calcareous earth. Though, in the vegetable kingdom, there be a considerable latitude of choice, yet experience has shown, that all vegetables are not equally suited for the production of nitre. In general, those vegetables are to be preferred which are most easily decomposed, and which seem to contain most of the elementary principles of that substance. Of this kind are some of the poisonous plants, and plants of a strong and fœtid odour, such as hemlock, tobacco, lungwort, henbane, cabbage, hoarhound, nettles, &c. The extract of these plants is found, by keeping, to be covered with crystals of nitre. The cruciform and leguminous plants answer extremely well for the production of nitre. The dry and fibrous parts are of least use. Among animal substances, the soft are to be preferred to the hard, because they are more readily decomposed.

decomposed. Herbiverous are in general preferred to carnivorous animals. Worms, insects, and reptiles, are said to be capable of being resolved almost entirely into nitre. Blood seems to be the animal fluid which affords the greatest quantity of this substance. The dung of hens and pigeons has always been considered as extremely productive. That of oxen is said to yield less than that of sheep. Urine ought to be employed only towards the latter stage of the process of nitrification, as it favours the production of muriat of soda. The purpose which these animal and vegetable substances serve in nitrification is now known. They all give out, during their decomposition, a greater or less quantity of azot, which, uniting with the oxygen of the atmosphere, forms the nitric acid. But the presence of lime, or of some alkaline basis, is necessary to fix this acid. When vegetable or animal bodies are mixed with siliceous or aluminous earths, little or no nitric is produced; the acid which is said to be formed being either exhaled into the air, or carried off by the water. The addition of an alkaline substance is proper only towards the end of the process; if added sooner, it retards the decomposition of the organic substance.

The lightest and most porous calcareous substances are found to answer best. Their property of affording nitre is increased by their containing a quantity of iron: it is increased also by dividing them minutely, so as to increase as much as possible the extent of their surface. It seems to be for the same reason that calcareous substances which contain an admixture of siliceous or aluminous earth, or even of chaff, are more productive than the calcareous earths which are pure. It is not easy to determine nor to preserve the just proportion between the earthy base and the putrifying principles; it must be such, however, that all the acid formed may be readily combined. Too great a proportion of earth is hurtful, not only by its occupying an useless space, but also by retarding putrefaction. In general (Chaptal says), the proportion of calcareous earth may vary from one-fifth to one-tenth of the volume of the vegetables employed. Besides serving as a base to fix the acid, do not calcareous substances dispose the oxygen and the azot to unite, in consequence of the *affinité dispose?*

The oxygen gas combines with azot only in the moment of its disengagement from animal or vegetable matters, and before it has assumed the gaseous form. In this state it has been not unaptly termed *Nascent* azotic gas. A high degree of temperature becomes, therefore, improper, because it would cause the azot to assume the gaseous form, and would consequently prevent the formation of the acid. A very low temperature is equally injurious, because, by retarding or putting an entire stop to the decomposition, it prevents the disengagement of azotic gas. Experience has shewn, that the temperature fittest for the production of nitre lies between 75° and 90° of Fahrenheit. This temperature must result from the decomposition of the animal and vegetable substances, and not be merely the effect of art. It is to be preserved by excluding carefully currents of cold air, which would tend to carry off the heat.

An intense or strong light seems to be very injurious to the production of nitre. Besides the effect which it will undoubtedly have of volatilizing the azot, it may fairly be questioned, whether it will not also decompose the nitric acid. Saltpetre-makers, aware of the pernicious tendency of too strong light, have generally chosen a northern exposure for their nitre beds. This exposure has the additional advantage of preserving a more equal temperature. Towards the latter stage of the decomposition, it has been found useful to expose the putrifying matters to the light. At this period it seems to give new energy to the process, and to promote greatly the production of nitre.

In order to produce the combination of the oxygen gas with the azot, it is necessary that these two substances should remain for some time in contact with each other. All currents of air must, therefore, be unfavourable to the production of nitre; and hence it is that we find saltpetre-makers recommend, that the air should be in a state of absolute rest or stagnation. In order to increase the surface exposed to the air, it is a common practice with some saltpetre-makers to fix stakes of wood in various directions in the nitre beds. After the mass has become dry and a little firm, these stakes are withdrawn, that the air may penetrate every part of the mass, and come into contact with as large a surface as possible. The propriety of occasionally renewing this air must be obvious to every one who reflects, that this is the source from which the oxygenous part of the nitre is derived. It becomes necessary also, particularly in the latter periods of the process, to stir the mass, and expose every part of it to the action of the air. Great caution is required not to do this either too early or too often, as it is apt to retard putrefaction.

Either too great or too small a degree of moisture is equally unfavourable to the formation of nitre. In a hot and dry atmosphere, the parts of vegetables and animals would be dissipated without undergoing the process of putrefaction. Too much moisture, on the contrary, might not only retard the putrefaction, but might also carry off the acid after it had been formed. Great caution, therefore, is necessary in watering the nitre beds. The liquids most proper for this purpose are, the blood of animals, either by itself, or diluted in water, the water from dunghills, sewers, &c. These, besides affording the necessary degree of moisture, contain much vegetable and animal matter, in a state highly favourable to the production of nitre.

Such are the general principles on which nitre beds are constructed; but the particular steps of the process vary in different countries. These will be best understood by examples.

In Prussia, five measures of black vegetable earth, or the earth of subterranean caverns, are mixed with one measure of unlixiviated ashes and some straw. These substances beat up with the water of dunghills or sewers, are formed into walls or beds of twenty feet long, six or seven feet high, and three feet broad at the base, declining to two at the top. These beds are contained in shallow wooden cases or moulds, and are covered with a thatch of straw to protect them from the rain. They are moistened from time to time, and are fit for being lixiviated at the end of a year.

In Malta, they employ the most porous calcareous earth mixed with straw, which has been lixiviated. Oblong triangular piles are formed of alternated layers, each half a foot in thickness, of this earth and dung. These layers are terminated by a very thin layer of dung, applied loosely with the hand. The bed is occasionally sprinkled with mother water of saltpetre, urine, and water from dunghills. As soon as the surface becomes dry, it is turned down, and the bed moistened. This becomes fit for lixiviation at the end of three years. During the first year, the beds are every month sprinkled over with the powder of slacked lime.

In Sweden, their beds are raised on bricks laid on the earth. On this basis is placed a layer of mortar, composed of meadow turf, ashes, lime, and the necessary quantity of mother water, or of urine. Over this is placed a layer of straw; and these layers of straw and mortar are continued alternately to the summit. The beds are defended from the rain, and moistened occasionally with urine, stagnant water, &c. These beds yield nitre at the end of a year, and last for ten years. The saltpetre is swept off every eight days; and, after each sweeping, the beds are moistened with weak mother water. The matter remaining at the end of ten years forms an excellent manure in the culture of hemp and flax.

In the canton of Apenzel, in Swisserland, they take advantage of the situation of their stables, on the rapid declivities

declivities of their mountains, to form very productive nitre beds. The upper side of these square stables rests on the mountain, while the lower is supported by stones or pillars of wood, raised two or three feet above the earth, according to the greater or less declivity. This leaves an interval open to the air between the floor of the stable and the mountain. In this place a ditch is dug of about three feet in depth. This ditch is filled with very porous earth, which imbibes the urine of the cattle. It is lixiviated every two or three years. The earthy residue is dried in the open air, and returned back into the ditch. In this manner they obtain about a thousand pounds of saltpetre from an ordinary stable at each lixiviation.

The earthy part of nitre beds requires to be renewed more or less frequently according to the quantity of calcareous earth which it contains. No particular time can be specified for the term of putrefaction, the periods of moistening the beds, or the time proper for turning them. The appearance of the beds, and the general principles already laid down, can only direct these particular steps, which must vary extremely according to circumstances. The general marks by which a bed may be known to contain so much nitre as to make it worth working, are the efflorescence and cracks on the surface in which no plants grow. If some of the particles of the bed be tasted, they will give a salt taste, which will vary, however, according to the earthy or alkaline basis, and may therefore be mild, acrid, or bitter. The bed must be afterwards examined to the depth of several inches, and in different places, in order to ascertain whether the whole be nitrified. Another, but more troublesome method, is, to lixiviate a small quantity of the bed, a cubic foot, or yard, for instance, and from its produce to calculate the value of the whole.

The following is the process now generally followed in the great manufactories in France, for the purification of nitre. The nitre is first pounded, and put into tubs in quantities of 500 or 600 pounds, Twenty per cent. of water is poured into each tub. The mixture is well stirred, and left to digest for six or seven hours, during which time the water acquires the density of between twenty-five and thirty-five degrees. This water is now poured off, and ten per cent. of fresh water added, which is suffered to remain only for one hour. Five per cent. of water is now to be poured on, and immediately drawn off as soon as it has been stirred. The nitre, when properly drained, is thrown into a boiler, containing fifty per cent. of boiling water. The solution will mark between sixty-six and sixty-eight degrees of the hydrometer. The solution is next poured into a vessel to crystallize, where, in the course of from four to six hours it deposits about two-thirds of the original quantity of nitre. As it is of consequence in the subsequent drying that the crystals should be in small needles, it becomes necessary to stir the solution during the whole time of the deposition. The crystals formed are removed with a skimmer, and thrown into baskets to drain, and the water which passes through is carefully collected. The saltpetre is afterwards put into wooden vessels with double bottoms, formed in the shape of mill-hoppers. The upper bottom, which is raised about two inches above the other, is perforated with a number of small holes, through which the water passes to the lower bottom, from which it is discharged by a single opening. The saltpetre is washed in these vessels with five per cent. of water; and this water is afterwards employed in the solution of the salt. This saltpetre, well drained and exposed for some hours to the air upon drying tables, is fit to be used for the manufacture of gun-powder. This salt may be dried more quickly by a stove, or by putting it in a flat metallic vessel. For this purpose, it may be put into the vessel to the depth of five or six inches, and heated to about 135° of Fahrenheit. By stirring it in this situation for two or three hours, it loses its regular form, and puts on the appearance of a fine dry sand. This degree of dryness, however, is not necessary when the gun-powder is made by pounding. These discoveries, which resulted from the necessities the French were lately under, of supplying their powder-mills with salt-petre of their own making, cannot fail to prove of great value to this country, when ever it might happen to be cut off, as they were, from foreign supplies of nitre.

Nitrat of Soda.—This salt is seldom found pure in nature; it is therefore produced by art. Bowles asserts that he found it in Spain. It is called cubic, quadrangular, or rhomboidal, nitre: Fourcroy says, that *rhomboidal* is the properest name, because that is generally the shape of the crystals.

This nitrat is prepared with carbonat of soda: it is to be saturated with nitric acid; strain the liquor, then evaporate with a gentle heat, till pellicles are formed on the surface: when left to settle and cool, rhomboidal crystals or prisms are formed. Its taste is cooling, and rather more bitter than that of nitrat of potash. Fire decomposes it; but it decrepitates, and does not melt so easily as the nitrat of potash; but, like that salt, it gives out vital air, mixed with azotic gas, at the same time that it becomes alkalized. It is slightly deliquescent when exposed to the air. Nitrat of soda detonates on coals, and causes the complete combustion of inflammable bodies; if it is heated, the detonation is somewhat less rapid than that of nitrat of potash, and the colour of the flame is a deep yellow; that of nitrat of potash is a very bright vivid red; and this may serve to shew whether there be nitrat of soda in saltpetre or not. Gunpowder made with nitrat of soda will not have the same strength, nor give such a loud report, as that made with nitrat of potash. After combustion, there remains potash or soda combined with carbonic acid, which proves that all the carbonic acid which is formed does not exhale. This salt is easily soluble in water; it requires about three parts of water of the mean temperature of the atmosphere to dissolve it: boiling water dissolves more than its weight.

The sulphuric acid decomposes nitrat of soda; white vapours are thrown off, and sulphat of soda is formed. Muriatic acid decomposes nitrat of soda, but not by seizing on the soda: it attacks the nitric acid, makes nitrous acid, and a muriat of soda is formed. Much of the muriatic acid is required; for, while one part of it decomposes the nitric acid, the rest combines with the soda. With nitrat of soda and muriatic acid, a kind of nitro-muriatic acid is formed.

A very good glass is made with nitrat of soda and fine sand. The soda unites with the silex, the nitric acid is decomposed by the caloric, and in the crucible remains a very beautiful and pure glass, finer than can be made with nitrat of potash. Nitrat of soda is decomposed by barytes and potash, forming nitrat of barytes or nitrat of potash, as the case may be.

Nitrat of soda may be applied to the same uses as nitrat of potash; but as it does not produce all the effects of this last salt (doubtless on account of its greater affinity with water), and likewise because it is merely a product of art, little use has yet been made of it, neither have all the experiments been made, which are necessary to afford a complete knowledge of its properties.

Nitrat of Strontian.—This is obtained by decomposing sulphure of strontian with nitric acid. It crystallizes in octahedrals. Subjected to heat in a crucible, it is entirely decomposed, and the earth remains pure at the bottom of the vessel. By putting a little nitrat of strontian in the wick of a taper, it gives a purplish cast to the flame. By burning alcohol, which will hold this nitrat in solution, the same kind of flame is produced; which particularly distinguishes this earth from barytes.

A mixture of nitrat of strontian, of sulphur, and of charcoal, in the same proportion as these latter substances are used for making gunpowder, though very dry, burns slowly,

flowly, giving out purplish sparks, and a beautiful green flame. It is soluble in one part and a half of water. Of earths, barytes, potash, and soda, decompose it. This salt has a strong pungent taste. In a dry air, it loses its water of crystallization; in a moist, it attracts humidity. Like all other nitrats, it deflagrates on hot coals. When the heat rises to redness, it begins to boil, and the acid is dissipated.

Nitrat of Lime.—This is plentifully found in ancient buildings, which have been long inhabited by men or animals. It is prepared by saturating nitric acid with lime. Strain, and evaporate the liquor till it has nearly the consistence of a syrup. Then leave it in a cool place; and it settles in very long prismatic crystals, or rather in bundles of needles diverging from a common centre. In taste it is acrid and bitter.

Nitrat of lime, dried, melts over coals; in a state of perfect dryness, it is very proper for drying gases. It easily melts by heat, merely with the aid of its own water of crystallization; but the effect is hardly sensible: it is decomposed almost immediately, and nitric acid is disengaged. If carried into the dark after having been thus liquefied by heat, it becomes luminous, and in this state constitutes the *phosphorus of Baldwin*.

Nitrat of lime, otherwise called calcareous nitrat, quickly attracts the moisture of the air, and for that reason it is necessary to keep the crystals of this salt in well-closed vessels, which must not be opened too frequently. It is very soluble in water, two parts of cold, or less than one part of boiling water, being sufficient to hold it in solution. It is more easily decomposed by charcoal than the nitric acid is; for heat disengages the nitric acid from the nitrat of lime in the form of an acid, whereas in other experiments, it is decomposed into its elements.

Sulphuric acid decomposes nitrat of lime, the nitric acid passing off in white vapours: a solid mass remains, and much caloric is disengaged. Sulphuric acid poured on a solution of calcareous nitrat, immediately produces a precipitate of sulphat of lime, and the nitric acid remains disengaged in the liquid. The action of other acids on this salt is not known. Argil, barytes, potash, soda, and strontian, decompose it. The calcareous nitrat decomposes the neutral sulphuric alkaline salts.

This salt might be employed in medicine as a very active solvent, and some chemical physicians affirm, that its application has been attended with success. As the oxalic acid takes the lime from every other acid, and forms with it an insoluble compound, it is used as a test of the presence of lime, either free or in the state of combination.

Nitrat of Ammoniac.—This is found sometimes in the mother-waters of nitre; but in general it is the production of art. It is prepared by the direct combination of nitric acid with ammoniac. To avoid waste, it is better to use the carbonat than the pure ammoniac, because there is an effervescence and a strong heat, which the carbonat tempers. Its crystals are prisms of six sides, terminated with hexangular pyramids. Its taste is bitter, penetrating, and urinous: it is very flexible under the pestle like all the ammoniacal salts. When exposed to the action of fire, it loses its water of crystallization, and gives out aqueous vapours. Thrown on a red-hot iron, it catches flame, which is not the case with the other nitrats; it makes a considerable hissing, and the flame is yellow and very vivid. Making the experiment with a pneumatic apparatus, there first passes over a little water; then some oxygen gas is produced; and, lastly, there is a pretty loud detonation. It will not be prudent to try the experiment with any large quantity of matter.

This salt is deliquescent, or liable to melt of itself, especially in winter. It is very soluble in water; unites with, and melts ice, producing a considerable degree of cold. Half its weight of hot water is required to dissolve it, and twice its weight of cold; it crystallizes irregularly by cooling, but the most perfect crystals are obtained by spontaneous evaporation. If this salt be mixed with sulphur or charcoal, and heated in an apparatus proper for obtaining gases, the oxygen acts on these substances in such a manner that the nitrat of ammoniac is not decomposed: carbonic acid and ammoniac are obtained; azot is disengaged.

Sulphuric acid decomposes nitrat of ammoniac; sulphat of ammoniac is obtained, and nitric acid is set free. Muriatic acid makes it undergo a change, but with different results: the muriatic acid acts first on the nitric acid, from which it takes a part of its oxygen, and converts it into nitrous acid; oxygenated muriatic acid is therefore formed, which volatilises by the help of the caloric, and the muriat of ammoniac which is in solution in the water.

With two parts of nitrat of ammoniac, and one of muriatic acid, a liquor is made which will dissolve gold. In this case, the decomposition of the nitrat of ammoniac takes place in a different manner: the oxygen of the nitric acid immediately attacks the gold; the oxyd of gold thereby formed dissolves by degrees in a portion of the muriatic acid. By precipitating this solution of gold with a fixed alkali, *aurum fulminans*, or orat of ammoniac, is produced; for the alkali not only decomposes the muriat of gold, but also the muriat of ammoniac; so that, as the oxyd of gold is separated, it unites with the ammoniac, and forms that peculiar combination of which we have just spoken.

Barytes, lime, magnesia, soda, and strontian, decompose nitrat of ammoniac by uniting with its acid; hence result different nitrats and pure ammoniac, as appears by its lively and pungent smell. This decomposition is made in the cold, and is effected by triturating that salt with those substances dry, as lime, potash, &c. With magnesia, a triple salt is produced, ammoniaco-magnesian nitrat. This salt must not be prepared in vessels of metal, especially of iron and copper, as it easily dissolves them. The nitrat of ammoniac has not hitherto been applied to any use.

Nitrat of Magnesia.—This is sometimes found native, but always in small quantities. It is formed by carbonat of magnesia made caustic by an alkali, and then mixed to saturation with nitric acid. It has a bitter taste, somewhat like nitrat of lime. It is very soluble in water, requiring but one half of its weight at most to dissolve it: it crystallizes in cooling, or by evaporating the acid with the heat of the sun; its crystals are quadrangular oblique prisms without pyramids; but most commonly they are in needles, yet so connected together as to present no determinate form. Exposed to heat in closed vessels, it produces at first some bubbles of oxygen gas and nitrous-acid vapours; but the nitric acid soon passes over without decomposition, and the magnesia remains disengaged in the retort. A small heat is sufficient for the decomposition of nitrat of magnesia, which shews that its elements have no great affinity for each other; it shews also that magnesia has not a tendency to unite with the nitrous acid, like lime, barytes, &c. This salt is deliquescent in the air.

Sulphuric acid decomposes nitrat of magnesia, by taking away its base. Muriatic acid decomposes it also, but not by taking away the base: it attacks the nitric acid, and forms oxygenated muriatic acid: the nitric acid is disengaged in white vapours. The muriatic acid seizes upon the magnesia as fast as it is disengaged from its acid, and forms with it a muriat of magnesia. It is also decomposed by barytes, potash, soda, lime, and strontian; ammoniac does not precipitate it completely; for, as soon as there is enough of the ammoniac to form a triple salt with the nitrat of magnesia, the precipitation ceases, because the ammoniac cannot entirely decompose the nitrat of magnesia; and, by adding more ammoniac, it would produce no effect. What farther proves that the ammoniac cannot decompose all the nitrat of magnesia, is that, after the precipitation has ceased with the action of ammoniac, more magnesia may be precipitated by another alkali. The other alkalis precipitate magnesia in very light

light flaky bladders: this is pure magnesia, free from all acid; but care must be taken that it does not attract carbonic acid in the drying; it must be dried in balneum mariæ, in a close vessel. The alkaline sulphits also decompose nitrat of magnesia: alkaline nitrats and sulphit of magnesia are the product, which are precipitated in the form of small insoluble crystals. This salt consists, according to Bergman, of twenty-seven magnesia, forty-three nitric, and thirty water; but this is not to be depended on; for it is impossible to separate the water of crystallization, without dissipating a portion of the nitric acid. Magnesian nitrat is not used in the arts, nor in medicine. Its strong taste, its deliquescence, and all its other properties, show, that it would act strongly on the animal œconomy; yet it deserves to be tried as a solvent and aperient medicine.

Nitrat of Alumine.—This salt has not yet been found in nature, but is always produced by art. Its properties are very little known, farther than the nitric acid dissolves the earth of alum: very pure and moist alumine must be employed, or the combination will be very difficult: it crystallizes in thin laminæ or leaves, very ductile and deliquescent. This salt is always slightly acid, whatever quantity or proportion of alumine be used. A slight heat decomposes it, separating the nitric acid without decomposition. It is not fusible over charcoal like the other nitrats: it puffs up like alum, but does not burn the coal, nor make it flame like nitrat of potash; it melts, boils up, loses its acid, and remains like calcined alum.

Nitrat of alumine is decomposed by sulphuric acid; it gives out white vapours. All the earthy and alkaline substances decompose it. The aluminous precipitate, obtained from nitrat of alumine by caustic potash, is re-dissolved in an excess of alkali, and points out a very good mode of separating alumine from magnesia; for magnesia is not always soluble in an excess of alkali. This earth may be precipitated afresh, by saturating the excess of alkali with an acid. Ammoniac has not this property. Lime re-dissolves the alumine like the caustic alkalis. If too much lime be put into nitrat of alumine, nitrat of lime is first produced; then follows a combined precipitation of lime and alumine. Nitrat of alumine precipitates all the solutions of the vegetable colours, as turnsol, syrup of violets, Brazil wood, &c. In this manner common alum acts also; by precipitating the colours upon the stuffs to be dyed.

Nitrat of Zircon.—The nitric acid combines with zircon, when it is in the humid state. It is impossible, however, to saturate the nitric acid with this earth, so as to destroy its acid properties, for the nitrat of zircon always changes the blue infusions of vegetables in the same manner with acids. The solution of nitrat of zircon, when evaporated by a gentle heat, affords a yellowish transparent, extremely tenaceous and viscous matter, which can be dried only with great difficulty. This salt has a styptic and astringent taste, and leaves a thick matter on the tongue, which is produced from a decomposition occasioned by the saliva. Nitrat of zircon dissolves only in a very small quantity in water. To obtain it in a state of crystallization, it is necessary to evaporate it in a very gentle heat, or by simple exposure to the air. Zirconia has the weakest affinity of all known earthy substances for acids.

The nitrat of zircon is decomposed by sulphuric acid, which forms with it a white precipitate, soluble in an excess of that acid; 2dly, By carbonat of ammoniac, which produces in it a deposit soluble in an excess of that salt; 3dly, By an infusion of galls in alcohol, a white precipitate is produced, soluble in an excess of the infusion; but if the zircon contains iron, the precipitate is of a blue colour, approaching to grey, a portion of which remains in solution, and gives to the liquor a pure blue colour. This liquor, when mixed with carbonat of ammoniac, affords a matter purple with refracted, and violet with reflected, rays. Crystallized gallic acid precipitates also the nitrat of zircon, of a bluish grey colour; but this colour is not so beautiful. The nitrat of zircon is decomposable by all the preceding bases.

Of NITRITS.

Nitrits have some properties in common with nitrats; such as, a cooling taste, and being fusible on coals. Nitrits cannot be formed by synthesis. Nitric acid decomposes them, which shews clearly that nitrous acid exists in nitrits in a manner very different from nitric acid. It should rather seem that nitrits are a triple combination, formed by the union of the nitric acid with two bases, one of which is always the oxyd of azot. These combinations are not easily made but by decomposing the nitrats in the dry way; for, by immediately combining the nitrous acid with different alkaline, earthy, or metallic, bases, nothing but nitrats are in general produced, because these different bases commonly separate the oxyd of azot almost entirely from its combination with the nitric acid; whereas, by making the nitrats red-hot, the caloric and the light tend to separate a certain quantity of the oxygen, at the same time that the azot, deprived of this acidifying principle, seeks bases to form a triple combination, by uniting with the base of the nitre, and also with that portion of nitric acid which was not decomposed at all.

Nitrit of Potash.—This is obtained from nitrat of potash, decomposed by fire; it is very soluble in water. Let it be pounded, and pour very weak nitric acid over it, and a nitrous vapour will be thrown up; this vapour is very red and strong; it has heat and effervescence, because the nitrous acid is disengaged in the gaseous state. The other vapour is not so strong, because the nitric acid, being diluted with water, this water tempers the vapour as it flies off; which does not happen when concentrated sulphuric acid is used.

Nitrit of potash, diluted in water, gives syrup of violets a green colour. Hence it must contain an excess of alkali; and, as the nitrat is perfectly neutral, it is plain that the excess of oxygen contained in the nitrat serves to saturate the base and alkali. When nitrits are decomposed by a weak acid, as the acid of vinegar, or even muriatic acid, it is doubtful whether the vapour that rises be nitrous acid, or only nitrous gas. Fill a balloon with a large aperture with nitrous vapours; suspend, by means of threads, a small glass vessel containing caustic alkali either liquid or solid: a nitrat, and some nitrous gas, will be the product. The other nitrits are but little known.

Of MURIATS.

Muriats have generic properties which distinguish them from other salts: 1. They are all soluble in water. 2. They are all crystallizable; yet those of alumine and magnesia with difficulty. 3. Several are deliquescent. 4. They all melt over fire, volatilize, spread in white fumes, but are not all decomposed by heat like the nitrats. The volatility of the acid is communicated to its bases, and this shews that the base has a strong affinity for that acid. 5. They all precipitate a solution of sulphat of silver, under the form of very heavy white flakes. 6. They effervesce with sulphuric acid, and throw up a white vapour into the air.

Muriat of Barytes.—Bergman asserts that this salt is found in some of the mineral waters of Sweden. It is commonly made by decomposing sulphure of barytes with muriatic acid; but, as the sulphat of barytes often contains oxyd of iron, the muriatic acid unites with it at the same time as with the barytes; whence this salt has a yellow colour. It is easily separated from this foreign matter, by exposing it to the fire for a few seconds in a crucible; as soon as it gets hot, the muriat of iron is decomposed, its acid volatilizes, and there remains only the oxyd of iron with the muriat of barytes, which by solution in water is easily obtained pure. Or it may be purified by washing in alcohol; the muriat of iron in that

that caſe is diſſolved, and the muriat of barytes is left pure. This ſalt has a bitter metallic taſte. Its cryſtals are ſquare and long, the edges channelled with dihedral ſummits. Its ſpecific gravity is very conſiderable. It is neither decompoſed by heat, nor altered by air. It takes five or ſix parts of cold water to diſſolve it; the combination is eaſier with the aid of heat; and it cryſtallizes in cooling. Several acids decompoſe it, as the ſulphuric, nitric, oxalic, and tartareous.

As ſulphuric acid forms with barytes a ſalt perfectly inſoluble in water, it may be uſed for detecting the ſmalleſt quantity of ſulphuric acid in mineral waters, or other combinations. Water containing only 0·0004 of its weight of ſulphat of ſoda recently cryſtallized, will give a viſible and immediate precipitation, by only putting in one ſingle drop of muriat of barytes; 0·0009 of this ſalt diſſolved in the ſame quantity of water, in a few minutes produce a very viſible cloud; laſtly, 0·00003 of ſulphat of ſoda, in the ſame quantity of water, occaſion a ſlight cloud not viſible for ſeveral hours.

Very pure ſulphureous acid will not decompoſe the muriat of barytes. Nitric acid decompoſes it; this may be eaſily proved, by putting into a concentrated ſolution of this ſalt ſome drops of nitric acid: they form a cryſtallized precipitation, which requires twelve parts of water to diſſolve it. Hence it follows, that, if we would know whether nitric acid contains ſulphuric acid, or any ſulphats, by means of the muriat of barytes, care muſt be taken to temper the liquors with water; for otherwiſe we may be led into an error, by attributing to the ſulphuric acid what ariſes only from the combination the nitric acid has with that terreſtrial ſubſtance.

Muriat of barytes is not to be decompoſed by earths or alkalis, becauſe barytes has in general more affinity with acids than any of theſe ſubſtances. Sulphats and ſulphits have the property of decompoſing it, by the operation of double attraction. Nitrats have alſo the faculty of ſeparating the barytes from this ſalt; then there is a reciprocal exchange of acid and baſe. The carbonats alſo form carbonat of barytes, and different muriats, according to the carbonat employed. The muriat of barytes is a very ſenſible re-agent for analyzing the ſulphuric acid; alſo to try whether alkalis and many other ſubſtances are pure. Crafford, Chauſſier, and others, have lately uſed it in medicine, as ſhewn in the Memoirs of the Medical Society of Paris, for the ſixth year of the republic.

MURIAT OF POTASH.—This is very rarely found native: it is ſaid, however, to be produced in the bogs of Picardy, and in ſome of the mineral waters of Normandy. It is met with in many vegetables, and all aſhes contain it more or leſs, which proves that it is ſpread over the ſurface of the ſoil, whence it is drawn up by the fibres or veſſels of plants, together with the juices that nouriſh them; for Vauquelin thinks it probable that it is formed during the act of vegetation. To obtain this ſalt very pure, take cauſtic potaſh, and ſaturate it with muriatic acid; let it evaporate and cryſtallize. This muriat was formerly called *febrifuge ſalt of Silvius*; it has been called alſo *regenerated marine ſalt*, but improperly; as it differs from that ſalt in the nature of its baſe. Its taſte is ſalt, penetrating, bitter, and diſagreeable. In the fire, it decrepitates; that is to ſay, its cryſtals ſuddenly break, and fly in pieces, by the rarefaction of the water, which enters into their compoſition. If the heat be then continued, and ſufficiently ſtrong, it melts, and is volatilized without decompoſition. It is not much altered by expoſure to air; it, however, ſlightly deliqueſces. About three parts of cold water are required to hold one part in ſolution; hot water diſſolves a greater quantity; and therefore recourſe muſt be had to ſlow evaporation to obtain cryſtals: its cryſtals are regular cubes, or rectangled parallelopipeds.

Sulphuric acid ſeparates the elements by uniting with the baſe; muriatic acid is diſengaged in the form of a white ſmoke. Nitric acid acts alſo upon muriat of potaſh by ſeizing on the potaſh; but the muriatic acid, as it is diſengaged, re-acts upon the nitric acid, from which it takes a portion of its oxygen, and thus becomes oxygenated muriatic acid, while the nitric acid becomes nitrous acid.

Acids fixed by fire, ſuch as thoſe of phoſphorus, borax, arſenic, tungſten, &c. decompoſe it at a high temperature, but not in the cold. Of all the earths and alkalis, barytes is the only one which can decompoſe it. Clay appears to decompoſe it in part; but this operation affords but a ſmall quantity. Nitrat of lime decompoſes it; in this caſe nitrat of potaſh and muriat of lime are produced; hence it follows that this ſalt, contained in the potaſh of commerce, is not uſeleſs in the fabrication of ſalt-petre.

This ſalt was formerly employed as a febrifuge, but it does not poſſes this property otherwiſe than in common with all bitter ſalts; the ſulphats of potaſh and ſoda are at preſent preferred to it. The muriat of potaſh is not uſed in the arts; its diſagreeable bitterneſs prevents its being uſed for culinary purpoſes, like the muriat of ſoda; its chemical properties agree with thoſe of the latter ſalt, excepting with reſpect to its bitter taſte, leſs degree of ſolubility, unchangeableneſs in the air, and leſs regular cryſtallization.

MURIAT OF SODA, OR COMMON SALT.—This ſalt, diſtinguiſhed likewiſe by the name of *marine* ſalt, is more abundant in nature than any other; it is found in prodigious maſſes in the internal parts of the earth, in England, Spain, Calabria, Hungary, Moſcovy, and more eſpecially in Wieliczka in Poland, near Mount Crapax, where the mines are very large, and afford immenſe quantities. This ſalt, when contained in the earth, is ſeldom cryſtallized in any regular figure; it has various degrees of whiteneſs, and is often found coloured, in which ſtate it is called *ſal-gem*, becauſe it often has the tranſparency of gems. There are two varieties of ſal gem, the *lamellar* and *fibrous*. The latter is found only in amorphous maſſes. It is the lamellar which forms the large ſtrata of ſal gem. Theſe ſtrata vary greatly in their thickneſs. They are generally ſeparated from each other by a layer of clay. The colour of the ſal gem depends on ſome adventitious ſubſtance. The red colour has been ſuppoſed to be derived from iron, the violet from a ſmall portion of the muriat of mangameſe, and the green from copper. Beſides, an admixture of clay, ſal gem often contains muriat of magneſia, and the muriat and ſulphat of lime.

Sea-waters abound with this ſalt, as do likewiſe the waters of certain lakes and ſprings. The quantity of ſalt contained in ſea water varies greatly in different climates. At a medium, however, it is ſaid to be about one thirtieth of the weight of the water. Some of the ſalt ſprings contain more, and others leſs ſalt than ſea water. In ſome places the water of theſe ſprings has been ſaid to contain one third, and often one fourth of its own weight of ſalt. From theſe ſources it is obtained by one or other of the following general proceſſes. The firſt conſiſts in ſpontaneous evaporation by the heat of the ſun, as is practiſed in the ſouthern provinces of France. Trenches are made near the ſea-ſide, lined with clay well rammed. Theſe are divided by low walls, into ſeveral compartments communicating with each other; and the flood-tide fills them with water, where it is retained by a kind of ſluice gates. Care is taken that the quantity of water ſhall be of an inconſiderable depth, that it may be eaſily evaporated by the ſun. When a ſaline pellicle is formed, the workmen break it, and it falls to the bottom, which they continue to do as long as any water remains. The ſalt is then raked together, and laid in heaps to dry. This is mixed with every other which the the ſea-waters contain, ſuch as ſulphat of ſoda and magneſia, the muriats of magneſia and lime; it is likewiſe contaminated by a portion of the clay, which forms the floor of the ſalt-pans; and laſtly, it contains iron, and mercury much divided; the latter of which is eaſily ſhewn

shewn, by leaving a mass of gold for some time in the salt, which becomes manifestly whitened. This salt, formed by spontaneous evaporation, is usually called *bay salt*. The salt which is obtained by slow evaporation, is also purer than that which is formed by quick boiling. The Dutch salt, in so great repute for the salting of fish, is prepared with a very gentle fire. They add a quantity of sour whey to their brine before evaporation. The action of this substance does not seem to be well understood, though it is said to conduce to the purity of the salt, and to favour the production of large crystals. The salt obtained by quick evaporation always contains more or less of the muriat of lime and sulphat of soda. In the salterns of France, common salt is obtained by artificial evaporation, effected by means of heat. In Arranchin they take the quicksands on which the sea-water has deposited its saline crystals; these are washed with the smallest quantity of water sufficient to dissolve the salt, and the water is then evaporated to dryness in leaden boilers.

There are many salt springs, the waters of which are charged with different quantities of muriat of soda. At Montmorot, in France, a neutral salt is prepared, which is known by the name of Epsom salt of Lorrain, but it is nothing more than sulphat of soda, or Glauber's salt, whose crystallization has been disturbed: it may be distinguished from the sulphat of magnesia, by its efflorescing in the air; whereas the Epsom salt is deliquescent. Here the spontaneous evaporation is united to evaporation by heat: the water of the spring is pumped up into a large reservoir, at the top of a building, or shed, beneath which are suspended boards covered with little bundles of thorns or brush-wood; on these the water falls through small cocks, and becomes divided into minute drops. The large surface of water thus exposed to the air, which circulates quickly through these sheds, causes an evaporation of nearly two thirds. Selenite is deposited on the brush-wood; and when the liquid, upon trial with a kind of hydrometer, is found charged with salt to a certain degree, it is conveyed into large iron boilers, supported by bars of the same metal; these boilers are very large and shallow, and contain a large quantity of salt water. A brisk heat is applied; and, as soon as the water boils strongly, it becomes troubled, and an ocherous earth is separated, in the form of scum; another salt, of difficult solubility, is next separated, which is found to be sulphat of lime, the workmen call it *schlot*, the schlat, mixed with a small quantity of muriat of soda, sulphat of soda, and earthy muriats. The scum is received in little troughs of cloth, placed round the sides of the boiler, into which it is thrown by the circulation of the boiling liquor. These troughs are taken out and cleared, from time to time, and repeatedly put in again, till a large quantity of small cubical crystals, called by the workmen *pieds de mouches*, appear on the surface of the liquor. At this period, the troughs are taken away entirely; the fire is diminished, and the muriat of soda is taken out with ladles, in proportion as it crystallizes in sufficient quantity; the evaporation is continued till no more cubical crystals are afforded. The crystals are larger, the slower the evaporation; and the remaining fluid, called mother-water, contains earthy muriats.

Wallerius mentions a fourth process to obtain salt from sea-water. This water is exposed in trenches on the sea shore, where it forms so thin a stratum, that the cold of the atmosphere soon freezes it; but, as the ice consists of mere water, the unfrozen part, after the ice is taken out, is of course more concentrated, and may be duly evaporated with a less degree of heat. It is conveyed into leaden boilers, and evaporated by fire. Scheele had observed, that by exposing a mixture of two parts of the solution of sulphat of magnesia, and one of the muriat of soda, to the temperature of freezing, sulphat of soda was formed. More lately, Gren remarked, that a similar effect is produced in sea water exposed to a low temperature, sulphat of soda being formed in it by the double decomposition of its muriat of soda and sulphat of magnesia. It is remarkable, however, that an increase of temperature will not reproduce the muriat of soda, nor restore the salts to their former state. From these facts, all must perceive the disadvantage which will arise from concentrating sea-water by freezing, and the propriety of Gren's important plan of separating the deliquescent salts before evaporation, in the art of salt making, by chemical affinity. With this view he directs the addition of sulphat of soda to waters containing only the muriats of lime and soda, and of lime to those which contain the muriat of magnesia and sulphat of soda. In the latter instance, muriat of lime is first formed, which afterwards decomposes the sulphat of soda by double affinity. Where muriat and sulphat of magnesia are present without the sulphat of soda, or where the waters contain only the muriats of lime and magnesia, lime and sulphat of soda should be added at the same time. But if the water contains the sulphat and muriat of magnesia, together with the sulphat of soda, lime alone will be necessary, unless the quantity of sulphat of soda be insufficient, in which case some of it must also be added. Many advantages are thus gained. The bitter taste of common salt, occasioned by the presence of the sulphats of soda, and magnesia, is prevented; no mother water is formed, and pure muriat of soda alone is obtained on evaporating the fluid. Much expenditure of time and fuel is saved in the processes of evaporation, and trying the salts, and a pure, not deliquescent, salt is obtained, capable of resisting the impression of the air, and of being transported without loss. The principal objection to these processes may arise from the necessity of purchasing the sulphat of soda; but the sea-water will itself in general produce it when brought to a temperature below zero; and for this purpose it will only be necessary to collect a quantity in the basons, to be exposed to the cold during the winter. We might from this water also obtain the sulphats of soda and magnesia by adding the sulphat of iron. It will even be found advantageous to purify waters by these means, which do not contain sulphat of magnesia, as the most unproductive waters will not require more than from fifty to seventy-five pounds of sulphat of soda to produce thirty quintals of muriat of soda. In following this method it will only be necessary to ascertain the component parts of the fluid employed previous to ascertaining what substances should be added. Direct experiment will easily point out the quantities which may ensure the most perfect success.

When mines of sal gem are found in the bosom of the earth, they are easily wrought, and at a small expence. It is sufficient to sink wells, and make galleries, and to loosen the salt with pickaxes, bars, levers, &c. Sal gem, besides partaking of different colours, as white, yellow, green, blue, red, &c. is either hard, soft; pleasant to the taste, or bitter. Its varieties of colour proceed from the oxyd of iron being more or less charged with oxygen; its hardness depends on the quickness with which it was formed; and its difference of taste arises from some other saline substances, particularly muriat of lime, commonly mixed with it.

We have now given, from Fourcroy, Chaptal, &c. the various methods in use for extracting muriat of soda from the waters in which it is held in solution, the object of all which is to separate the water from it. But to rectify it, or to obtain it in the pure state which is requisite for chemical experiments, dissolve it in four parts of cold water; strain it; the matters which do not unite with the water, as the clay, salt, chalk, oxyd of iron, &c. remain behind, but the muriat of lime is dissolved also: it is decomposed by putting into the solution a few drops of carbonat of soda; its base combines with the muriatic acid, and the carbonic acid with the lime, and forms carbonat of lime, which, being insoluble, falls to the bottom. Care must be taken not to add more of the carbonat

bonat of soda than is necessary, as in that case there will be as much inconvenience another way: when there is a sufficiency, the drops no longer cause any motion in the liquor: then let the solution evaporate, collect the salt as it separates, and it will be very pure. To have it in regular crystals, the spontaneous evaporation must be employed; then the saline molecules or elementary particles easily re-unite, and form cubic crystals. Lord Dundonald proposes, in the purification of muriat of soda, to take advantage of the fact, that water, saturated with one salt, will yet dissolve a portion of another salt. The process which he recommends is as follows: Take a conical vessel, having a hole in the small end, which is to be undermost, and place it, filled with common salt, in a moderate heat; saturate a portion of water with this salt, and pour the solution, boiling hot, on the salt in the conical vessel. The boiling water will not dissolve any of the common salt, but will dissolve the bitter earthy salt which it contains. When the solution ceases to drop out of the hole at the bottom of the vessel, the same process is to be repeated by means of fresh portions of the same parcel of salt, already partly purified, till it be brought to the degree of purity required. Lord Dundonald reckons that three such washings make the common salt of this country purer than any foreign salt; that each washing makes it 4½ times purer than before; so that (disregarding fractions) after the second washing it will be twenty times, after the third ninety-one times, after the fourth 410 times, and, after the fifth, 1845 times, purer than at first.

The taste of this salt is well known, as it is daily used. When exposed to a brisk heat, it bursts, and flies in pieces. This phenomenon is called *decrepitation*, and is produced, as we have already observed, by the rarefaction of the water of crystallization. When all the water is evaporated in this manner, the decrepitation ceases, and the salt is reduced to a pulverulent form: if the heat be continued, it melts after ignition, and being poured on a smooth stone, becomes a kind of mineral crystal; but it is not at all altered, for its original form may be again restored by solution in water. Fire does not, therefore, decompose it; a very strong heat volatilizes it without alteration.

Muriat of soda, when pure, is not sensibly changed by exposure to the air; it rather becomes dry than moist, and attracts humidity only in such cases as it contains muriats with earthy bases. It is very soluble in water; no more than three parts of this fluid being required to dissolve one of the salt. Three ounces and a half of water dissolve one ounce of salt very completely; and it is not more soluble in boiling than in cold water. Heat causes the solution to be made somewhat more quickly. The crystals of this salt are obtained by a very slow evaporation.

As muriat of soda combines very quickly with water, it produces a great degree of cold, that is to say, much caloric is absorbed in a short time. We are not to suppose, however, that it requires more heat than any other salt for its solution; there are some facts which seem to prove, that it rather requires less than many others. It seems to have more affinity with water than most other salts; for, except those that are deliquescent, it precipitates most of them from their solutions; and during these precipitations a certain quantity of caloric is always disengaged.

Sulphuric acid decomposes muriat of soda; muriatic acid is thereby disengaged, which is disposed to combine with all the substances presented to it, except silex. The residue of this operation is the *sal admirabile* of Glauber, which may be used in medicine or in the manufacture of soda.

To extract muriatic acid, an apparatus is used, as represented on the Chemistry Plate V. fig. 3. Take eight parts of purified soda in powder; put this into a retort A, or into a matrass; add five parts of sulphuric acid at 66° by means of a doubly-curvated tube B; some water may be put in, to prevent the effervescence from being too strong. Adapt a matrass, C, to the neck of the retort, to receive those portions of sulphuric and muriatic acids which pass over, particularly towards the end of the operation, by means of the heat. D, E, F, are collateral bottles, containing water equal in weight to the salt; these bottles are united by tubes, which have tubes of safety G G. The joinings must be carefully luted. When things are thus prepared, make some fire under the retort, and increase the heat by degrees till nothing comes over. If, instead of a retort, a matrass be used, the first receiver must be a two-necked bottle, as represented in the Plate; a little water should be put in this bottle also, and a tube of safety inserted, in order to retain the sulphuric acid, and the oxyd of iron, which rise towards the end of the experiment. When the gas combines with the water, there is heat; and, when the temperature is lowered, the water becomes susceptible of absorbing more. To make this experiment answer, the bottles should be surrounded with ice; but care must be taken they do not burst at the time when, by the raising of the temperature, the water can no longer retain the acid; for it must not be forgotten, that warm water restrains the muriatic acid much less than cold.

Nitric acid decomposes muriat of soda in the cold; but the muriatic acid hereby obtained is not pure; it is properly nitrous acid mingled with oxygenated muriatic acid: Put muriat of soda reduced to powder into a retort; add nitric acid in the same proportion as for the decomposition of this salt with sulphuric acid: adapt to the retort a tubulated balloon, whence runs a tube of safety, which goes into a Woulfe's bottle, containing water equal in weight to the salt in the retort. Heat the apparatus by degrees. The nitric acid begins by uniting with the soda, forming nitrat of soda; and very-concentrated muriatic acid is disengaged. This acid attacks the nitric acid not yet combined, takes a portion of its oxygen, and forms oxygenated muriatic acid. In the mean time nitrous acid is formed, proceeding from that part of the nitric acid which could not combine with the soda, even before it could have formed that combination; and the oxygenated muriatic acid, combined with the nitrous acid, converts this into nitric acid: by giving it its oxygen, it is reduced to the state of simple muriatic acid.

The other acids have no effect, when cold, upon muriat of soda; but some will decompose it by the aid of caloric, or heat; such are the phosphoric and boracic acids. The reason of this difference is, that muriatic acid is inclined to combine with caloric, when accumulated and condensed in this manner in the muriat of soda, which consequently weakens the affinity between the principles; now the phosphoric and boracic acids not having the same attraction for caloric, and their tendency to combine with the soda not being spread or divided, it happens at a certain time that the affinity of the caloric for the muriatic acid, and of the fixed acids for the base of the marine salt, must prevail; and then the decomposition takes place. In one case, phosphat of soda is the result; in the other, borat of soda.

Of all earthy substances, barytes only decomposes this salt in the cold: it seizes on the muriatic acid, and leaves the soda in the caustic state. Though soda has commonly more affinity with muriatic acid than alumine has, yet, by raising the temperature, a certain quantity of muriatic acid may be disengaged by alumine; and this is the process used in manufactories of aqua fortis to make what is called *spirit of salt*. It is probable that this decomposition is chiefly owing to the pyrites, which are almost always contained in the siliceous clays used in this operation.

Lime decomposes this salt also. Boil muriat of soda and lime together; the soda rises to the surface, becomes carbonat of soda by absorbing the carbonic acid contained in the atmosphere. It must be supposed, that there is a com-

a combination of muriat of lime with the excess of lime disengaged by the soda separated by the carbonic acid. Potash is the only alkali which decomposes muriat of soda; muriat of potash is formed, and the soda remains free. Many methods have been tried for extracting soda from marine salt; but they all come to the same end, that of converting the muriat of soda into sulphat of soda, of decomposing this by charcoal, and of absorbing the sulphur by means of calcareous earth or iron. For decomposing muriat of soda by a metallic oxyd, Mix four parts of muriat of soda with one of semi-vitreous oxyd of lead or litharge; beat it up in a little water; the litharge loses its colour by degrees; a white matter is produced, and the soda may be extracted by washings. This is Turner's process. The decomposition may be accomplished also, by dissolving twenty-five parts of marine salt in thirty parts of water; pulverise 100 parts of litharge, and mix it in a gentle heat, about 70°, but without letting it boil; for ebullition retards the decomposition. A very white muriat of lead is the product; the lead is easily separated from the muriat, by mixing it with charcoal and exposing it to a strong heat.

Muriat of soda is of extensive use in the arts, and in culinary affairs. In chemistry, it is employed in the formation of the simple and oxygenated muriatic acids; with tanners, for preparing the Hungarian hides, in the glazing of pottery, by producing a slight fusion of the exterior surface of the ware; in glass-making, to render the glass whiter and clearer; in docimastic assays, either as a flux to facilitate the precipitation of metals from the scoriæ, or to prevent their alteration by the contact of the atmosphere; in salting and preserving vegetable and animal substances, and it is universally used as a seasoning for food; it facilitates digestion, by producing a commencement of the putrid alteration in the alimentary substances. For though it is well ascertained, by the experiments of Pringle, M'Bride, &c. that it retards putrefaction, and, like most saline matters, is a powerful antiseptic when added in considerable quantities to animal matters; yet it acts in a very different manner when mixed with those substances in a small dose, since it causes them to putrefy more quickly. This fact is proved by the experiments of the author of Essays intended to serve as an History of Putrefaction, and likewise by those of Mr. Gardane. This salt is not of less utility in medicine; it is put into the mouth, and employed externally as a powerful stimulant in apoplectic or paralytic disorders; and is in many cases a good discussive. It is particularly recommended by Dr. Russel for lymphatic tumours, arising from a scrophulous disposition of the animal system. It proves purgative when administered in a dose of several drachms. As it is the impure salt that is commonly used, its effects are in part to be attributed to the calcareous and magnesia muriats which it contains.

Muriat of Strontian.—The same process is used in preparing this salt, as is directed for *nitrat* of strontian. The sulphuric and nitric acids decompose it; also barytes, potash, and soda. By burning alcohol, which holds muriat of strontian in solution, the flame is of a purplish-red colour, which distinguishes this salt from that of barytes and all others. The crystals of muriat of strontian are slender delicate prisms, sometimes two inches long, having a soft silky appearance. These prisms are all hexagonal, some having all their sides equal, others having two broad sides, with two intervening narrow ones, while another sort is seen with three broad, alternating with three narrow, sides. At one time they end abruptly, at another, an obtuse trihedral pyramid terminates them, and now and then they are seen pointed like a needle. If a few drops of a solution of this salt be put on a plated glass, it will soon discover itself, by shooting into long slender needles, which are often disposed in a radiated form. These crystals, when strongly dried, suffer little change from exposure to air. They deliquesce, however, in a moist atmosphere. At the temperature of 60°, an ounce of distilled water is capable of dissolving one ounce four drachms and one scruple of this salt. The solubility of muriat of strontian is greatly increased by heat. If strong muriatic acid be added to a saturated solution of this salt, an immediate precipitation is produced. The taste of this salt is sharp and penetrating. It loses forty-two per cent. by exposure to a strong fire, and is converted into a white powder, which melts when the crucible is heated to redness. Its acid is not dissipated by fusion in a strong fire, though this effect may be produced by exposing it to the stronger heat of a blow-pipe.

Muriat of Lime.—This is a combination of muriatic acid with lime. It is found almost every where; in the matters containing saltpetre, in calcareous earths, sea-water, the mother-waters of salt-pits, the wells of Paris, &c. It is made by decomposing carbonat of lime with muriatic acid; when the saturation is complete, strain and evaporate. Its taste is acrid and bitter. It loses a portion of its acid in a violent heat, but not the whole; the residue is muriat of lime with an excess of base; this is called *Baldwin's phosphorus*, as it is luminous in the dark, especially if rubbed with an iron blade. It is susceptible of the aqueous and igneous fusions. If, during the igneous fusion, bars of iron be plunged therein, a crust is formed over them, and they will then exhibit a bright phosphoric light in the dark. Exposed to the air, it attracts humidity, and liquefies; this is what was formerly called *oil of lime*. Its greediness in absorbing the humidity of the air, made Lavoisier use it for drying of gases, particularly in re-producing water from hydrogen gas and oxygen gas. Muriat of lime, therefore, might take place of caustic potash. It is indeed an accurate hygrometer, on account of its absorbing the humidity of the atmosphere: for, by exposing a known weight of dried muriat of lime in a determinate quantity of air, we can obtain the real and exact weight of the water contained in that air.

From what has been said, it appears that this salt has a great affinity with water; yet it crystallizes very slowly; though after a proper evaporation, the solution furnishes six-sided prisms, crowned with pyramids of the same shape. When the solution has been too much concentrated, it cools without crystallizing; then, if it be suddenly agitated, it assumes a solid form, as hard as stone, and much heat is at the same time disengaged. The sulphuric and nitric acids decompose it, by seizing on its base. The sulphuric acid drives off the muriatic acid in form of a white smoke; and sulphat of lime is produced. But, as nitric acid is not so strong, the precipitation is not so plentiful; and, as the nitrat of lime which is formed is soluble also, the whole remains suspended in the liquor, especially if it be diluted with water. The oxalic and tartarous acids decompose it also. Barytes, strontian, and fixed alkalis, decompose muriat of lime, because they have more affinity with the muriatic acid than lime has. Ammoniac makes no change in it when pure. If it be found mixed with carbonic acid, then there is a double affinity, and carbonat of lime will be produced. All the sulphats, except that of lime, are reciprocally decomposed in contact with muriat of lime: in each case sulphat of lime is formed, and different muriats, according to the sulphats employed.

Muriat of lime is used in medicine, and is employed as a solvent. It is very soluble in alcohol, which facilitates its separation from the other salts with which it might be mixed. This salt, thus dissolved in alcohol, burns with a beautiful red flame; it should be agitated during the inflammation; the more the liquor thickens, the redder it grows.

Muriat of Ammoniac.—This salt was called *sal ammoniac* by the ancients, because they received it from *Ammonia*, in Lybia, where the temple of Jupiter Ammon was situated. It is found native in the vicinity of burning mountains, as Vesuvius, Etna, and even in the Vivarais,

varais, where it is of different colours, grey, blackish, red, green, &c. but it is impure, and generally mixed with arsenic and iron. Sometimes it is found in solution in the waters of the lakes of Tuscany; it is found also in some of the mountains of Tartary and Thibet, in the caverns or grottoes of Puzzoli, &c. But the muriat of ammoniac met with in commerce, is the produce of art. It is more particularly in Egypt, that this saline substance is fabricated from the dung of animals, who feed on saline plants. They collect the ordure of oxen, camels, and several other animals; dry it by spreading it upon walls; then burn it for the purposes of fuel. The soot which is made by the combustion of these matters is put into large round glass bottles, a foot and a half in diameter, terminated by a neck two inches high, which is filled to within four inches of the neck; each bottle contains about forty pounds of this soot, and affords nearly six pounds of the salt. These vessels are placed on a furnace, so formed that the neck only is exposed to the air; a fire is made with camel's dung, and continued for three days and three nights; and the salt sublimes on the twelfth or thirteenth day. The bottles are then broken, and the loaves of sal ammoniac are taken out; these loaves, which we receive in the form they obtain from the subliming vessels, are convex and unequal, having a protuberance on one side formed from the neck of the subliming vessel. The carbonic and sooty matters remain at the bottom, because they are not volatile; yet there is generally a little empyreumatic oil, half-decomposed, which flies up in vapours, and soils the surface of the loaves of sal ammoniac. This salt is not formed during the combustion of the above-mentioned excrements, but seems rather to have pre-existed in the dung and urine of the animals. It is probable that the muriat of soda contained in the plants on which these animals are fed, is decomposed during the processes of digestion and assimilation, and changed into muriat of ammoniac; for Chaptal observes, that, when animals live on fresh vegetables, their dung affords no muriat of ammoniac; but that in winter, on the contrary, when they are fed on salted herbs, it affords a great quantity. The muriatic acid probably unites with the ammoniac that is constantly formed in the animal economy, and the soda remains in combination in the animal humours, which always contain a quantity of it, particularly in combination with phosphoric acid, which seems also to be an animal product.

There are several manufactories in France where they make sal ammoniac, by distilling all sorts of animal substances in a kind of furnaces which perform the office of large retorts, and by mixing the aqueous product, charged with carbonat of ammoniac, with the mother-waters of the brine-pits in the departments of Meurthe, Jura, Mont-blanc, &c. which contain the muriats of lime and of magnesia. These salts are decomposed by carbonat of ammoniac by the means of a double attraction, in which the muriatic acid unites with the volatile alkali, and the carbonic acid to the lime and magnesia. These two last combinations, being insoluble, are precipitated, and the muriat of ammonia remains in the liquor: let the liquor be evaporated to dryness; then sublime the salt in earthen vessels, which, by opening in the middle, facilitate the extraction of the matter, and may serve several times. At Franciade, they combine directly the muriatic acid, drawn from marine salt by sulphuric acid, with the product of animal substances distilled in a gun-barrel. Baumé has established a manufacture of muriat of ammoniac in the neighbourhood of Paris, where this salt is entirely composed by a different process from that of the Egyptians, who only extracted it. Baumé's salt is much purer than the Egyptian.

Sal ammoniac is now made in large quantities in England. The volatile alkali is obtained in an impure liquid state from soot or bones, or any other substance that affords it; to this the sulphuric acid is added: and the sulphat of ammoniac thus produced, is decomposed by muriat of soda by double affinity; the sulphuric combining with the mineral alkali, and the muriatic acid with the volatile alkali. The liquor therefore contains sulphat of soda and muriat of ammoniac, which are separated by crystallization; and the muriat of ammoniac is sublimed into cakes for sale. The cheapness of the sulphuric acid, and of common salt, is the cause why they are made use of instead of the muriatic acid, with which the muriat of ammoniac might have been directly formed. Lord Dundonald extracts volatile alkali from pit-coal; but whether it can be afforded cheaper for the general purposes of commerce than that of the above process, is not yet ascertained.

In chemical laboratories, this salt is prepared by a direct combination of muriatic acid with ammoniac to the point of saturation. Its taste is pungent, acrid, oily, and ammoniacal. It possesses a singular physical property, namely, a kind of ductility or elasticity, so that it rebounds under the hammer, and may be bended; a circumstance which renders it difficult to pulverize. Heat does not decompose, but reduces it to vapours. Thrown on coals, it speedily volatilizes in white fumes; and, by applying an inverted jar, it will be lined with a white powder, which is muriat of ammoniac. When the operation is performed in the large way, a long-necked matrass is used, and the aperture stopped with paper to prevent loss. As this salt is very volatile, this method is used to procure it in a state of purity. Linnæus recommends this sublimation to be performed in *circular* vessels, that is, cut all round, or shaped like washball boxes. This salt is not sensibly changed by exposure to the air. The metallic oxyds decompose it; the manner of operating we shall shew when we come to speak of *Metals*.

Water, at the temperature of 10° dissolves 0·35 of its weight; boiling water dissolves much more, so that a great quantity of crystals are deposited in cooling. Mingled with ice, it produces a considerable degree of cold. Its crystals are quadrangular prisms, crowned with four-sided pyramids. Some acids, especially the sulphuric, decompose this salt; muriatic acid and sulphat of ammoniac are produced. With nitric acid, it forms a kind of *aqua regalis*, which dissolves gold: the nitric acid decomposes the muriat of ammoniac in the cold, but not in the heat.

Muriat of ammoniac is decomposed by barytes, strontian, lime, and even by magnesia, if caloric be employed: on this property is founded the art of preparing ammoniac: Take two parts of lime, and one of sal ammoniac, both pulverised; put them into a good stone retort, to which adapt a tube and a tubulated balloon, or a two-necked bottle, whence goes a tube which communicates with a bottle filled with water; if one is not sufficient, use two, three, &c. The quantity of water in the bottle should be nearly equal to the salt made use of. The apparatus, being well luted, is to be heated by degrees; as the ammoniac is disengaged in the state of gas, it is dissolved by the water, and forms what was formerly called *fluor volatile alkali*. The muriatic acid remains in the retort united to the lime; this has also been called *Baldwin's phosphorus*, because by friction in the dark it emits sparks of light. Exposed in a moist place, it melts in part, becoming a thick liquid smooth to the touch, which occasioned it to be called *oil of lime*. Powdered lime triturated with muriat of ammoniac, will also disengage ammoniacal gas. The two fixed alkalis decompose the ammoniacal muriat, in the same manner as lime; and they in like manner disengage pure ammoniac in the gaseous form.

This salt is very useful in the arts, in chemistry, and in medicine. It is employed in dying, to brighten certain colours; by brasiers, to cleanse the surface of copper, previous to its being tinned; in assaying, to prove the

the presence of iron in minerals, because it favours sublimation; in medicine, it is used in preparations both external and internal.

Muriat of Magnesia. This salt is found in solution in many waters, in calcareous soils, and in nitric substances, where it constantly exists, together with nitrat and muriat of lime, &c. It is fabricated by a direct and saturated combination of magnesia with muriatic acid; filtre the mixture, and let it evaporate. Its taste is bitter, acrid, and penetrating. It is decomposed by heat, which drives off the acid, and leaves the magnesia pure. It attracts the humidity of the air, and deliquesces into a sort of syrup, or oil, very soft to the touch. It is very difficult to obtain it in perfect crystals by solution in water; sometimes it is in laminæ; but most commonly it takes a gelatinous form in cooling, though rarely in any regular shape. When pure and well crystallized, it produces cold by its solution in water; but, if dried, it has a contrary effect. These two properties are common to all salts which absorb much water in crystallizing; and the reason is obvious, from the quantity of water they solidify.

The sulphuric and nitric acids decompose this salt, and separate the muriatic acids with effervescence. To effect these decompositions, a mixture of one part of either of these acids, and two parts of muriat of magnesia, are to be exposed to heat in a glass retort. The acid of the latter becomes volatilized, while the stronger acid combines with the magnesia, and forms sulphat and nitrat of magnesia. With nitric acid, oxygenated muriatic acid mixed with nitrous gas is obtained. Boracic acid likewise disengages the muriatic acid by heat.

Barytes, strontian, and the fixed alkalis, decompose muriat of magnesia: if the alkalis are very caustic, the magnesia is precipitated in a pure state. The alkalis in excess do not dissolve the magnesia as they do alumine, which points out an obvious method of separating these two earths when united in certain solutions. Ammoniac does not operate a complete decomposition, as a kind of triple salt is formed, *ammoniaco-magnesian muriat*, crystallizable with the remaining portion of magnesian muriat.

The muriat of magnesia decomposes the sulphats and nitrats with base of fixed alkali and ammoniac, by the way of double affinity; but in order to be assured that these decompositions take place, the mixture must either be evaporated, or spirit of wine added, which seizes the water; otherwise the new saline results will remain dissolved in the fluid.

Muriat of magnesia is very soluble in alcohol, and burns with a yellowish flame, which afterwards becomes red. This salt is scarcely at all in use; but we think it might be advantageously employed as an opening medicine; it is continually administered in small quantities in Epsom salt, Sedlitz water, and the impure marine salts, these substances always containing it.

Muriat of Glucine.—This salt has many properties in common with its nitrat above described. It differs in the following particulars: 1st. It crystallizes with greater facility; yet its crystals are so small, that Vauquelin could not finally determine their shape. 2. It does not attract the humidity of the air. 3. It is not decomposed by the sulphuric acid. Though not deliquescent, it is plentifully dissolved by alcohol; and this solution, with water, forms a very pleasant saccharine liquor. This salt is decomposed by all the preceding bases; but it has not yet been applied to any use.

Muriat of Alumine.—This salt is not found in nature; it is always produced by art, namely, by uniting muriatic acid with alumine; but it is not an easy matter to saturate it perfectly. It cannot be crystallized in any regular form. It reddens syrup of violets; and its taste is styptic, like alum. It has the property of swelling up hides or skins; and it is supposed that the Hungarian hides are prepared with muriat of alumine, because muriat of soda and sulphat of alumine are used; so that there is a decomposition in the soaking of these skins: in that mixture, the muriatic acid of the muriat of soda falls on the alumine, and the sulphuric acid of the sulphat of alumine attacks the soda; so that a sulphat of soda is formed, which is soluble, and likewise some muriat of ammoniac which insinuates into the leather, and thus fastens and preserves its admirable colour.

Muriat of alumine is decomposed by heat, and the alumine is set at liberty. The solution of this salt assumes a yellow colour by evaporation; it furnishes a gelatinous semi-transparent mass of the same colour as the solution, and, being of a horny consistence, is very hard to reduce to powder. It is decomposed by some of the metallic oxyds; therefore, when a mixture of sulphat of alumine, which contains oxyd of iron, is exposed to the fire, the ore must be calcined, that the sulphuric acid may attack the alumine instead of the iron; otherwise the product would be sulphat of iron rather than of alumine.

Terrestrial and alkaline substances decompose this muriat. Potash and soda have the property of re-dissolving the precipitate of alumine, when those alkalis are in excess, a property which magnesia has not; and ammoniac does not totally re-dissolve the precipitate. Several acids decompose this salt, especially the nitric and sulphuric: in general, alumine does not adhere strongly to acids.

Muriat of Zircon.—The muriatic acid unites readily with zircon, when it is divided or combined with carbonic acid, but it becomes incapable of combination with it after this earth has been brought to a slight red heat in the fire: drying this earth therefore with a strong heat, must be carefully avoided when the intention is to combine it with acids.

Muriat of zircon has no colour. Its taste is astringent; it is very soluble, and dissolves equally well in alcohol, to the flame of which it does not communicate any particular colour. The muriatic acid is expelled by heat. This salt forms concretions in the mouth in consequence of being decomposed by the saliva. The solution of this salt affords, by a careful evaporation, small transparent needle like crystals, of a form difficult to be determined. This salt loses its transparency in the air, by giving out a portion of its water of crystallization. When muriat of zircon contains some portion of silex, cubical crystals are produced, which have a consistence resembling that of a jelly. These cubical crystals, when exposed to the air, gradually lose their transparency, and suffer a diminution of volume. White and silky needles are at the same time formed in the mass of this salt, which project beyond the cubes from which they take their rise. The affinity of the muriatic acid for zircon, is the same with the nitric, so far as earths and alkalis are concerned.

Muriat of zircon is decomposed, 1. By sulphuric acid. A part of the sulphat of zircon which is formed, is precipitated in the form of heavy white flocks, while another portion is retained in solution by the muriatic acid. But, if this acid be dissipated by heat, the remaining portion of the sulphat of zircon is gradually deposited; and, if the evaporation of the liquor be stopped before that is reduced to dryness, it forms a kind of jelly by cooling. The sulphat of zircon is therefore soluble in muriatic acid; and this solubility is increased by means of caloric. 2. The phosphoric, citric, tartarous, oxalic, and sacolactic, acids, decompose the muriat of zircon, and form with its base insoluble compounds, which are precipitated in the form of white flocks. 3. The gallic acid precipitates the muriat of zircon in the form of a white matter, or in that of a greyish green, if it contain iron. In the latter case the deposit acquires, by drying, a shining black colour, like that of China-ink. The liquor in which the gallats of zircon and iron have been formed, preserves a greenish colour; and, though fresh quantities of gallic acid do not occasion any more precipitation, the carbonat of ammoniac separates a very copious flocky matter, which has a purplish colour, similar to that of lees

lees of wine. These experiments prove, that the gallic acid has a greater affinity with zircon than the muriatic acid possesses, and that the gallats of zircon and iron are soluble in muriatic acid, since a part of them remains in solution in the liquor which was separated by carbonat of ammoniac.

Carbonat of potash, saturated with carbonic acid, precipitates zircon from its solution in muriatic acid; and, though this solution be made with effervescence, the precipitate, when washed and dried in the air, retains a large portion of carbonic acid; for this earth afterwards produces a lively effervescence, when dissolved in acids. A solution of sulphurated hydrogen gas in water, mixed with a solution of muriat of zircon containing iron, disturbs the transparency of the solution, and gives to it a reddish colour; but it does not occasion a true precipitate. The hydro-sulphure of ammoniac instantly precipitates this salt of a beautiful green colour, which become black when dry. This precipitate, when placed on burning coals, gives out the smell of sulphurated hydrogen gas, and becomes of a blueish slightly purplish colour by pulverization; before it has been heated it affords a powder of a pearl grey colour. This colour is owing to the oxyd of iron combined with the zircon.

The carbonat of ammoniac produces at first a deposition in muriat of zircon, but fresh quantities of the ammoniacal salt re-dissolve the greater part of the precipitate. In this case, a triple salt is formed, which may be decomposed by heat. The prussiat of mercury produces in the solution of muriat of zircon, a very copious precipitate, soluble in muriatic acid. This deposition cannot be owing to the combination of the mercury with the muriatic acid, for none of the salts into which it enters forms a precipitate with the prussiat of mercury. Were we even to suppose this case to be an exception, still the deposition would not be soluble in simple muriatic acid.

A plate of zink, introduced into a solution of muriat of zircon, occasions a slight effervescence, owing to the disengagement of hydrogen gas. The liquor becomes milky, and at the end of some days assumes the form of a white semi-transparent jelly. Pure alumine decomposes the muriat of zircon, by the assistance of a slight heat. The alumine is dissolved, the liquor becomes milky, and assumes a gelatinous form by cooling. When the muriat of zircon contains iron, it remains in solution along with the alumine, so that the zircon which is precipitated does not contain any sensible quantity of that metal; it therefore furnishes an easy and simple method of separating this earth from the iron with which it is mixed in hyacinths, and which adheres to it very strongly.

Muriat of Silex.—This salt is very little known; Fourcroy was the first who observed it. To prepare it, the silex is to be melted with the alkali, and muriatic acid poured on the mixture; the silex dissolves in the acid, and always retains an excess of acidity; the silex may be precipitated by heat, and muriat of potash and of silex is produced. This salt reddens the blue vegetable colours; and is decomposed by heat. Its other properties have not yet been ascertained.

Super-oxygenated Muriat of Potash.—This salt, lately discovered by M. Berthollet, is prepared by passing oxygenated muriatic acid gas into a solution of caustic potash, or combined with carbonic acid. The apparatus may be the same as that already depicted and described for oxygenated muriatic acid, except that in the Woulf's bottles, instead of water, a solution of potash must be put. The best proportion between the water and the potash, is six parts of the former, and one of the latter. When carbonat of potash is employed, there arises in a certain time an effervescence from the disengagement of the carbonic acid; with caustic potash there is no effervescence, but a little heat is produced: the difference is easily understood. As the super-oxygenated muriat of potash is not by far so soluble as potash, as soon as a certain quantity is produced, it crystallizes in the middle of the liquor in the form of shining spangles, the quantity increasing as the saturation goes on. Berthollet, when he examined the result of the experiment, found that the oxygenated muriatic acid did not combine with the potash as it came over; on the contrary, it divided into two parts, one of which gave out its oxygen to the other, so that there were formed super-oxygenated muriatic acid and common muriatic acid, which both uniting with the potash, give birth to common muriat of potash, and super-oxygenated muriat of potash. There are therefore three affinities in this operation: that of a fresh quantity of oxygen for the oxygenated muriatic acid; of this for the potash; and of the common muriatic acid for the same alkali.

The solubility of these salts being very different in cold water, their separation becomes easy; it is sufficient to collect the salt which has crystallized during the operation, to dissolve it in the requisite quantity of boiling water, to filter the solution to separate it from a small quantity of earth which is found in common potash, and then to let it cool. The super-oxygenated muriat is deposited in brilliant laminæ. To obtain it dry, decant the super-natant liquor; let it drain, and then dry it upon blotting-paper. As the super-oxygenated muriat of potash is not very soluble in cold water, but little remains soluble in the residuary or mother-waters; yet it may be collected without loss, if the liquor be reduced by boiling, and then left to cool.

This salt generally takes the form of very thin square plates; sometimes it is in a parallopiped shape. In taste it is cool and pungent, like saltpetre: it fuses on lighted coals, in the manner of saltpetre, but with more velocity, and a brighter flame. Ground on porphyry, or in a marble mortar with a wooden pestle, it crackles, and emits sparks. It is easily decomposed by distillation in a retort; and, with a gentle heat, gives very pure oxygen gas: 100 parts of the salt furnish about 0·33 of its weight of oxygen gas. If prepared with care, and the distillation be made skilfully, the oxygen gas which is formed is almost all absorbed by the phosphorus; Berthollet had but from 0·02 to 2·03 of residue, and even that proceeded from air in the apparatus, which it is difficult to avoid. The slight heat at which the oxygen quits the muriat of potash, shews that this principle does not adhere to it very strongly, or that it retains in its combination a great quantity of caloric; as appears from several circumstances wherein the super-oxygenated muriat is decomposed by combustible bodies.

Barytes does not decompose this salt. If thrown into concentrated sulphuric acid, it detonates, flies to a distance from the vessel, and gives out a deep-red light. With concentrated nitric acid, it crackles and emits sparks, but not with explosion, as in the preceding case. Mixed with sulphur, in the proportion of three parts of the muriat to one of sulphur, and triturated in a metal mortar, it produces a succession of strong detonations, like the report of pistols, if the experiment be made with only about fifteen grains. The same mixture detonates more strongly under the hammer: it flames in concentrated sulphuric acid, and burns with a very bright light. A mixture of three parts of this salt, one part and a half of sulphur, and one half part of charcoal, produce the like effect, but in a much more violent degree. Several of the very combustible metals, as iron, antimony, zink, arsenic, and the metallic sulphures, mixed with two parts of oxygenated muriat, detonate with flame by a blow, but do not flame in sulphuric acid. Several vegetable matters, as oils, sugar, starch, alcohol, ether, sawdust, &c. produce the same effects. All these mixtures detonate with the electric shock, producing a very vivid flame.

These experiments, for which we are indebted to Fourcroy and Vauquelin, prove, that the oxygen is much less attached to the muriat of potash than to the nitrat,

nitrat, since that salt does not produce the same phenomena with combustible bodies treated in the same manner. Berthollet, who first discovered the facility with which this salt gives out its oxygen to combustible bodies, has made several attempts to form a gun-powder stronger than that commonly used. His expectations were realised; but he found that the use of it would become extremely dangerous, from its extraordinary inflammability.

Of PHOSPHATS.

Phosphoric acid unites to earths and alkalis, and forms salts, which have obtained the name of *phosphats*; while those which result from the combinations of the phosphorous acid, are called *phosphits*: which denominations indicate at once the nature of the salt, of the base, of the acid, and of the state it is in. The combinations of phosphoric acid with earths, alkalis, and some metallic oxyds, are decomposed by the sulphuric, nitric, muriatic, oxalic, &c. acids, when made cold, and in water; but it is the contrary with heat, and the sulphat of potash, nitrat of potash, &c. are decomposed by that acid.

PHOSPHAT OF BARYTES.—This may be made two ways, either by directly uniting, to saturation, pure barytes with phosphoric acid, or combined with phosphoric acid; or else by double affinity, by bringing in contact a barytic salt dissolved in water, such as the muriat or nitrat, with phosphoric acid combined with an alkali, whether soda, potash, or ammoniac: then the phosphoric acid attacks the barytes, and forms a deposit in the liquor, while the other salt remains in solution.

This salt melts by fire without changing its nature, and vitrifies in a red heat of several hours. It melts under the blow-pipe; and, if the operation be performed on a bit of charcoal, it spreads a yellow phosphoric flame; the globules it forms become opaque in cooling, unless they contain an excess of alkali. It is insoluble in water; but becomes soluble by an excess of acid. It is not decomposed by earths and alkalis; neither do acids entirely decompose it, with the exception, as is supposed, of the sulphuric acid; but, as phosphat of barytes has a very great affinity for an excess of acid, the nitric and muriatic acid only take away a part of the barytes, and an acid phosphat of barytes remains.

Phosphat of barytes is decomposed by those salts which act by double affinity, especially when the acid of those salts acts more strongly upon the barytes than upon their bases: thus phosphat of barytes is decomposed by sulphat of barytes and by all the alkaline carbonats, whether hot or cold; but, in the former case, the carbonat of ammoniac is not sufficient. This salt has not hitherto been applied to any use; but it might be employed, to advantage, for separating the sulphat of lime from the phosphoric acid drawn from bones: by boiling these things together, the sulphuric acid unites to the barytes, and the lime to the phosphoric acid; whence arise two perfectly-insoluble salts.

PHOSPHAT OF STRONTIAN.—This salt is prepared by combining phosphoric acid with pure strontian, in the proportion of 58·76 of strontian, and 41·24 of phosphoric acid. Heated with the blow-pipe, it melts into a white enamel, and spreads a phosphoric light. It is soluble in water, by the aid of the muriatic and nitric acids. It is decomposed by barytes, and by the sulphuric acid, becoming acidulated phosphat.

PHOSPHAT OF LIME.—This salt exists abundantly in nature, and in considerable masses: it constitutes the base of the skeletons of most animals; and it is found more or less in the ashes of all vegetables. In Spain, in the province Estramadura, it has been lately discovered in large and extensive strata: it is of an opaque colour, scattered with yellowish spots arising from the oxyd of iron.

The phosphat of lime, used in chemistry and the arts, is drawn from the bones of animals, strongly calcined in furnaces, to separate the animal substances which connect the parts. This salt by exposure to heat, seems to be only softened, to assume a kind of semi-fusion, like porcelain earth; therefore these matters, when strongly calcined, have been called *porcelained bones*. Yet bones, exposed to a very strong heat, throw out a yellow phosphoric light, which indicates a decomposition of phosphoric acid, whose phosphorus burns at a certain distance; but this decomposition is very confined, and soon stops. Perhaps these phenomena may arise from a small quantity of phosphat of ammoniac, contained between the bony plates, or in the membranes which unite them.

Phosphat of lime is insoluble in water, but becomes soluble with the help of an acid, such as vinegar, or the phosphoric acid itself. Alkalis and earths produce no alteration in it, whence it is evident that its principles are very strongly united; but the sulphuric, nitric, muriatic, acetous, and oxalic, acids, decompose it in part, just to the point from which they had separated from the phosphoric acid, about 0·40 of the lime contained in a certain mass of the calcareous phosphat. It is by the decomposition of phosphat of lime with nitric acid, that Scheele has explained the nature of bones: but the same end is now obtained in a more simple way, as follows:

Calcination of Bones.—A furnace is to be built of brick, about eight inches high, and forty inches wide; lay bars of iron across, to form a kind of grate, and upon this place the bones to be calcined; leave a hole about eight inches square in the furnace, to supply a current of air; and through this hole introduce some pieces of wood already lighted, which will set fire to the bones: then they burn of themselves till they are sufficiently calcined. This operation, which is attended with no expence, should be made in the open air, because the oily matter, which comes over by combustion, is still sufficient to be dangerous in a small confined place. These bones are then reduced to fine powder, and sifted.

The next operation is the separation of the phosphoric acid by means of sulphuric acid. Take one part of these calcined bones, temper them in four parts of water, and pour over the mixture one half part of concentrated sulphuric acid, stirring the mixture continually. Let the whole macerate for four-and-twenty hours, stirring it from time to time, to renew the surfaces and points of contact. At the moment the acid is poured on, there is a disengagement of caloric, and a brisk effervescence, occasioned by the disengagement of carbonic acid; for, besides the phosphat of lime, the bones contain also a certain portion of carbonat of lime. The sulphuric acid now unites with the lime, forming an insoluble salt; and the phosphoric acid, being set at liberty, dissolves in the water. The acid which is obtained still contains a good deal of lime, and is to be considered, according to the experiments of Fourcroy and Vauquelin, as an acidulated phosphat of lime. To separate all the phosphoric acid from the bones, the acidulated phosphat may be decomposed by oxalic acid, carbonat of ammoniac, or nitrat of lead: but the first is too expensive; the second, by precipitating all the lime as chalk, and forming a phosphat of ammoniac, decomposable indeed by charcoal, gives the required result, but it rather confuses the operation by furnishing carbonat of ammoniac; the third (nitrat of lead) seems preferable, because it forms nitrat of lime which is held in solution, and phosphat of lead which is precipitated, in the liquor: this precipitate well washed, and heated with very dry charcoal, easily parts with all its phosphorus.

From the experiments of the above-cited chemists, it appears, that 100 parts of neutral phosphat of lime, or earth of calcined bones, contain 0·41 of phosphoric acid, which, according to the analysis of Lavoisier, contain 0·16 of phosphorus; thus, by setting these 0·41 of phosphoric acid at liberty, there is gained by distillation with charcoal, 0·16 of phosphorus, or little less than a sixth part of the weight of the earth, which in truth contains

that quantity. But, as there are only 0·17 of this acid disengaged, and as 0·24 still remains closely united with the lime, these 0·17 can yield but 0·06 of phosphorus; thus more than two-thirds of the phosphorus contained in the waters are lost; and, after the distillation of their acid obtained in the usual way by charcoal, the residue contains 0·59 of phosphat of lime not decomposed. These explanations therefore lead us to prefer the process of Fourcroy and Vauquelin, as follows:

Evaporation of Acid Liquors, and their Mixture with Powder of Charcoal.—When the matter has been macerated, as mentioned before, draw off the clear liquor; wash the remaining thick stuff in river-water several times; unite these waters with the first, and evaporate in pots of copper, or rather of lead. During the evaporation of this liquor, there will be separated a considerable quantity of sulphat of lime, held in solution by means of the phosphoric acid; this may be taken away by decanting after it has settled; but the phosphoric acid will always retain a certain quantity of it, which cannot be separated but by operations very complex and costly.

The phosphoric acid commonly appears as a mass of a white colour, slightly tinged with yellow, formed of little shining scales like pearls; this is called *concrete phosphoric acid*; but it is not pure, containing still a good deal of lime. With this acid they make phosphorus. To extract the phosphorus from the phosphoric acid, mix it with one fourth of its weight of charcoal in powder, and dry the mixture in a melting-pot, till the greatest part of the moisture is gone.

Pelletier's method is to bring the acid liquors to a thick consistence; then add the powdered charcoal, previously calcined till the matter is friable: continue the drying, but stir it frequently to prevent it from being grumous; and keep up the fire till the bottom of the vessel be red-hot. The vessel should have a very thick bottom, and be well luted on the outside, or the fire may calcine it.

Distillation of Phosphorus.—Fill a stone retort with the mixture, and for a receiver use an inverted retort containing water. Pelletier uses a copper receiver made on the same principle. The water in the receiver stops the phosphorus as it passes over, and prevents it from coming in contact with the air; and hereby a large quantity of phosphorus escapes combustion, because it must pass through a column of water of near eight inches, before it has contact with the air; yet there is a small portion volatilized naturally, which is driven four inches above the neck, where this phosphorus burns in sparks, and the neck or tubulation is sometimes clogged up with pulverulent phosphorus; attention must be paid to this, to prevent absorption; but, if the operation is conducted with skill, this inconvenience does not take place. For the purification, &c. of phosphorus, see the directions already given in page 200. At the beginning of the operation, hydrogen gas and carbonic acid are disengaged, arising from the decomposition of the water by the charcoal. When the phosphoric acid begins to be decomposed, the hydrogen gas dissolves a little of the phosphorus, which gives it the property of shining in the dark by the contact of air. At last, if the heat is strong enough, the phosphorus takes the form of an oil, which falls into the water of the receiver, where it congeals. This experiment shews, that at a high temperature, the carbon has more attraction for the oxygen than the phosphorus has; that this has more than the hydrogen, since the water is decomposed before the phosphoric acid; lastly, that hydrogen can dissolve a certain quantity of phosphorus. It appears that the water of the receiver retains the phosphorated hydrogen; for, if exposed to the air in the dark, even after being strained, it gives out a very bright phosphoric flame, especially if the surfaces are renewed by agitation.

The uses of phosphat of lime are numerous. It serves to polish metals, jewels, and factitious stones; to make cupels, or assay-vessels; to take spots of grease out of stuffs, linen, or paper; in the manufacture of toys, before it is calcined; lastly, it is used in the large manufactures of ammoniac, as carried on in the country of Liege.

PHOSPHAT OF POSASH.—This phosphat is but little known. It does not crystallize; it becomes a sort of jelly when the solution is evaporated; in that state it attracts the moisture of the air; it is decomposed by lime, barytes, and strontian, which have all more attraction for the phosphoric acid. Vauquelin has made some experiments which seem to prove that soda takes this acid from potash. This salt is not decomposable by charcoal, like the phosphat of ammoniac; which must be the case, since carbonat of potash is decomposed by the phosphure, which deprives the carbon, by a double affinity, of the oxygen it contains in combination with the potash. It is not decomposed by heat, but vitrefies. Most of the metallic solutions, as of silver, iron, mercury, and antimony, are decomposed by it. If the phosphat of potash be not well saturated with alkali, it reddens blue vegetable colours.

PHOSPHAT OF SODA.—This salt is produced by a combination of phosphoric acid with soda. It is very soluble in water, and crystallizes easily, provided there be a slight excess of alkali; and then it changes the syrup of violets to a green. Its usual form is a lengthened rhomboid, the faces inclining one over the other; sometimes it exhibits rhomboidal and prismatic crystals, or little lamellous crystals; but its crystallization is generally a rhomboidal parellelopiped with blunt angles. If, instead of having an excess of alkali, it has an excess of acid, it crystallizes very imperfectly, appearing as a mass composed of little shining leaves like pearls, resembling sedative salt: this is what Bergman called *Haupt's pearly salt*. Its taste is pleasant, sweet, but little saline. It is very transparent, but by exposure to the air soon grows white and opaque: the crystals however preserve their form and much of their consistence, contrary to many salts, which, when they lose their water of crystallization, become farinaceous. Phosphat of soda contains a good deal of this water of crystallization, so that it liquefies with a gentle heat; in a stronger heat, it becomes opaque, and vitrifies, producing a glass of the colour of milk. Under the blow-pipe, it begins to liquefy; then passes into the white concrete state; and at last a little vitreous globule, which appears transparent when melted: this little globule becomes opaque in cooling, and assumes a polyhedral shape. Phosphat of soda in this case acts the same as phosphat of lead, according to Pelletier. As this salt melts easily, it facilitates the fusion of earths, either simple or compound, as well as the metallic oxyds; hence mineralogists and chemists use it often with success, in their experiments with the blow-pipe, to discover the nature of the substances they are assaying.

This salt is decomposed by barytes, strontian, lime, and potash, and by the calcarean, magnesian, barytic, and aluminous, salts; but the decomposition of the latter is operated by double affinity. Most of the metallic salts are decomposed by this; by which metallic phosphats are very easily and expeditiously formed, which indeed are subject to vary in the proportions, because, in these decompositions, the strongest acid always takes the lead, and determines the relation between the weakest acid and the base which the other gives to it. This phosphat is often used in medicine for sulphat of soda, of which it has all the good properties: the dose is one ounce in a large glass of water.

PHOSPHAT OF AMMONIAC.—This salt is prepared by mixing carbonat of ammoniac and phosphoric acid to the point of saturation; then evaporate with a gentle heat. It is difficult to obtain crystals of this salt, for, if heated too much, the ammoniac volatilizes; it is necessary, as the liquor evaporates, to add a little more ammoniac to replace that which flies off in vapours; without this, the salt would contain an excess of acid.

Phosphat of ammoniac is always found with phosphat of

of soda in animal substances; they even appear to form together a triple salt, according to the proportions of each, which proves that they exercise a reciprocal attraction, which occasions them to unite. Exposed to heat, the ammoniac is disengaged, and the phosphoric acid remains in the vitrified state. It undergoes no change by exposure to the air. It is soluble in four parts of water, at the mean temperature of the atmosphere, and crystallizes easily into regular four-sided prisms, crowned with pyramids of the same shape.

Charcoal decomposes this salt. For this purpose, put into a retort a mixture of phosphat of ammoniac and of charcoal in powder; lute the retort with earth: place a balloon to receive the phosphorus, and a jar to collect the ammoniacal gas which is disengaged; a bent tube of safety must pass from the balloon, to be plunged underneath the jar in the pneumatic mercurial apparatus. The phosphoric acid is attacked by the charcoal, which seizes on the oxygen, and sets the phosphorus free; the action of the charcoal upon the phosphoric acid is assisted by heat. To this operation must the definitive operation be reduced, when the residue, evaporated to the consistence of honey, is decomposed, to fabricate the *phosphorus of Kunkel*; for the phosphats of soda and lime, contained in the residue, are not decomposed by the charcoal; it is only the phosphat of ammoniac, which being deprived of its ammoniac by the action of the heat which volatilizes it, leaves the phosphoric acid at liberty; and then, the charcoal, acting upon the oxygen, makes it easy to distil the phosphorus. This is the reason why the processes with urine yield so little phosphorus; and certainly it was long unknown that all the phosphorus of the acid constituting the phosphats of lime and soda was neglected and lost, because they could not be decomposed without the agency of an acid, stronger in affinity for lime and soda than the phosphoric acid, and such are the nitric and sulphuric acids.

The stronger acids decompose this phosphat; as do barytes, strontian, lime, potash, and soda: magnesia decomposes it with heat, for in the cold a little magnesia will always remain. By mixing concentrated solutions of the phosphats of ammoniac and of soda, a triple combination is produced, called phosphat of soda and ammoniac. This salt crystallizes and effloresces in the air. Its presence may be known as follows: If the mixture of the triple salt is not well made, that which is properly formed is evident by the efflorescence, while the uncombined portion of phosphat of soda crystallizes apart in a transparent rhomboid form. If, on the other hand, the ammoniacal phosphat is in excess in this triple combination, it is easily perceived also, because the ammoniac may be disengaged by caustic lime.

This salt is one of the best solvents that can be used in experiments with the blow-pipe: it hastens the fusion of stones, and the metallic earths and oxyds, the species of which is often known by the colour they communicate to it.

Phosphat of Magnesia.—This salt is but little soluble in water yet sufficiently so to furnish long crystals like flattened needles, very thin, and cut obliquely at the ends. We owe to Vauquelin the method of obtaining it quickly, in solid crystals of two or three inches long and one line thick. This method consists in mixing equal parts of sulphat of magnesia and phosphat of soda, both dissolved in water. At first there appears to be no action between these substances; but at the end of twenty-four hours, there will be found in the liquor prismatic crystals, perfectly transparent, varying in size according to the quantity of the salts employed. This substance, exposed to the air, loses its water of crystallization, becomes opaque, and is even reduced to powder in a short time; this proves that it has no great attraction for water. It has no sensible odour. It melts under the blow-pipe into a globule, which preserves its transparency after cooling.

The sulphuric, nitric, and muriatic, acids, separate the elements of the phosphat of magnesia, by uniting with its base, and setting the phosphoric acid free. It is decomposed also by barytes, strontian, and lime: it is easy to prove this, by pouring a solution of these earths into a solution of the salt, which immediately becomes turbid, because these phosphats are much less soluble than the magnesian. It is decomposed by the fixed caustic alkalis, but not by ammoniac; on the contrary, magnesia completely decomposes phosphat of ammoniac, especially in a gentle heat. Phosphat of magnesia unites easily with phosphat of ammoniac, forming together a triple combination, quite insoluble. Fourcroy described its properties in a calculus taken out of the colon of a horse, which died at the veterinary school at Alfort.

Phosphat of Glucine.—An insoluble salt is formed by the combination of this earth with phosphoric acid; pour into a solution of sulphat of glucine a solution of phosphat of soda without excess of alkali; a plentiful mucilaginous precipitate is formed, with no taste, very soluble in an excess of phosphoric acid, and even in a foreign acid. This salt is decomposed by the sulphuric acid; and by the earths and alkalis, except alumine and zircon. It melts into a vitreous pearl under the blowpipe, and keeps its transparency when cold.

Phosphat of Alumine.—This salt, like the preceding, is but little known: it is prepared by a direct combination of alumine with phosphoric acid. It melts with the blow-pipe into a transparent glass, and without being decomposed. It is almost insoluble in water, but becomes abundantly so by an excess of acid. It is decomposed by the mineral acids; and by earths and alkalis, except zircon.

Phosphat of Zircon.—Of the nature of this salt very little is at present understood; we know only, that the phosphoric acid decomposes muriat of zircon, and forms with its base an insoluble composition, which is precipitated in white flakes.

Phosphat of Silex.—This salt is as little known as the preceding. Fourcroy says, that, by uniting phosphoric acid with silex by fusion, this salt is obtained, but whose properties have not yet been described. By this method factitious jewels may be made.

Of PHOSPHITS.

Phosphits have many properties in common with phosphats. The phosphits of soda and potash are easily soluble in water, and crystallizable; those of lime, magnesia, and barytes, are but little so; but the phosphit of alumine enjoys this property in a very remarkable manner. Those phosphits which are insoluble in themselves become absolutely soluble by an excess of their acid. All, except perhaps that of barytes, are decomposed by lime. Yet these salts exhibit phenomena by which they may be easily distinguished from phosphats, and from all other substances of this class. These are chiefly, furnishing by distillation a small quantity of phosphorus, and of giving a bright flame when heated under the blow-pipe, even upon an incombustible substance These salts possess, in common with other salts, the property of precipitating gold from its solution in the metallic state, and of detonating by permission with the super-oxygenated muriat of potash. There are seven phosphits which are perfectly known, from the experiments of Fourcroy and Vauquelin: these are, the phosphits of potash, soda, ammoniac, lime, barytes, magnesia, and alumine.

Phosphit of Potash.—This salt crystallizes very readily by cooling, when the water in which it is dissolved is sufficiently evaporated. Its form appears to be a four-sided prism, terminated slopewise. Its taste is slightly penetrating. It is very soluble. Heated with the blow-pipe, it swells, and melts, without emitting, like the other phosphits, phosphoric light. It is collected, by melting it, into a transparent globule which crystallizes,

ftallizes, and becomes opaque by cooling. It is decomposed by lime and barytes, which produce copious precipitates in a folution of this falt. The fulphuric, nitric, and oxalic, acids, &c. feparate the phofphorous acid from its alkaline bafe, the oxygenated muriatic acid converts it into a phofphat. It confifts of potafh, 49·424; phofphorous acid, 39·466; water, 11·110.

Phosphit of Soda.—This is very foluble in water, requiring in the ordinary temperature of the atmofphere only two parts of that liquid to diffolve it. Its folution, when fubjected to a flow evaporation, exhibits at firft on the fides of the capfules, fmall plumofe cryftals like thofe of fal-ammoniac; afterwards fquare laminæ are formed on the furface of the liquor, which feemed to be formed by the union of four triangles. Some portion of this falt affume the form of the pappus, or down, of fome vegetable feeds; but, in examining thefe with a good glafs, they appear to be compofed of a great number of fmall cubes, which come very clofe together, but do not unite, for we can eafily fee the fpace which feparates them. It decrepitates with the blow-pipe, and gives out a phofphorefcent flame. It then melts into a glafs, which fpreads on the fupport, and becomes opaque by cooling. This falt confifts of foda, 23·680; phofphorous acid, 16·320; water, 60·000.

Phosphit of Ammoniac.—This has a very ftrong penetrating tafte. It creeps up the fides of the veffels in which it is evaporated. It cryftallizes in the form of very long fine tranfparent needles, fo that it is difficult to determine, by the fight alone, the form and the relation of its angles. It boils up and fwells with the blow-pipe, giving out, after a few feconds, a great quantity of phofphorated hydrogen gas, which inflames in the air, and forms very beautiful circles of white fmoke. This experiment proves, that phofphorus, in a high temperature, when affifted by the prefence of ammoniac, poffeffes the property of decompofing water. The oxygen of the water, combines with one portion of this inflammable fubftance, and its hydrogen with another portion, to form phofphorated hydrogen gas, which inflames as foon as it comes into contact with the air. It is decompofed by diftillation in a retort. The ammoniac is difengaged partly in a liquid ftate, and partly in the ftate of a gas, which retains phofphorus in folution, but which does not inflame. It gives out a phofphorefcent light, when mixed with oxygen gas. What remains in the retort is vitreous phofphoric acid. It is decompofed by potafh, foda, lime, and barytes; for the folutions of thefe earths occafion a copious precipitation in that of phofphit of ammoniac. A ftrong fmell of ammoniac is perceived during the action of the fixed alkalis. It precipitates nitrat of mercury, of a white colour, but the phofphit of mercury which refults, foon becomes of a grey colour, particularly the part which is expofed to the light. It confifts of ammoniac fifty-one; acid, twenty-fix; water, twenty-three.

Phosphit of Lime.—The phofphorous acid forms with lime a very intimate combination, which is very infoluble in water, and which has no perceptible tafte. It is rendered foluble by an excefs of acid, and this triple union affords fmall hard and brilliant cryftals, by a careful evaporation. Thefe cryftals are too fmall to enable us to determine their form. The phofphorous acid, appears to adhere ftrongly to the phofphits of lime, for it is impoffible to feparate it by frequent wafhings with water. This excefs of acid is taken from it by all the earthy and alkaline fubftances, although thefe have for the phofphorus acid lefs affinity than lime, which feems to prove, that the acid in this combination is retained by two different forces. It melts with the blow-pipe, emitting a phofphorefcent light, and forming into a globule, the tranfparency of which remains after cooling. Its fufion is promoted by an excefs of acid, and the glafs which it affords is more tranfparent. Lime feems to have, of all fubftances, the ftrongeft affinity for phofphorous acid. It is decompofed by the mineral, and even by fome of the vegetable, acids, fuch as the oxalic, citric, tartaric, &c. It confifts of lime, fifty-one; acid, thirty-four; water, fifteen.

Phosphit of Barytes.—This is difficultly foluble in water. Lime water forms with the folution however, an evident cloud. The folubility of this falt, is greatly increafed by an excefs of acid, fo that it affords by fpontaneous evaporation fine needle-like cryftals, fo fmall indeed, that it is impoffible to afcertain their exact form. The falt in this ftate, has the fame habitudes with water, or the acidulous phofphit of lime. The oxalic acid forms in its folution a cryftalline depofit, compofed of fmall and long needles. Thefe cryftals are a combination of oxalic acid and barytes: ammoniac takes the excefs of acid from the phofphit of barytes, which is precipitated in the form of a white cloudy powder. This powder is foluble, like the phofphit of lime, in acetous acid, although this acid is unable to decompofe thefe falts. Phofphit of barytes melts with the blow-pipe into a globule, which is covered with fo ftrong a light, that it is impoffible to look at for a few feconds without injuring the eyes. This globule, which is tranfparent during fufion, becomes opake by cooling. With the exception of lime, the earths and alkalis produce no change on this falt. The mineral and feveral of the vegetable acids decompofe it. It is compofed of barytes, 51·230; acid, 41·770; water, 7·000.

Phosphit of Magnesia.—This falt is flightly foluble in water, without the affiftance of an excefs of acid. It has no fenfible tafte, and effervefces in the air like phofphat of magnefia. It fwells fuddenly with the blow-pipe; inflames and emits a greenifh phofphoric light: it melts into a globule, which acquires a milky colour by cooling. It is decompofed by the fixed alkalis, lime, and magnefia. Ammoniac produces only a partial decompofition, and forms with it, as with all other magnefian falts, a triple falt, poffeffing peculiar properties. The fulphuric, nitric, muriatic, fluoric, citric, oxalic, and tartarous, acids, decompofe it by difengaging its phofphorous acid. The oxygenated muriatic acid converts it into a phofphat, by burning the fmall quantity of phofphorus which it contains. It confifts of magnefia, twenty; acid, forty-four; water, thirty-fix.

Phosphit of Alumine.—This is very foluble in water, without an excefs of acid, in which it differs from the phofphat, which is infoluble, and which becomes fo only by an excefs of acid. Evaporated with a gentle heat, it exhibits no mark of cryftallization, no faline depofit; on the contrary, it forms a tranfparent ductile mafs, which has a ftrong refemblance to a foft gum. This falt has an aftringent tafte. Placed on burning charcoal, it fwells up like alum, and emits a beautiful phofphoric light. It preferves the volume it acquired in fwelling, and becomes very light and fpongy. It does not attract humidity from the air, but remains dry and tranfparent. Alumine has the weakeft attraction of alkaline and earthy matters, for phofphorous acid, fo that is eafily decompofed. The greater part of acids decompofe it. Vauquelin remarks, that were we to judge by analogy of the properties of compound fubftances, we fhould be led to believe, that the phofphits muft be very combuftible, as they contain a portion of unburnt phofphorus, which has fo ftrong an attraction for oxygen, that it will unite with it in every temperature. But this is contrary to obfervation; for the phofphits remain for months, either in the liquid or folid ftate, without undergoing the fmalleft alteration. Sulphits, on the contrary, are in the fame circumftances foon changed into fulphats. He ingenioufly accounts for this difference, in the following manner.

The combuftion of a body takes place more eafily and fpeedily in conjunction with other bodies, which increafe its affinity. It is in this way that metals diffolve much more rapidly in water mixed with an acid, than they do in pure water. It is on the fame principle, that the nitric acid

acid yields its oxygen to gold, when it is mixed with muriatic acid; though, if alone, it does nor part with any, becaufe the affinity of the nitric acid for the oxyd of gold is not fufficient to produce the decompofition of a part of the acid. It is therefore the pre-exifting affinity of the oxyd of gold for the muriatic acid, which is very ftrong, that favours the oxydation of that metal. It is alfo in this manner in confequence of the greater affinity which alkaline and earthy bafes have for the fulphuric and phofphoric acids, that thefe bafes folicit, as it were, the fulphits and phofphits to abforb a frefh quantity of oxygen, in order to unite with their acids more clofely or completely. But as the fulphuric acid has a much ftronger affinity for alkaline fubftances than the phofphoric, the combuftion of the fulphits muft be more rapid than that of the phofphits. In addition to this, there feems to be a greater difference between the affinity of the fulphuric and fulphurous acid for the fame fubftances, than between that of the phofphoric and phofphorous; the phofphorus in the phofphorous acid being in a ftate of much more complete combuftion than the fulphur in the fulphurous acid; fo that, being furrounded by a great number of particles of oxygen, its affinity for this principle is proportionally diminifhed, and confequently the combuftion of the phofphits is rendered lefs energetic.

OF FLUATS.

Thefe have in general two properties: fome have but little tafte, and are hardly foluble; others have more tafte, and are more foluble. Some cryftallize; others not. The ftronger acids decompofe them all; fo does lime. Heat alfo decompofes the greater part of them.

FLUAT OF LIME.—This fluat is found native in the neighbourhood of mines, and in the ores of lead, filver, cobalt, copper, &c. There are ten varieties partaking of different colours, as blue, green, white, red, &c. This diverfity of colours arifes from the prefence and ftate of the iron, which affumes various hues, according to the quantity of oxygen it contains. The moft beautiful fluor fpar, and the rareft yet known, is the white; the green is the moft common, and next to that the amethyftine. It is neither denfe, hard, nor fufceptible of a fine polifh; it has commonly a lamellated appearance, and is mingled with quartz. That which is called white, has always a caft of yellow. It is called fluor fpar, vitreous fpar, fpath fluor, phofphorous fpar, and calcareous fluat. Thefe fluats are in general one and the fame faline fubftance, that is to fay, the combination of the fluoric acid with lime. This fpecies of falt is three times the weight of diftilled water. Harvey difcovered that its cryftal was a perfect octahedron, which afterwards diminifhed into a cube.

The calcareous fluat, broken in pieces, and heated in a red-hot fhovel, gives out a violet phofphoric light; but it is only the coloured fpar which does this, fo that it appears the light is due only to the colouring fubftance. Scheele made fome experiments on this fubject; and he has demonftrated, that, when this fpar has once been expofed to a red heat, it cannot be made phofphoric again by a fecond calcination. Scheele fuppofed alfo that the phofphoric property was due to the combuftion; but the matter is phofphoric in vacuo: fo that the caufe of the phenomenon is not yet known.

Heat melts this falt, but does not decompofe it: it becomse a fort of enamel; when fuddenly heated, it decrepitates almoft as ftrongly as muriat of foda. By the help of the blow-pipe, it may ferve as a folvent for ores. It is not altered in the air, nor foluble in water, yet it will diffolve and cryftallize of itfelf. Sulphuric, nitric, and muriatic, acids, decompofe the fluat of lime. The refidues are falt with a bafe of lime, contrary to what is afferted by Monnet; and the acid obtained is of a peculiar nature, nothing like the acids employed, as we have already fhewn, in the examination of the fluoric acid. When this decompofition is made, the acids muft be diluted with water, that the falts which are formed may find water for their folution; they feize on it quickly. Without this precaution, the fmall quantity of water which the concentrated acid contains is prefently abforbed, which clogs up the mixture, hinders the point of contact, and may even ftop the operation. The calcareous fluat is not however decompofed by any alkaline or earthy matter; but, if alkalis in the ftate of carbonats be ufed, then the double affinity is excited, and a double decompofition takes place. For this purpofe, one part of this fluat being fufed with four parts of carbonat of potafh, and poured hot into water, a precipitate of chalk, formed by the carbonic acid united to the lime of the calcareous fluat, is obtained; and the fluid holds in folution fluat of potafh, which may be obtained, by evaporation, in the form of a jelly. When the experiment is repeated with carbonat of foda, chalk and fluat of foda are in like manner obtained; alfo a cryftallized falt.

Calcareous fluat is of no ufe excepting in fome mineral countries, where it is ufed as a very good flux. It might be applied to the fame purpofe in affays.

FLUAT OF BARYTES.—The fluoric acid poured on a folution of nitrat or muriat of barytes, occafions a precipitate; and this precipitate effervefces with the fulphuric acid, which difengages the fluoric acid. This experiment proves, that Monnet was wrong in ftating, what he has repeated in his very laft work, that the fulphuric and fluoric acids were fimilar. This fluat is decompofed only by lime, and the alkalis in a carbonaceous ftate.

FLUAT OF STRONTIAN.—This falt has as yet been but little inveftigated. If fluoric acid be added to a folution of ftrontian in water, or in the nitric or muriatic acids, the refult will be fimilar to that of fluat of barytes. This falt is decompofable by lime and barytes.

FLUAT OF POTASH.—When an alkaline fluat is prepared with filiceous fluoric acid, the filex will never be all precipitated; part of it remains as a triple falt, which however may be decompofed by continuing the heat fomewhat longer, and then the filex comes away like a jelly. If, on the other hand, we work with pure fluoric acid, the fluat of potafh is then obtained in ductile plates, but with the acid prepared in veffels of earth it will be in a jelly: this circumftance led the celebrated Scheele into an error, for he never could obtain it in cryftals.

Fire difengages the fluoric acid, and leaves the alkali only in the veffel; if the experiment be not made in metal retorts, a triple falt, in a gelatinous form, would be produced. It is foluble in water. The fulphuric, nitric, and muriatic, acids, feparate the fluoric acid: heavy white vapours are immediately perceived, which are filiceous from the beginning if veffels of glafs are ufed in the operation. This fluat is decompofed alfo by lime, barytes, and ftrontian; according to Scheele, the calcarean muriat, and the magnefian fulphat, decompofe this falt. Some of the metallic folutions, as thofe of filver, mercury, and lead, are decompofed by double affinity.

FLUAT OF SODA.—The true nature of this falt is lefs known than that of the preceding. Boullanger, who examined all the products of the fluoric acid, fays, that it cryftallizes in the cubical form; Scheele fays it does not cryftallize at all. In general, it acts nearly the fame as fluat of potafh when heated. It is decompofed by lime, barytes, ftrontian, and potafh: barytes even diffolved in water decompofes it, and the fluat of barytes which is formed, fhews clearly a direct affinity, for no double affinity can take place here. The carbonats and the muriat of lime decompofe it alfo. By double affinity, it is decompofed by folutions of filver, mercury, lead, &c. for, the fluoric acid alone would occafion no precipitation, did not the foda attract the acid, while the fluoric acid attracts the metal.

FLUAT OF AMMONIAC.—This may be prepared from cryftallized carbonat of ammoniac, or by faturating liquid ammoniac with fluoric acid. It cryftallizes in little grains, if the fluoric acid be very pure; for, if it contains filex,

silex, a triple salt will be formed, incapable of crystallization; and the same effect takes place if evaporation be made in vessels of glass. It should be observed, that towards the end of the operation some ammoniac is disengaged, so that more must be added, in order to obtain the fluat of ammoniac in a regular form: without this precaution, almost the whole of the ammoniac would be disengaged.

This salt is always found with an excess of acid. The most neutral fluat of ammoniac which can be obtained, corrodes glass, and perhaps the crystals which are produced are a triple salt, ammoniaco-siliceous fluat. When distilled in close vessels with sulphuric acid, pure fluoric acid passes over, and a thick crust is formed upon the water of the recipient. The earthy substances previously examined, as well as the alkalis, decompose it also, by disengaging the ammoniac. Distilled with carbonat of lime, or chalk, ammoniacal carbonat and fluat of lime are obtained: this decomposition cannot take place without heat. Calcareous muriat and nitrat decompose it also: there is then an exchange of the bases. Scheele says that this salt disturbs a solution of sulphat of magnesia. Solutions of silver, mercury, and lead, are decomposed also.

Fluat of Magnesia.—This is formed when magnesia is dissolved by the fluoric acid; but it is deposited immediately with the acid, and forms with the undissolved earth a gelatinous mass. This salt is soluble with excess of acid; it cannot be obtained in a neutral state. It is decomposed by all the preceding bases. When decomposed by means of ammoniac, a triple salt is formed, ammoniaco-magnesian fluat: this takes place with all the magnesian salts, when decomposed by ammoniac: and the decomposition of these salts stops, the moment that the necessary portions for forming the triple salt is combined.

Fluat of Glucine, is a combination not yet investigated.

Fluat of Alumine.—This is produced by the combination of fluoric acid with alumine, which affords a weak solution, not crystallizable, but in form of a jelly. It may be decomposed by all the bases.

Fluat of Zircon.—This earth has not yet been treated experimentally with the fluoric acid, so that its properties are not ascertained.

Fluat of Silex. See *Fluoric Acid*, page 220.

Of BORATS.

Borat of Barytes.—Barytes combines with the boracic acid, forming an insoluble salt, not decomposable by other earths and alkalis; but it is not quite certain whether it may not be decomposable by lime. It is decomposed by all the acids in the cold way; but, with heat, the effect is contrary; this salt being fixed by heat, it is the boracic acid which decomposes the alkaline and earthy salts. Besides alkalis and acids, many salts decompose this borat by double affinity; as, when muriat of lime is put in contact with borat of barytes; then there is an exchange of base.

Borat of Strontian.—This seems to be but very sparingly soluble in cold water. It requires about 130 times its own weight of boiling water to dissolve it. The solution changes to a green, the colour of paper stained with the juice of violet. This salt has as yet been but little examined.

Borat of Lime.—To prepare this borat, lime-water is to be poured into a solution of boracic acid to perfect saturation; then evaporate the saline liquor to dryness. This salt has little taste; it is fixed by heat, and vitrifies. It is less soluble than lime; and barytes is the only earth that decomposes it. By help of heat, it is decomposed by the acids which precipitate the boracic acid. The muriatic acid should be preferred, because the muriat of lime which is formed, being soluble, remains in solution in the liquor; an advantage not to be obtained with sulphuric acid, because the sulphat of lime would be precipitated at the same time.

A substance was found for several years, in the environs of Lunenberg, in some beds of sulphat of lime, which substance, from its form and shape, got the name of *cubical quartz*. Westrumb has proved, from numerous experiments, that this is a triple salt composed of magnesia, lime, and boracic acid, in the following proportions; boracic acid, 0·66; lime, 0·105; magnesia, 0·135; and 0·1 of foreign bodies, consisting of a little iron, silex, and alumine. The caustic alkalis will not decompose the native magnesio-calcareous borat; it was by acids only that Westrumb could separate its elements, and determine its proportions.

Borat of Potash.—The boracic acid unites easily with potash, producing a salt of a slightly-alkaline taste. It crystallizes irregularly in six-sided prisms, two large and two small, with quadrangular pyramids. It however requires an excess of the potash to make it crystallize, like that of soda. Though the alkaline taste be very perceptible in the borats of potash and soda; and though they turn the blue vegetable colours to a green, and restore the colours reddened by acids, it is certain that the excess of alkali is not thereby disengaged.

This salt, vitrified by heat, is more soluble than that of soda. It is decomposed by barytes and lime; when too great a quantity of lime is added, the borat of lime may be dissolved by the excess of lime; this property is remarkable, that the lime in excess should be able to dissolve the borat of lime which was formed, for insoluble salts are generally re-dissolved by an excess of acid. This solution takes place, therefore, from an excess of base. The acids decompose this salt; but, as the affinity of potash for the boracic acid is stronger than that of soda for the same acid, the decomposition is not made without difficulty.

Borat of Soda, or Borax.—This salt is found in commerce in three different states. 1. Crude borax, *tincal*, or *chrysocolla*, a name which it has received from the use which is made of it by brasiers, jewellers, and goldsmiths, for soldering. 2. Chinese borax. 3. Dutch or purified borax. The crude borax, or tincal, is brought from Persia to Holland in green crystals, sprinkled with greenish-white dust. To purify this, the Hollanders dissolve the borax in boiling water, mixing therewith either lime or soda, and putting in whites of eggs, or bull's blood, to purify it. Maregrave found copper and clay in the crude borax; but that might proceed from the vessels it was prepared in. Its taste is styptic and urinous; it reddens syrup of violets, because it contains an excess of soda. Its form is six-sided irregular prisms, terminated by pyramids. Thrown upon burning coals, it gives out an oily empyreumatic smell, which seems to prove that it contains some animal substance. It melts easily with heat, swelling up, and considerably increasing in magnitude, and is then distinguished by the name of *calcined borax*. The borax is not at all altered in its composition; nothing being driven off by the heat, but the water of crystallization, which is somewhat more than a third of its weight. Its original form may be restored by solution in water and crystallization; but, when calcined borax is more strongly heated, it melts into the form of a transparent greenish glass, which tarnishes in the air, and by that means gets an efflorescence on its surface. The borax, thus vitrified, loses at least three parts of its magnitude; and it is often preferred to the boracic acid for experiments with the blow-pipe, because it melts more easily, and more readily combines with terrestrial substances. Air produces no change in this salt, except an efflorescence on its surface, occasioned by its losing a portion of its water of crystallization. Borax is soluble in water: twelve parts of cold, or six of boiling, are required to dissolve one part of this salt. It serves as a flux, or solvent, for silex; and the gloss thereby formed undergoes no change by exposure to the air.

Care

Care must be taken to divide the earth well, when it is to be melted with borax. When an earthy substance, in very fine powder, is to be united with borax by the blowpipe, the earth should be laid at bottom, and the borax over it, that the wind may not carry it away: the wind must not be too strong till the matter begins to mix; and put enough of the borax, that the glass may be transparent; for if the silex abounds, the glass will be opaque.

Borax gives a yellowish colour to flame; this is one of its characteristics. It dissolves silex with ease; and the combination may be known to be perfect when the globule shines bright. The makers of artificial stones, or false gems, prefer borax, as a flux, to the boracic acid; it melts easier, and makes a very bright fixed glass, clearer indeed than some stones; but it has neither their density, hardness, nor weight.

Alumine combines with borax, and a brisk effervescence is produced, which probably arises from the presence of a little air or carbonic acid. Barytes and lime decompose this salt; and, if quick-lime be used, the decomposition is complete. Borax shews the presence of metallic substances by the manner in which glass is coloured.

The borax of commerce is loaded with excess of soda; and Bergman found, that, to bring it to the state of a neutral salt, it absorbed half its weight of boracic acid. This neutral borax is not soluble as the borax of the shops.

Potash decomposes the borat of soda; but ammoniac does not alter it at all; for the solution, by spontaneous evaporation, lets the ammoniac escape, and at last keeps nothing but the boracic acid. All the acids, except the carbonic, decompose borax in the cold way, and the borats in general; they separate the acid in form of spangles.* But, with a strong heat, the boracic acid decomposes all the acids whose salts are less fixed. See the article BORAX, in our third volume, page 210.

BORAT OF AMMONIAC.—To obtain this salt, dissolve very pure boracic acid in caustic volatile alkali or ammoniac, until the saturation appears complete; then dilute with a small quantity of water, and about half the liquid is to be evaporated on a sand-bath; a pellicle of united crystals is formed, whose surface exhibits the figure of polyhedral crystals. Its taste is penetrating and urinous; it converts syrup of violets to a green, and gradually loses its crystalline form, and becomes brown by exposure to air. It is moderately soluble in water, and is decomposed by barytes, lime, potash, and soda. It differs from the other borats in this, that the ammoniac volatilises, while the acid remains pure.

BORAT OF MAGNESIA.—This name is given to the combination of boracic acid with magnesia; it dissolves therein but slowly: the fluid, by evaporation, affords granulated crystals. This salt has a sweet saccharine taste. It is fixed by heat; it melts, forming a transparent glass, which becomes opaque in cooling, but which will continue clear, if there be an excess of the boracic acid. Its degree of solubility is not known. Lime and barytes decompose it; as do the alkalis. The acids take up the magnesia, and leave the boracic acid separate. To prepare calcareous borat of magnesia, mix sulphat of magnesia with muriat of lime, and add borat of soda thereto.

BORAT OF GLUCINE.—This has never yet been defined by any chemist.

BORAT OF ALUMINE.—The combination of boracic acid with the earth of alum, which we call aluminous borat, has not yet been observed. It is only known that if a solution of borat of soda be added to a solution of aluminous sulphat, a light and fleecy precipitate is formed. The sulphuric acid quits the alumine to unite with the soda. This earth combines with the boracic acid, which is at the same time separated, and the new salt is gradually re-dissolved. The liquid precipitated by fixed alkali, affords by evaporation a viscid and astringent mass, in which sulphat of soda and aluminous borat are confounded together. This species of borat is decomposable by the same substances as alum: its properties however have not yet been examined with sufficient care.

BORAT OF ZIRCON.—This yet remains for modern chemistry to investigate.

BORAT OF SILEX, *by fusion*.—The nature and properties of this salt has not yet been examined.

OF CARBONATS.

The following is the method of obtaining carbonats in general. In a large doubly-tubulated bottle, put a weak acid much diluted with water; to one of the apertures adapt a long tube or conical conduit, the narrow end within the bottle, the broad part open upwards: through this tube diluted chalk is to be introduced: the neck of a matrass narrowed at the end may be made fit for this purpose. This tube or neck must be so long that by help of the liquid which dilutes the carbonat, the gas may be compressed with a force superior to the pressure laid upon it by the other parts of the apparatus. This conduit may be stopped at will, by means of a piston, which is made with a solid tube of glass, at one end of which some glass is roughly melted on with a lamp, and this extremity is covered with thread, or a bit of rag. To the other aperture of the bottle is adapted a bent tube, whose aperture should be four inches wide; the second branch of this tube is to be plunged into a bottle similar to the first, and which is to contain a solution of potash. Other bottles may be added, containing alkaline or earthy solutions; but for those earths which are not soluble in water, they need only be diluted. The apparatus thus disposed, lute the joinings; then raise the tube or syphon, introduce the diluted chalk by degrees, which falling on the acid is decomposed, and loses its carbonic acid, which is forced through the solutions, and thus becomes saturated with acid gas. When the liquors are entirely saturated, strain, and evaporate them to obtain the crystallised carbonats.

CARBONAT OF BARYTES.—Native carbonat of barytes has been known for some years: Dr. Withering first discovered it, in the mines of Alston-moor in Cumberland; it is found also in Scotland, at Strontian, in Argyleshire; likewise in the vein of silver at Simcoff in the Altaic mountains, and between the Ob and Irtich in Siberia. This substance is extremely compact, semi-transparent, and of the colour of horn; it is of a fibrous texture, divided into irregular laminæ, according to the direction of its fibres. When broken transversely, it has a fatty look, and a form both convex and concave, like siliceous substances: outwardly its fibres are of an unequal texture, and lie in bundles, with intervals between them, which give it a cellular appearance: but this is not constant or necessary. That which comes from Strontian is in the form of agglutinated prisms, lying horizontally on the calcareous spar: these prisms seem to have an hexagon form with parallel striæ, and blunt tops. The specific gravity of these carbonats of barytes is very great, it is 42·382. This salt has neither smell nor taste; it is neutral, and insoluble; but, like carbonat of lime, it is soluble in water charged with carbonic acid.

Carbonat of barytes is made artificially, for the native kind is very scarce. Barytes is separated from the sulphat, and then saturated with carbonic acid. The manner of obtaining the barytes is shewn in our section on *Earthy Substances*, page 223. But the native carbonat of barytes differs from that which is formed by art; the former loses not an atom of its acid by exposure to great heat; the latter loses a small portion of it.

Mixed with charcoal, and urged by a great heat, for two hours, in a crucible, the carbonic acid is disengaged, and the barytes remains pure: but the process is uncertain, and slow. If native and artificial carbonat be mixed together in powder, and heated, the mixture takes a green colour, which lasts for some months; and then disappears. All the mineral acids decompose it.

When this substance, after having been long exposed to the fire, is warmed with boiling water, and the solu-

tion filtered, the barytic earth shoots into small crystals, some of which are evidently of an octahedral figure. This fact has been observed by Klaproth, Vauquelin, and Pelletier. Like the carbonat of lime, it becomes soluble by an excess of acid. The super-saturated carbonat is an extremely useful substance in chemical experiments. It serves to precipitate the sulphuric acid, by the insoluble compound which it forms with it. It serves to purify the phosphoric acid from the sulphuric, and the carbonats of potash and soda from the sulphat which they contain. It is prepared with great care, by putting some carbonat of barytes, or, which is the same thing, barytes precipitated from muriatic acid by an alkaline carbonat, into a bottle of water impregnated with carbonic acid. The bottle is inverted, and the mixture left to digest in the cold for some hours. The solution is filtered, and kept in inverted bottles, to prevent the escape of the carbonic acid. By digesting some of the sulphat of barytes in water impregnated with carbonic acid, Morveau obtained some carbonat of barytes with an excess of acid. He conceives that a small portion of the carbonat is mixed with the sulphat.

Carbonat of Strontian.—This is found at Strontian, among the lead ore. It is of a light green colour, some is transparent and colourless; sometimes it is striated in a regular crystalline form. Its specific gravity is from 36·583 to 36·750, consequently lighter than carbonat of barytes. It retains the carbonic acid gas very strongly; but with care, and by keeping up the fire, about five or six parts of carbonic acid gas may be separated from 100 of carbonat of strontian, without putting the crucible in danger; yet the fire must not be too strong, for in that case the earth will attack the crucible, and form glass of a crysolite colour.

To an hundred parts of carbonat of strontian, add ten parts of charcoal in powder, and make it into a strong dough with starch; and this salt may be decomposed in the following manner: put this dough into a crucible, with a little charcoal dust newly calcined: lay the dough over the charcoal; cover the whole with powdered charcoal; adapt a head to the crucible, and lute it with earth. When the crucible is thus secured, expose it to a very strong heat for a full hour, which will suffice for disengaging the carbonic acid gas: when the crucible is cold, open it, and the lump will be found preserved, weighing only seventy-two parts. If the remaining matter be dissolved in distilled water, crystallized strontian is produced.

To manufacture carbonat of strontian, expose a solution of this earth in water to the air, and a white pellicle will be formed over it, which is only a combination of the strontian with the carbonic acid gas it has attracted from the atmosphere. The mineral acids decompose carbonat of strontian. This carbonat is neither vomiting nor deadly, as is the carbonat of barytes, both native and factitious; which shews a great difference between these carbonats.

Carbonat of Lime.—All calcareous matters in general, are neutral salts, resulting from the combination of carbonic acid with lime. There are many substances of this kind, as chalk, spar, marble, shells, concretions, &c. Each of these salts is different in texture, transparence, and grain; variations which arise from their quick or slow combination, subsequent exposure to peculiar temperature, &c. These matters are commonly coloured by metallic substances, as iron, manganese, &c. The Icelandic spar has the property of doubling the object of vision, a phenomenon which has never been truly explained. Chalk, or calcareous carbonat, improperly called Spanish white, is prepared in France at Marli, Mardon, Cavereau, &c. But the most transparent calcareous spar only, such as white marble, should be used in making experiments to establish the properties of this earthy salt.

When exposed to the action of heat, it loses its acid, and water of crystallization. Take calcareous spar or powdered marble; put it into a retort of porcelain or of earth, or rather into a glass tube well luted; or a gun-barrel may be used, and laid through a furnace; (but in this case the operator must not be surprized at finding a little hydrogen gas in the course of his experiment; for this is produced by the action of the water contained in the earthy salt with the iron.) Adapt a recurved tube of safety to its lower extremity, which tube is to go under a bell-glass, or jar. Then heat the tube, and carbonic acid gas will be found under the jar: the residue in the tube or retort is quicklime, which no longer effervesces with acids. If the transparent calcareous spar be suddenly heated, it decrepitates and becomes opaque.

The process for the fabrication of lime, is founded on the principles of the preceding experiments; the object is always to separate the acid from the calcareous substances. A kind of hard calcareous stone, called *lime-stone*, is most commonly used in making lime. These stones are to be piled up in the form of an oven or vault; under the arch a fire of wood is to be lighted, which must be continued till a strong flame, without smoke, rises considerably above the furnace, and till the stones are become very white. Still the fire must not be too strong, for the surface of the stones will vitrify, especially if they contain silex and alumine: in that case the lime is insoluble, and is called *over-burnt lime*. If the acid is not yet disengaged, the lime is still insoluble, which is often the case with the lime of commerce: some pieces are found also which are not baked enough, and some too much. The oxyd of iron contained in the stone is proper also to excite fusion; so that, for ochreous stone, a more moderate heat should be employed, and longer continued. The oxyds of iron and manganese render the lime better, especially the oxyd of manganese. Sometimes lime-stone is white in the quarry; grows blackish in the air, and even of a fine deep black: it is because the oxygen of the air lays open the oxyd of iron or manganese, which originally existed as a white oxyd; water greatly favours the developement of this oxydation. Lime, to be good, should be sonorous and hard, should heat quickly and strongly with water, and give out a thick smoke.

The calcareous carbonat is not changed by the air. It is not soluble in pure water, but in water loaded with carbonic acid: thus it is that nature dissolves those calcareous masses which the waters afterwards carry away. When the waters, by exposure to the air, lose the acid which favoured the solution of the calcareous matters, deposits are formed and hence arise the stalactites and incrustations formed about springs, &c. and even beds of calcareous laminæ, which no doubt have been kept in solution. If these waters lost suddenly the acid which favoured solution, there is an irregular precipitation: hence calcareous stones which are soft, cellular, and spongy. But, if the crystallization was slow, we have crystallizations, marble, stalactites, &c.

If acidulated water, holding carbonat of lime in solution, be boiled, the excess of acid evaporates, and the calcareous carbonat is deposited. This process may be used with advantage in the analysis of mineral waters. If an alkali, as ammoniac for example, be poured into an acid solution of carbonat of lime, there will be a precipitation. The precipitation thus obtained gives some trouble in analysing mineral waters; for it is not known whether it comes from the lime, or from the magnesia: this therefore must be tried: if it be a calcareous carbonat held in solution by the water, it will effervesce with acids; if it be magnesia, it will not. If the excess of carbonic acid found in a solution of calcareous earth, be saturated with lime, a precipitation will take place immediately. All these experiments prove that lime cannot be dissolved in water, but by an excess of acid.

The sulphuric, nitric, and muriatic, acids, decompose the carbonat of lime; they separate the carbonic acid with effervescence. The alkalis precipitate the lime of these

these solutions. Fluoric acid decomposes it also, as does boracic acid; but this last will not decompose the calcareous salt without heat.

Carbonat of lime promotes the vitrification of some earthy and stony substances. Mixed with siliceous earth, it causes fusion, when the latter is in the proportion of one-third, or one-fourth. This salt, when naturally mixed with argillaceous earth, forms the substance called *marl*. This substance presents a great number of varieties, with respect to colour, density, &c. and melts into a greenish yellow glass, when urged by a strong heat. It is used with great success as a manure to fertilize lands.

Barytes decomposes carbonat of lime, but not without heat. Muriat of ammoniac is decomposed by it; the results are, muriat of lime, and carbonat of ammoniac, formerly called *sal volatile of England*, or *concrete volatile salt*. This operation is made, by distilling in a stoneware retort, a mixture of one pound of sal ammoniac, and two pounds of chalk or cretaceous spar, in powder. These two substances must be very dry. A receiver or cucurbit of glass is adapted to the retort, and the fire is gradually raised to a low red heat, the receiver being kept cool with wet cloths, or by a small stream of cold water, which runs on it during the whole operation. White vapours pass over, which condense in very pure and white crystals on the sides of the receiver. This is the carbonat of ammoniac. This experiment offers a fresh proof that the variation of temperature changes the affinities: for, carbonat of ammoniac decomposes muriat of lime when cold, which shews an anomaly; the contrary happens when heat is applied; the heat tends to detach the carbonic acid from the lime, and the ammoniac from the muriatic acid: hence it is not wonderful that the equilibrium of the divellent and quiescent affinities should be totally destroyed by the difference between cold and heat.

Carbonat of Potash.—To combine potash, and indeed any of the alkalis, with carbonic acid, we have above described an apparatus which should always be contrived so that the surfaces of the fluids may be renewed; and this will be better performed by means of the apparatus with double syphons, which we have described and figured, for obtaining carbonic acid gas; in which apparatus the syphons of themselves agitate and shift the liquors, and thus continually renew their surfaces. The carbonic acid, though weak, neutralises alkaline substances, and forms salts; yet the alkalis preserve with it the property of restoring vegetable tints, giving them a green colour, and they continue something of an alkaline taste. Thus carbonic acid has not so much of a saturating property, with respect to alkalis and earths, as other acids.

It is not long since carbonat of potash has been known in a state of purity; it was formerly supposed to be deliquescent; it was called *tartarian alkali*, because it was obtained by burning tartar of wine to ashes. When moistened by the air, it was called *oil of tartar per deliquium*: this property arose only from the fixed salt of the tartar not being saturated with the carbonic acid. Bohnius obtained this salt in the form of regular crystals; but he could not explain the process. Black and Bergman have since thrown great light upon the subject.

As we now prepare this salt from its principles, by a direct combination of carbonic acid gas with potash, we have seen the possibility of producing a salt, with properties entirely different from that of which we have been speaking: it has been called neutral carbonat of potash, to distinguish it from the other non-saturated alkalis, which are met with in commerce. This neutral carbonat of potash is no longer caustic; it is saltish only, with a slightly urinous taste. It is greatly altered by fire, losing therein 0·5: of its weight, and what remains is caustic potash. Distilled in a retort, it loses its water of crystallization, and its acid assumes the aëriform state; the potash remains at the bottom of the retort, retaining always a little of the carbonic acid, which it is very difficult to separate. It undergoes no alteration by being exposed to the air.

When common potash is put in water for dissolution, it at first absorbs a certain quantity of it, which it solidifies; then the potash is dissolved in the excess of water which is added. In general, when a salt absorbs and solidifies water, there should naturally be disengaged some caloric, which constitutes the liquid form of water. The contrary happens when cold is produced. The absorption of the water by the potash, is in truth a combination in consequence of affinity or attraction; which is very different from simple extension by solution in a liquid: hence a sensible heat is disengaged. This effect only takes place with the potash met with in commerce. If, on the other hand, a salt well crystallized be put into water, there is surely a production of cold; for, in that case, there is no water to be solidified: it is a solid converted into a liquid. But, if a dried salt be used, it employs the strong affinity it has for the water, it seizes it, and disengages its caloric; then when saturated with solid water, it dissolves, and returns to the class of crystallized salts. Four parts of cold water are required to dissolve one of this salt: by evaporation, and cooling, crystals in various shapes are produced; the most common is the quadrangular prism, or laminæ with dihedral triangular summits, so that the face answers to one of the solid angles of the prism.

Carbonat of potash is decomposed by all the acids. Indeed the carbonic acid may be separated by the impure acid residues tempered with water, and by the residues of distillation, such as acid sulphat of potash, &c. dissolved in water: the carbonic acid is always disengaged with effervescence. The boracic acid will not decompose the carbonat of potash without heat; but, by raising the temperature, the decomposition takes place. This salt may be used, like potash, as a flux for vitrifiable earths, because the caloric decomposes it, by dissipating the carbonic acid. If one part of silex and three of potash be made into a paste, and melted either in a crucible, or by means of the blow-pipe, a glass will be obtained.

Barytes, strontian, and lime, decompose this salt. If a solution of these terrestrial substances be poured into a solution of carbonat of potash, a precipitation immediately takes place; the carbonic acid unites with the earth, and forms an insoluble salt, while the potash is held in solution by the liquor. By this decomposition may be prepared the *lapis causticus*, or caustic potash. But particular care must be taken to have a quick evaporation, and in silver vessels, to have it pure, and that it may not absorb the carbonic acid: then dry it, melt it, and pour it on marble.

The neutral salts are not changed by this carbonat. The magnesian salts give no precipitate in the cold by admixture with carbonat of potash; but, by boiling the mixture, a precipitation is obtained. The same effect takes place by exposing the mixture to the air; carbonat of magnesia is produced, which may even be obtained in the crystallized form. Hence an excellent mode presents itself of separating lime, barytes, and alumine, from magnesia; for, by pouring carbonat of potash into a solution of these earthy substances, the lime is presently deposited, by separating the sulphat, nitrat, &c. if combined with these acids, in a liquor previously analyzed; then, by heating the liquor, magnesia is obtained.

The uses of carbonat of potash in the arts are many; it is employed in medicine as a very active solvent; in obstructions of the mesentery and the urinary passages, it is not administered but in small doses, together with some substance which may moderate its action.

Carbonat of Soda.—This salt was formerly called *natrum*, *natron*, *mineral alkali*, and *salt of soda*. This carbonat, when used for the arts, is extracted from the ashes of

of marine plants: such is the carbonat of soda met with in commerce. But it is found ready formed in the earth, and in several mineral waters, as the acidulated alkaline waters; the overflowings of the Nile leave it abundantly on the surface of the earth. Native carbonat of soda seems to come from marine salt, decomposed by vegetable and animal substances, and especially by lime; hence we see efflorescences of carbonat of soda on walls built with some peculiar kinds of earth, under the arches of bridges, and particularly in caverns near the sea; this is muriat of soda decomposed by a terrestrial agent.

But soda, with us, is most usually obtained from marine plants by combustion; Spanish barilla furnishes the best. Collect a heap of these saline plants, and dig a round pit near them, growing larger towards the bottom, and about a yard deep; by means of this the vegetables are to be burned, and the combustion is to be continued without interruption for several days; when the combustion is finished, a mass of alkaline salt is found, which is divided in pieces for sale or exportation; this is called *soda-stone*, or *soda*. This is to be pounded, and exposed in a subterraneous place, where it may attract carbonic acid; it is then washed as for salt-petre; the sea-salt is separated, then drawn off; and, finally, you have pure carbonat of soda. The soda exists in the caustic state in the plant; for, if sulphuric or muriatic acid be poured over the pulverized plant, a muriat, or sulphat, will be obtained without effervescence; but, by combustion, the carbon of the plant itself furnishes the carbonic acid, and the carbonat is formed.

To obtain this salt quite pure and well crystallized, proceed as for carbonat of potash. It may likewise be prepared by pouring carbonic acid into a vessel, the sides of which have been moistened with a solution of soda. The vessel is covered with a wet bladder, and, at the end of a few hours, the combination is effected. The bladder sinks in the vessel, on account of the vacuum which is formed in it, while the salt is deposited in regular crystals on its sides.

The carbonat of soda has an alkaline taste, and renders the syrup of violets green, though this does not alter its colour so much as the caustic soda does; its taste is urinous, but neither so burning nor so caustic as that of the same alkali in a state of purity. This neutral salt hastily crystallized, appears to be formed of rhomboidal laminæ, obliquely applied on each other, after the manner of tiles. When it is slowly crystallized, it takes the form of rhombic octahedrons, whose pyramids are truncated very near their base, or decahedral solids, with two acute and two obtuse angles. By the action of heat it loses 0·64 of its weight. If the fire be kept up, it loses its carbonic acid, and becomes caustic; for, in proportion as part of the acid is disengaged, what remains is more concentrated, and more straitly holden by the soda, which makes a strong heat necessary at the end of the operation. This salt effloresces in the air, and its crystals fall to powder, because this carbonat has less affinity with water than air. The warm dry air of summer acts briskly upon it; yet air takes away only one half of the weight of the water it contains; to separate a greater quantity, there requires more than the action of dry air, namely, that of caloric.

Carbonat of soda produces cold by its solution in water: it is more soluble than carbonat of potash, as it requires only twice its weight of cold water, or half that quantity of boiling water, to hold it in solution. It crystallizes by cooling; but spontaneous evaporation affords more regular crystals.

This salt, well saturated and dried, is decomposed by phosphorus. See the process in the account we have given of *Carbonic Acid*. This carbonat favours the fusion of vitrifiable earths much more than potash; and the glass it forms is more durable. If a solution of barytes, strontian, or lime, be poured into a solution of carbonat of soda, a precipitation takes place immediately: the carbonic acid seizes on the earths, and forms an insoluble salt; the soda remains in solution in the liquor. Potash decomposes this salt also. All the acids separate its carbonic acid with effervescence. Nothing is more easy than to decompose the alkaline carbonats; which, no doubt, arises from the carbonic acid having a great affinity for caloric; and this affinity acts in most of the experiments.

Carbonat of soda decomposes the calcareous, magnesian, and aluminous, salts. When a calcareous salt is to be decomposed by carbonat of soda, the liquor must be heated; otherwise there will remain in the solution enough of carbonat of soda to hold the carbonat of lime in solution; this excess of acid is dissipated by heat. It is the same with the magnesian salts. This carbonat may be employed for the same uses as the carbonat of potash, and is much more valuable in the manufactories of glass, soap, &c.

Carbonat of Ammoniac.—Pure ammoniac and carbonat of ammoniac were formerly supposed to be the same thing. It was formerly *concrete volatile alkali*, and *volatile salt of ammoniac*, and a great affinity for lime is given to it in the ancient tables: this was an error; it is known now, that this affinity arose from the presence of the carbonic acid, which was not then understood or even suspected; and the effects it produced were attributed to the ammoniac.

Besides the methods pointed out in speaking of carbonat of lime, carbonat of ammoniac may be obtained several different ways; as, 1. By agitating the alkali in the upper part of a vat of fermenting liquor: 2. By passing the carbonic acid into volatile alkaline spirit: or, 3. By pouring the acid into a vessel, on the sides of which a few drops of ammoniac dissolved in water are spread: 4. By combining directly over mercury carbonic acid gas and ammoniac. These two gases immediately unite; much heat is extricated, and a concrete salt is formed on the sides of the vessel in which the mixture is made. In all these cases, crystals of ammoniacal carbonat are formed. It is likewise obtained by decomposing ammoniacal muriat, by the addition of carbonic neutral salts, with base of potash or soda. Its taste is urinous, but much less so than that of pure and caustic ammoniac; its smell, though similar, is much fainter: it converts syrup of violets to a green. It is very volatile, and the smallest heat sublimes it entirely, if it be well crystallized. The first effect of heat is that of liquefaction, by means of its water of crystallization, or the aqueous fusion. It slowly attracts moisture from the air, especially when it is not entirely saturated with carbonic acid. It is very soluble in water, and, like all other neutral salts, produces cold; a property so contrary to that of pure ammoniac, as to afford an additional argument for ranking it among the neutral salts. Two parts of cold water dissolve more than one of carbonat of ammoniac; hot water dissolves more than its own weight. Its crystals are many-sided prisms. But it is very difficult to obtain this salt well crystallized; for, being more volatile than water, if the liquor be left to evaporate, it will volatilize: the carbonat of ammoniac must therefore be dissolved in water of 30° heat; strain the liquor with a covered funnel; then, being less soluble cold than hot, it crystallizes as it cools. Carbonat of ammoniac will not decompose phosphorus; because the double affinity, which favours this decomposition with alkalis, does not take place here.

The sulphuric, nitric, muriatic, and fluoric, acids, have a stronger affinity than the carbonic acid to ammoniac: when one of these acids is poured on the carbonat of ammoniac, a strong effervescence arises from the disengagement of the carbonic acid. If this decomposition be made in a tall slender vessel, the presence of the carbonic acid gas may be observed by the extinction of a lighted candle, the reddening of the tincture of turnsole, or the precipitation of lime-water immersed in a small cup

cup below its orifice. These decompositions of the carbonat of ammoniac by lime and fixed alkalis, which seize its acid and separate the ammoniac, and by acids which seize the alkali, and disengage the carbonic acid, clearly shew the nature of this salt. Bergman has found, by accurate experiments, that a centenary of this salt, contains forty-three parts of ammoniac, forty-five parts of carbonic acid, and twelve of water. From the consideration that this salt contains a larger proportion of acid than carbonat of soda, and this last a larger quantity than carbonat of potash, he concluded, that the weaker the alkaline base, the more carbonic acid will be required for its saturation. The acid of borax does not decompose the carbonat of ammoniac in the cold; but when the latter is poured on a hot solution of boracic acid, a very sensible effervescence is produced, and the disengagement of carbonic acid is shown by the usual methods; a true borat of ammoniac being also found at the bottom of the vessel. This experiment, proves, that heat modifies or changes the laws of affinity, or elective attraction, as Bergman long ago observed.

This carbonat is decomposed by barytes, strontian, and lime. If powdered lime be mingled with carbonat of ammoniac, an ammoniacal odour arises immediately; this will be facilitated by adding a few drops of water. But the experiment may be made at once with lime-water. If lime-water be poured into a solution of carbonat of ammoniac, a precipitate is immediately formed, and a strong smell of volatile alkali is perceived. The lime seizes the carbonic acid, and forms chalk, or calcareous carbonat, which falls down, and the ammoniac is disengaged and volatilizes. With magnesia, there is but a slight precipitate, because the mixture, while cold, retains a sufficient excess of carbonic acid to hold the carbonat of magnesia in solution; but, if the liquor be heated, this excess of acid is dissipated, and a precipitate is formed. Potash and soda decompose this salt, as well as lime, barytes, and strontian, by separating the pure ammoniac, and uniting with its acid.

The carbonat of ammoniac is employed in medicine as a sudorific, anti-hysteric, &c. It is mixed with certain aromatic matters; and thus is prepared what we in England call *sal volatile*. It has been considered as a specific against the bite of vipers; but the Abbé Fontana, with great reason, combats this opinion. Many have advised the use of the carbonat of ammoniac, or concrete volatile alkali, as a remedy in venereal disorders; experience, however, has not yet decided on this head. All the knowledge the art of medicine possesses with regard to this salt is, that it is purgative, opening, diuretic, diaphoretic, discussive, and that it has a good effect in such disorders as depend on the density of the lymph; as certain venereal cases, coagulations of milk, scrophulous disorders, &c. It is administered in doses of a few grains, in a proper vehicle, or compounded with opium.

Carbonat of Magnesia.—This is said to be found in quarries in Savoy; several mineral waters hold it in solution; they wash it away in their course, then it precipitates and crystallizes. It is more soluble than lime in acidulated waters which have an excess of carbonic acid.

This salt has borne different names, it was used in medicine under the name of *mica*, or *white magnesia*; it was formerly made with the mother-water of nitre evaporated to dryness, or precipitated by fixed alkali; it was first known by the name of *Count Palma's powder*, *powder of Sentinelli*. It has likewise been called *laxative polychrest powder* by Valentini, *white magnesia of nitre*, *magnesia of common salt*, because it was likewise obtained from the mother-water of this last salt. But the medicine, so prepared, always contains calcareous earth, and other foreign substances. The magnesia at present used is commonly precipitated from sulphat of magnesia by the fixed vegetable alkali or carbonat of potash. Mr. Butini has described a process for obtaining very fine magnesia in the greatest possible quantity. A certain quantity of potash is dissolved in double its weight of cold water, and exposed to the air for some months, if time permits, that it may absorb carbonic acid from the atmosphere and precipitate its earth. This being filtered, a solution of an equal weight of sulphat of magnesia in four or five times its weight of water is made; the solution is filtered, and fresh water added in about fifteen times the weight of the salt. This liquor is heated, and, when it boils, the alkaline solution is poured in. A precipitate of magnesia being formed, the mixture must be agitated and poured on a filter of paper. The precipitate must be washed on the filter with boiling water, to carry off the sulphat of potash it may contain. It is then taken from the filter, and thinly spread on papers, to dry by the heat of a stove; when dry, it is in white pieces, easily broken into a very fine powder, which adheres to the skin. This salt may be obtained in the crystallized form; sometimes in small cubes; at others in very fine brilliant needles, which through a magnifier exhibit prisms of six or eight sides.

To obtain very light carbonat of magnesia, the deposits should be dried very slowly, in small pieces, and in the shade: this slow drying favours the suspension of the molecules, or elementary particles, and occasions those small lumps to preserve their lightness. Its taste is sweetish, almost insipid; but its effect is more sensible on the intestines, as appears by its acting as a purgative. Exposed to the fire in a crucible, its loses its acid and water, and the magnesia remains pure: it is then called *caustic magnesia*; but it is not so, for La Grange asserts that half a pound of it may be eaten without danger. When perfectly calcined, it no longer effervesces with acids. Calcined magnesia is used with good effect to absorb acidity on the stomach. If carbonat of magnesia be calcined in close vessels by the aid of the pneumatic apparatus, the water and acid may be preserved.

Carbonat of magnesia is not sensibly altered by exposure to air; yet, as it gathers into lumps when kept in a moist place, it seems to be slightly deliquescent. Water dissolves but an exceedingly small quantity of this salt; and this solubility varies accordingly as the quantity of carbonic acid is greater or less. The sulphuric, nitric, and muriatic, acids, decompose carbonat of magnesia. They unite to the magnesia, with which they have a stronger affinity than the carbonic acid, and disengage the latter in the gaseous form, which constitutes effervescence.

Barytes, strontian, and lime, decompose this salt: by pouring a solution of these earths into carbonat of magnesia, a considerable precipitate is produced, how small soever be the quantity of this neutral salt holden in solution by the water. Fixed alkalis and ammoniac work the same effect. The neutral calcareous salts are decomposed by magnesia with effervescence, by the action of double affinity.

Carbonat of Glucine.—The carbonic acid unites also with glucine, by direct combination; for, if a precipitate of this earth by caustic alkali be dried in the air, it will produce an effervescence by solution in other acids. This carbonat is white, insipid, insoluble, and very light; however dry it may be, it is never inclined to fall to powder; it is always clammy, lumpy, fat, and soft to the touch. It contains about one fourth of its weight of carbonic acid, which it easily loses by heat. It appears scarcely soluble in carbonic acid; yet it is decomposed by all the acids and alkalis.

Carbonat of Alumine.—Though the union of the carbonic acid with alumine has been hitherto scarcely examined, yet it is certain that a portion of this acid combines with aluminous earth; because, 1. According to the remark of Bergman, when a solution of alum is precipitated by the alkaline carbonats, the filtered liquor deposits, at the end of a certain time, a small quantity of earth, which was held in solution by the carbonic acid, and is separated in proportion as that acid flies off. 2. This precipitation, when made in the cold, is not attended

tended with effervescence, and a portion of the carbonic acid separated from the alkali, appears to combine with the alumine, while another portion becomes dissolved in the fluid. It is likewise acknowledged, from the analysis of many argillaceous earths, by modern chemists, that they contain the carbonic acid; for they effervesce, when dissolved in the sulphuric or muriatic acids.

CARBONAT OF ZIRCON.—This salt yet remains to be investigated by modern chemists; its properties not being known.

Of METALLIC SUBSTANCES.

Before we proceed to the examination of each metallic substance in particular, it may be necessary to consider, 1. Their physical properties. 2. Their natural history, 3. The art of knowing their nature and quantity, called *docimasia*, or art of assaying. 4. The method of working them in the large way, or metallurgy. 5. Their chemical properties. 6. The manner of distinguishing one from another, and the divisions necessary to be established amongst them.

The ancients supposed metals to be composed of some earthy substances, combined with phlogiston; hence the denomination of perfect and imperfect metals. The alchemists gave the name of solar metals to those which were coloured, and lunar to such as are white. But metals in general are simple substances. At present there are reckoned twenty-one different species of metallic substances, which Fourcroy has described under five divisions.

I. Brittle and acidifiable metals, four kinds; arsenic, tungsten, molybdena, and chrome.

II. Brittle and simply oxydable, seven species: titane, uranite, nickel, cobalt, manganese, bismuth, antimony, and tellure.

III. Metals semi-ductile, and oxydifiable, two species: mercury and zink.

IV. Metals ductile, and easily oxydated, four species; tin, lead, iron, and copper.

V. Metals very ductile, and not easily oxydated, three species: silver, gold, and platina.

OF ARSENIC.

Native arsenic is often found; it is in black masses, little shining, and very heavy; sometimes it has a metallic brightness, and reflects the colours of the rainbow. Pure arsenic has also been called *regulus of arsenic*; but which denomination, says Fourcroy, ought to be abandoned as improper. In breaking it appears more shining, and seems composed of a vast number of little scales: when these scales are visible on the outside of the pieces, it is called *testaceous arsenic*, or, improperly, *testaceous cobalt*, *scaly* or *laminated arsenic*. It is also found in friable masses almost without consistence. Arsenic, under these forms, is brought from Bohemia, Hungary, Saxony, St. Marie aux Mines, &c.

Arsenic is sometimes in the form of a white oxyd, having even a vitreous aspect; this oxyd is often mingled with certain earths, or in the form of a superficial powder. It is in the metallic state in its combinations with cobalt, in testaceous cobalt, or with iron in *mispikel* or arsenical pyrites. It is often combined in the mines with divers metals, as antimony, tin, iron, copper, and silver. It is disengaged by calcining these metals. In many places they use long crooked chimnies which draw out the arsenical vapours, and detain them: the crust which is formed on the walls or partitions of these chimnies is taken off; and this is what is known in commerce under the name of arsenic: this is the oxyd of white arsenic. This oxyd, or calx, is often combined with sulphur; it then forms or produces orpiment and realgar, or calxes of yellow and red sulphurated arsenic. When red it is called *realgal*, *realgar*, *factitious risigal*, or red arsenic. When yellow, it is called *orpinum*, or factitious orpiment.

Orpiment and realgar are found native or complete in certain places; crystals of realgar are found at Salfaterra near Naples, according to Ferber; in the mines of Nagyag in Transylvania; in the mines of Felsobanga in Upper Hungary; in those of Joachimsthal in Bohemia, in Marienburg, and in Saxony. Realgar is common in China, where it is made into vases, pagodas, and other ornamental works: the Indians use these vases for purging, by drinking vinegar or lemon-juice which has stood in them some hours. Orpiment is less scarce than realgar: it almost always accompanies it. But the orpiment met with in commerce is sent to us from several parts of the Levant, in irregular masses, solid, or lamellated, of a fine yellow colour.

Arsenic, heated, with the admission of air, is quickly brought to an oxyd or calx: it flies off in a white vapour, which has much the smell of garlic. It is fused and sublimed in close vessels. It may be crystallized in regular four-sided prisms, if sublimed slowly. When red-hot, it burns with a blue flame. To sublime arsenic, first pulverize it grossly; fill a long-necked matrass with it halfway; place it in a sand-bath, covering the matrass nearly up to the neck: proceed to sublimation with a gradual heat, and continue till all the arsenic is sublimed: leave it to get cold, and then break the matrass. If the fire was sufficiently strong, the sublimed arsenic undergoes a kind of fusion; but it becomes transparent, and lies in a white colourless mass, if the heat was weaker. This is what is known under the name of white oxyd, formerly called *calx of arsenic*, and *white arsenic*.

If this oxyd be put into closed vessels, it flies off, by a gentle heat, into a white crystalline powder called *flowers of arsenic*. For this purpose reduce the arsenical oxyd to powder; take a glass retort with a very short and large mouth; fill it half or three parts full, and place it in the sand-bath of a furnace; lute on a globe to the mouth of the retort, and proceed as in common distillation. The arsenic rises in vapours, which are condensed inside the globe, in the form of a white powder; at the bottom of the retort remains a yellowish matter, similar to that in the preceding operation.

Arsenic, in the metallic state, does not act sensibly on combustible bodies; yet it easily dissolves in hydrogen gas. Exposed to the air, arsenic grows sensibly blacker; but has no action with water. The action of saline earthy matters upon arsenic, is not known. Weak sulphuric acid has little action upon it; it must be concentrated and boiling; then the solution is complete: it is transparent, but of a light brown colour. This solution furnishes in cooling a large quantity of small irregular crystals: this is arsenic reduced to the state of an oxyd.

Nitric acid dissolves arsenic extremely well, even quickly; but the acid must be hot; for, when cold, it has no sensible action. Strongly evaporated, it forms a salt without any regular shape, according to Bucquet: Baumé says, on the contrary, that the solution produces crystals, some nearly cubical, others diamond-fashioned: Wallerius, in his Mineralogy, (vol. i. p. 404.) says, that these crystals are like those of lunar nitre. These experiments therefore should be repeated, and the results carefully examined, in order to ascertain the fact.

Bayen and Charlard maintain, that muriatic acid, when cold, has no action upon arsenic; the action of fire is, therefore required to dissolve arsenic in that acid. Baumé says, that a yellow powder like sulphur is precipitated, which is insoluble in water. Arsenic in powder, mixed with oxygenated muriatic acid, burns with a white flame. Mixed with super-oxygenated muriat of potash, the mixture is strongly detonated by trituration and the stroke of the hammer. It flames with extraordinary rapidity and brightness, by the contact of sulphuric acid.

Oxyd of arsenic, or the white arsenic of commerce, has properties very different from metallic arsenic, formerly called *regulus*. To obtain arsenic in the metallic state, or to reduce the oxyd of arsenic, make a paste of the oxyd in powder and soft soap, or linseed-oil, or any other oil drawn out by expression: put this paste in a matrass,

matrafs, and place it in a fand-bath; then proceed to fublimation, firft with a gentle heat, in order to warm the veffels, and diffipate damp vapours. Increafe the fire by degrees, fo as to make the bottom of the veffel red-hot. In the upper part of the matrafs a fubftance almoft black will be fublimed. Break the matrafs, and feparate the fublimed matter: this is metallic arfenic, or regulus. This reduction may alfo be obtained by fufion: Mix one part of oxyd of arfenic with two parts of foft foap, and one and a half of potafh. Melt the mixture quickly in a crucible: as foon as melted, pour it into an iron-mortar fomewhat heated and greafed; then cover it up; when the matter is quite cold, feparate the arfenic, which occupies the lower part, from the fcoria.

Oxyd of arfenic has a very ftrong and cauftic tafte. If placed upon burning coals, it flies off in vapour with a ftrong fmell of garlic. In clofed veffels, it is volatilized, and vitrifies in a ftrong heat; and hence arifes a tranfparent glafs, fufceptible of cryftallization into four-fided pieces with truncated angles. This glafs eafily tarnifhes or grows dim in the air, and becomes lacteous, undergoing a fort of efflorefcence. This oxyd unites very well with fulphur: hence arifes a femi-tranfparent mafs, very heavy, of a yellow or red colour, according to the proportion of fulphur. Take two parts of arfeniat of potafh and one of fulphur; put the whole into a fmall matrafs, and expofe it to a fire that will make the bottom red-hot; take it off in an hour, and break it: it will produce orpiment and a fine fublimed realgar. The bottom of the matrafs contains a little arfeniated fulphure of potafh, and fulphat of potafh. When red, it is called *realgal, realgar, factitious rizigal*, or *red arfenic*; but, according to the modern nomenclature, *oxyd of red fulphurated arfenic*. When yellow, it is called *orpinum*, or *factitious orpiment*, or *oxyd of yellow fulphurated arfenic*. But, as many of thefe fubftances are found in commerce, it is not now ufual in laboratories to work at fuch combinations.

Thefe oxyds of fulphurated arfenic are decompofed by lime and alkalis, which have more affinity with fulphur than oxyd of arfenic has. The oxyd of white arfenic may be reduced by hydrogen gas, becaufe this gas has more affinity with the oxygen than the arfenic. The oxyd of arfenic is eafily diffolved in water: it requires but fifteen parts of boiling water, and eighty parts of cold water, to diffolve one. By evaporation and cooling, we obtain it cryftallized in eight-fided prifms, but oftentimes under various indeterminate fhapes.

The oxyd of arfenic, then, participates in the properties of faline fubftances, and differs from other metallic oxyds, 1. In being foluble. 2. As the metallic oxyds are inodorous and fixed. 3. As the other oxyds form no union with metals. 4. It unites with alkalis, whence arife the falts we are now to examine. All thefe properties, therefore, ferve to clafs this oxyd in the rank of *acids per fe*. In this rank they are placed by Fourcroy, who calls this oxyd *arfenious acid*; a name which we fhall preferve in fpeaking of it in this treatife.

Arsenious Acid is an excellent folvent of earthy matters in general; it fixes with moft of thefe earths, and promotes their vitrification: but every kind of glafs, in the compofition of which it enters, has the fault of foon tarnifhing in the air. Arfenious acid combines with potafh to the point of faturation; with foda the fame. Ammoniac diffolves this acid alfo, and is obtained in a cryftallized ftate: if heated a little, the ammoniac is decompofed, the azotic gas is difengaged, the hydrogen unites with a portion of the oxygen of the acid, and forms water. But thefe combinations have not yet been made with fufficient care to eftablifh the properties of thefe falts, which fhould be called *arfeniats*.

Sulphuric acid, concentrated and boiling, diffolves arfenious acid; but, when the folution is cold, the arfenious acid is precipitated, and the fulphuric acid feems no longer to retain it. Nitric acid concentrated attacks the arfenious acid more effectually: Pour fix parts of nitric acid upon one of concrete arfenious acid, and make the experiment in clofed veffels, with the pneumatic chemical apparatus, and with the help of caloric a nitrous gas will be obtained. In the retort will remain a white concrete matter, of properties entirely different from arfenious acid: this is called *arfenical acid*. This method may be employed to obtain it: When the muriatic acid is much concentrated, it diffolves by ebullition a third of its weight of arfenious acid; and, in cooling, a great part is fpontaneoufly feparated, but faturated with that acid. With the oxygenated muriated acid, a complete acidification of the arfenious acid may be obtained, as with nitric acid.

The action of the other acids is not known. Becker, Stahl, Kunkel, and Macquer, have particularly examined the action of the arfenious acid upon the nitrat of potafh. The laft in particular repeated the experiments of preceding chemifts; he examined the refiduum, of which thofe chemifts had not fpoken, and he difcovered that it was a particular neutral falt, which he calls *neutral arfenical falt*.

To decompofe nitrat of potafh by means of arfenious acid, mix equal parts of both, and put it into a retort much larger than the proportions of the mixture, to allow for the fwelling which follows: place it in a fand-bath; adapt a cap with two apertures, one large, to receive the mouth of the retort; the other, lefs wide, but to be fo lengthened and narrowed, as to be received into a tube, which in its bending is much leffened in diameter, and plunged into a bottle containing a quantity of water, more or lefs, in proportion as the nitric acid is required to be more or lefs concentrated. The apparatus being thus prepared, lute up the joinings, and diftil with a gentle heat. As the nitrous vapour is thrown off, it paffes through the tube, and is diffolved in the water; fome nitrous gas alfo efcapes, which may be gathered under a bell-glafs: the water imbibes a blue colour. The refiduum is the neutral arfenical falt of Macquer, or *arfeniat of potafh*. Let this faline mafs be diffolved in a fufficient quantity of boiling water; filter the liquor; and, in cooling, very regular cryftals are obtained, in four-fided prifms, terminated by pyramids of four equal faces; much variation is alfo obferved in the figures of the cryftals.

Nitrat of foda is alfo decompofed by the arfenious acid. For this purpofe the fame precautions muft be taken as in the preceding operation; the fame phenomena take place; and the fame apparatus may be ufed. The refiduum furnifhes not the fame falt: it cryftallizes into hexagonal prifms, terminated by planes perpendicular to their axis: this is *arfeniat of foda*.

Nitrat of ammoniac may in the fame manner be decompofed by arfenious acid; but the phenomena are different. The operation formerly required great precaution; but Pelletier has proved that it may be performed without danger. This is his method: When the mixture has been made, in the proportions above-directed, it is put into a pretty large retort of glafs, luted, and placed in a reverberatory furnace with a balloon for a receiver. Begin with a flight degree of heat; for the decompofition is fo rapid, and the nitrous vapour flies off with fuch force, that they may carry away a portion of the arfenic not decompofed; but, by proceeding gently, the decompofition is more gradual. First, fome nitrous acid paffes off; and, if the fire be increafed or continued, fome ammoniac is difengaged; laftly, if the fire be made ftill ftronger, a portion of oxyd of arfenic is fublimed, in the form of a white powder, and a vitreous mafs remains in the retort, which attacks the retort very violently, and eats into it: this is *arfenical acid*. When the experiment has been conducted with the precautions recommended, there remains in the retort a faline mafs, which is to be diffolved in boiling water; filter the liquor, and let the air evaporate; it furnifhes cryftals. This is *arfeniat of ammoniac*.

We

We shall presently see how all these salts may be prepared, by directly combining the arsenical acid with these same bases. We may also prepare these kinds of salts, by pouring the mixture by degrees into a heated crucible. By this means, particularly with care, the swelling up may be prevented; but there is one very great inconvenience, which is, that, when the arsenical acid is without a base, then it corrodes the earth or clay of the crucible; but, for the decomposition of the nitrat of potash and of soda, these may be easily performed in iron-crucibles, especially if we do not wish to preserve the nitric acid: in that case, by solutions and filtrations, we deprive them of arsenical salt with an argillaceous base.

Arsenical Acid.—Scheele gives two processes for obtaining this acid: one by means of the oxygenated muriatic acid; the other by nitric acid. This acid may also be obtained by decomposing the arseniat of potash with sulphuric acid: Take arseniat of potash, well dried, and mix it with half the quantity of sulphuric acid. Put this mixture into a luted retort, and bring it by degrees to a red heat: a white mass remains in the retort, which strongly draws the humidity of the air. When the matter is quite liquefied, there remains a white powder, which, when well-washed, is no longer arseniat of potash, but sulphat of potash. The same process will answer for decomposing arseniat of soda.

These experiments prove the possibility of oxygenating arsenic, and of converting the arsenious acid into arsenical acid. Hence we may understand, also, why the arsenious acid, previous to being saturated with oxygen, produces no arseniats; and why it cannot constitute those salts, but after having been previously treated by the acids it decomposes, and from which it extracts oxygen by means of heat. This acid, in its concrete form, drawing the humidity of the air, has a stronger savour than the arsenious acid: it turns the blue vegetable colours red.

If arsenical acid be put into a glass retort, and exposed to a fire that will make it red-hot, it comes out transparent, but grows dull in cooling. If the heat be increased till the retort begins to melt, the acid rises in ebullition, and is sublimed in the neck of the retort. If, instead of a retort, a covered crucible be used, and exposed to a strong heat, the acid boils violently, and begins to smoke in a quarter of an hour. If the crucible be placed under a bell-glass, while the acid smokes, it will be found covered within with a white dust, which is *arsenious acid*, not *arsenical acid*. In the crucible remains a little transparent glass, difficult to melt, which is spread over the sides of the crucible: this is *arseniat of alumine*.

Pure charcoal, or carbon, decomposes this acid. For this purpose, in a mixture of arsenical acid, there should be about one-half of charcoal: Put the mixture into a glass retort, luted with earth, and on a matrass: put the retort into a reverberating furnace, and heat it by degrees till the bottom is red-hot; then the whole mass burns violently, the acid is reduced, and rises into the neck of the retort in a metallic form, mixed with a little oxyd and charcoal-dust: some drops of an insipid liquor are usually found in the receiver.

With sulphur, different effects are produced. By digesting a mixture of six parts of arsenical acid and one of pulverised sulphur, it undergoes no change; but, by evaporating to dryness, and distilling in a glass retort, with a receiver, a violent combination is produced, as soon as the mixture is hot enough to melt the sulphur. The mass rises almost all at once, and forms a red sublimate. Sulphureous acid then passes into the receiver. Pelletier directs another method: Take equal parts of arsenical acid (in the vitreous form) and sulphur; put the mixture into a matrass, and keep it over the fire an hour; a very strong sulphureous acid will be disengaged; when this acid is no longer perceived, take the matrass off the fire and break it: a very beautiful sublimed realgar will be the result.

The arsenical acid loses its acidifiable property, if put in contact with hydrogen gas. Take pure arsenical acid; mix it with a little distilled water; the solution is transparent. Introduce a certain quantity of hydrogen gas, disengaged by the action of sulphuric acid upon iron; the liquor grows thick; a muriat is precipitated, which, when well washed with distilled water, exhibits all the phenomena of arsenic. The oxygen of the acid has united with the hydrogen, and formed water, while the arsenical acid came over: therefore the result is arsenic, and sometimes a dark-grey oxyd of arsenic. If, instead of hydrogen gas, sulphurated hydrogen gas be used, the result is water and a *sulphure of arsenic*. With phosphorus, phosphoric acid is obtained. The arsenical acid may also be dissolved in two parts of water. How this acid acts with other acids, is not yet known. According to Scheele, barytes, lime, magnesia, and alumine, form salts with this acid; but they are very little known, and rarely employed.

The combinations of this acid with alkalis, is better known. By combining arsenical acid with potash, the true neutral arsenical salt of Macquer, arseniat of potash, is produced. With soda, a salt is formed similar to that obtained by decomposing nitrat of soda with arsenious acid. To obtain arseniat of ammoniac, combine the arsenical acid with the ammoniac to the point of saturation. A strong effervescence is brought on; then evaporate the liquor in a gentle heat, and let it crystallize. Very regular crystals are obtained, of a rhomboidal figure, which at first sight resemble nitrat of potash, but they differ in this: if exposed to the action of fire in a retort, they first lose the water of distillation; then the ammoniac; and a vitreous mass remains in the retort, which strongly attracts the humidity of the air, and is nothing but very pure arsenical acid. All the alkaline arseniats are decomposed by lime; and it appears that lime and barytes have more affinities with this acid than alkalis have. Of the neutral salts, only sulphat of potash and of soda, nitrat of potash, muriat of soda, and muriat of ammoniac, are decomposed by the arsenical acid; but this decomposition requires the aid of caloric, or heat.

Arsenic is used in many of the arts; in washes for whitening of metals; in glass-houses, for melting; and in mining; it also enters into the composition of some kinds of varnish. Orpine and realgar are much used in painting; but, in general, arsenic is one of those productions whose advantages hardly compensate for its deleterious effects: this metal, especially in the oxyd state, or in that of arsenious acid, is well known to be a strong and fatal poison. To those who may be unfortunately poisoned by arsenic in the state of a white oxyd, sulphure of potash, formerly called liver of sulphur, dissolved in water, may be given with effect, as this decomposes the arsenious acid; then try sulphureous mineral waters, or milk; but never (what is commonly, though very erroneously, the first thing administered) oil.

Of Tungsten.

There are two species of mineral which have the generic name of tungsten. The one is called *tungsten* by the Swedes, and *lapis ponderosus*, ponderous stone; and by the chemists, *tungstat of lime*. The other is called *wolfram*, or tungstat of iron. Some say the German word *wolfram* signifies *wolf's foam*, because the Germans, when they put it in their furnaces, only oxydated and scorified metals instead of reducing them: others derive it from *wolf*, and *ram*, or *rham*, soot. When we come to examine the tungstats of lime and iron, we shall describe the manner of obtaining tungsten, and the tungstic acid.

This metal, when pure, is of a light brown colour, extremely hard, very brittle, and crystallizable: it is hardly to be touched by a file, and the magnet has no effect upon it. If a little metallic tungsten be boiled with muriatic acid, no hydrogen gas is disengaged, nor does the metal seem to undergo any change. If nitro-muriatic acid be boiled over the same metal, it will be a little

little oxydated; red vapours fly off, and the metal becomes of a lighter colour.

Of TUNGSTATS.

Tungstat of Lime.—This substance is found in the iron mines of Bitzberg, in the tin mines of Schleckenwalde in Bohemia; and most of the white tin crystals of Sauberg near Ehrenfriendersdorf, are tungstat of lime. This tungstat is not sensibly altered by heat; it decrepitates, but it does not melt. It has a sparry appearance.

To distinguish this from other native saline substances, pour over it some weak nitric acid, or muriatic acid, and digest with a gentle heat: with the muriatic acid more especially, the powder assumes, at the end of the operation, a fine clear yellow colour.

There are various methods of decomposing this calcareous tungstat: 1. One part of native calcareous tungstat in powder is fused in an iron crucible, with four parts of carbonat of potash; this mass is lixiviated with twelve parts of boiling water, and nitric acid is poured on, which unites with the potash, for which it has a greater affinity, and disengages the tungstic acid. More nitric acid may be poured in, which may be evaporated to dryness, and thus continue till no more red vapours arise: then we are sure it is sufficiently oxygenated. 2. About twelve parts of nitric acid, in the state of ordinary aqua-fortis, are required for the complete decomposition of one part of calcareous tungstat. Scheele performed this operation at several repeated times. After the action of three parts of weak nitric acid upon one part of this neutral salt, he pours two parts of caustic ammoniac upon the powder, which the nitric acid had changed to a yellow colour; it becomes white by the action of the alkali; and he repeats this successive action of the acid and the alkali, until the whole of the calcareous tungstat is entirely dissolved. By precipitation from the nitric acid employed in this solution, by the addition of the prussiat of potash, and afterwards by potash itself, he obtained a little prussiat of iron, or Prussian blue, and fifty-three grains of chalk: the ammoniac, by the addition of nitric acid, afforded an acid precipitate. In this experiment, the nitric acid decomposes the calcareous tungstat, by seizing the lime; and the tungstic acid, which is set at liberty by this decomposition, is seized by the ammoniac. The ammoniacal salt formed by this last solution is decomposed by the nitric acid, which has a stronger affinity with the ammoniac than this last has with the tungstic acid. As this last acid is much less soluble than the ammoniacal tungstat, it falls down, in proportion as it is set at liberty, in the form of a white powder. This powder is lixiviated with cold distilled water, in order to have the tungstic acid in a state of purity.

Sulphuric acid has very little action upon tungstat of lime; it decomposes but a very small part of it. The muriatic acid acts upon calcareous tungstat in the same manner as the nitric acid does, and decomposes it with the same energy.

Tungstat of Iron, or Wolfram.—Wolfram is one of those minerals whose equivocal effect occasioned it to be often ranked with different species, to which it seemed to have some resemblance; so that it was long before it obtained a permanent place. Henckel says, that at Altenbury in Misnia, it was erroneously called *antimony*; hence, perhaps, the name of *wolf's foam*, or *wolfram*. Many naturalists regarded it as a schorl abounding in iron; others considered it as an arsenical ore of iron; Wallerius thought it a species of manganese. But d'Elhuyar, Vauquelin, and Hecht, put an end to these conjectures, by proving that wolfram contains a metal of a peculiar nature, which is tungsten.

Wolfram is drawn from the mines of Saxony, Bohemia, and Sweden. It often accompanies crystals of tin, which are also of a blackish colour, but differs materially from it. It has been found in France also, in the department of Haute-Vienne, in the canton and commune of St. Leonard, and at Puy-les-Mines. It is of a brownish black colour; easily yields to the file, and then exhibits a brown colour, slightly tinged with violet, where the file has passed: the dust, rubbed upon paper, exhibits spots of the same colour. It is composed of brilliant laminæ, which are easily separated by percussion. Its specific gravity is considerable, according to M. Haüy, 73·333. Lastly, It is very slightly electric, and does not attract the magnetic needle.

Chemical Properties.—It is not fusible with the action of the blow-pipe. With borax it dissolves, running into a greenish globule. With phosphat of soda and ammoniac, it runs into a transparent globule of a deep red colour. D'Elhuyar and Vauquelin have several processes for decomposing of wolfram: 1. With nitrat of potash. 2. With carbonat of potash. 3. With muriatic acid.

To make this decomposition by means of nitrat of potash, introduce by degrees into a porcelain crucible, made red hot, three parts of nitrat of potash, and one part of wolfram, in powder; it is necessary that the crucible be large, to prevent the matter from running over, in consequence of the strong ebullition occasioned by the nitrous acid, which comes up in red vapours. Having kept the mixture in fusion for about half an hour, pour it on an iron plate, where it collects into a green mass, crystallized in needles on the surface; this mass diluted with water, leaves a brown insoluble powder: the strained liquor retains a green colour, which may be taken away by boiling, after which it again deposits a brown sediment. The acids precipitate from this transparent liquor a white powder, which is tungstic acid combined with potash, and which has retained a certain quantity of the acid used in the precipitation of this substance. The brown powder which the liquor precipitates in boiling, as well as that which is insoluble in water, are a mixture of oxyd of iron, and oxyd of manganese.

Wolfram may in like manner be decomposed, by exposing to the action of heat one part of wolfram, and two parts of carbonat of potash. The liquor obtained in this process is likewise a mixture of tungstic acid and potash. But the analysis of wolfram by the muriatic acid is to be preferred, because the pure acid may thereby be obtained with expedition and facility; whereas, in the preceding experiments, the triple salt must be first decomposed. Let one hundred parts of wolfram be boiled for a quarter of an hour, with three times its weight of muriatic acid; as soon as the liquor begins to heat, a yellow dust appears, and the liquor assumes a brown colour. When cold, decant the liquor, and lixiviate the deposit; digest this for some hours with ammoniac, which dissolves a part of it. Repeat the operation upon the residues, till the matter, undergoing no farther change, is reduced to about six parts, and is insoluble. By thus repeating the process, the wolfram is entirely decomposed; the ammoniacal liquor being evaporated to dryness, and the salt it furnished calcined, a yellow powder is obtained which answers to thirty-four parts. Put into the acid liquor, containing iron and manganese, some sulphuric acid, and evaporate to dryness; dissolve sulphats of iron and manganese in the water; three parts of silex will be gained by filtration. Saturate the excess of acid of the liquor with carbonat of potash; the liquor assumes a brown colour, but does not become turbid; by boiling, it loses its brown colour, and throws down a red powder. The transparent liquor, mixed with carbonat of potash, still precipitates a yellowish matter, composed of oxyd of manganese and oxyd of iron. By treating the precipitate as laid down in the foregoing experiment, the oxyd of manganese may be separated. By this operation, Vauquelin obtained from 100 parts of wolfram, 67 parts of calcined tungstic acid, 18 of black oxyd of iron, 6·25 of black oxyd of manganese, and 1·50 of silex; making in all 92·75, so that 5·25 only were lost.

Tungstic Acid.—With the blow-pipe, in a spoon of platina, this acid assumes a dark green colour; upon coals, it turns almost entirely black. It dissolves in borax, without changing the colour or transparency of the globule, even if in a pretty large quantity; but a very considerable quantity will at length turn the borax black, or dark blue.

The ammoniacal phosphat of soda dissolves this matter completely, forming a dark blue globule. By long calcination with exposure to the air, the yellow colour becomes darker, and sometimes changes to green; exposed to heat for several hours in a covered crucible, it assumes a blackish grey colour. Thus calcined, it has no taste, is not soluble in water, and very little so in acids. Triturated with water, the acid remains long suspended, forming a kind of yellowish milk, which does not impart a red to the blue vegetable colours. It changes colour neither by exposure to the sun, nor to moisture. The nitric acid has no action upon this acid.

From these experiments Vauquelin concludes, that the substance formed by the combination of tungsten with oxygen, does not possess the properties generally attributed to acids; since it is insoluble in water, does not change the blue vegetable colours, and has no apparent favour. If Scheele, adds the same chemist, regarded it as an acid, it was because he never obtained it but in a triple combination, which then possesses the acidifiable properties, because it always retains a portion of that acid, which was used in precipitating the tungstic acid from its alkaline solutions. Vauquelin therefore advises to exclude this substance from metallic acids, and to regard it as an oxyd of tungsten; such as are the oxyds of zink, tin, antimony, and arsenic, which, like this substance, unite with earths, alkalis, and some other metallic oxyds, with which they form a kind of neutral salts. To reduce the oxyd of tungsten to the metallic state, put one hundred parts of it into a strong crucible with a little oil, and expose the mixture for two hours to the violent heat of a forge furnace. When it is cold, there is found in the crucible a matter of a blackish grey colour, consisting of a vast number of globules. Morveau has lately discovered, that the tungstic oxyd renders vegetable colours so fixed, as not to be acted on even by the oxygenated muriatic acid.

Tungstat of Magnesia.—Mix oxyd of magnesia with carbonat of magnesia and water; boil the mixture for some time, and the strained liquor, with the help of an acid, precipitates a white powder. By evaporation a soluble salt is obtained, of a similar taste to other salts of this nature; it is unchangeable by air, and crystallizes in little bright spangles. Whether this oxyd will combine with barytes or alumine, is not known.

Tungstat of Potash.—Caustic potash dissolves oxyd of tungsten even when cold; but, if the liquor be boiled, and a certain quantity of the oxyd remains undissolved, the liquor contains always an excess of potash: by evaporation a salt is obtained, in form of a white powder, without any regular crystallization. This salt has a metallic caustic taste, is soluble in water, and strongly attracts the moisture of the air; its aqueous solution is decomposed by all the acids, which throw down a white precipitate, which is a triple salt, differing in its nature according to the acid used.

Tungstat of Soda.—This oxyd is to be treated in the same manner, with a solution of caustic soda, or even carbonat of soda. By evaporating the liquor, a salt is obtained crystallized in long hexahedrals. This salt has an acrid metallic taste; it is soluble in four times its weight of cold water; boiling water dissolves one-half of its weight. It restores the colour of turnsole reddened by an acid; the sulphuric, nitric, muriatic, acetous, and oxalic, acids, decompose it, forming a white triple salt; it is precipitated also by lime-water; but phosphoric acid occasions no precipitation; muriat of lime and barytes, and the acid sulphat of alumine, occasion a white precipitate.

Tungstat of Ammoniac.—Ammoniac quickly dissolves oxyd of tungsten, even when cold; and it produces a salt which crystallizes sometimes in little spangles, like the boracic acid, sometimes in small needles, which incline to the form of three-sided prisms. This, like other salts of the kind, has a metallic taste; it is soluble in water, draws no humidity from air, and is completely decomposed by heat. The ammoniac, as it is disengaged, leaves the oxyd of tungsten free, and of yellow colour: one hundred parts of this salt contain seventy-eight parts of oxyd of tungsten.

Of Molybdena.

Certain substances have long been confounded under the names of black-lead ore, mineral lead, plumbago, or molybdena, which the more exact analysis of Scheele has proved to be of a different nature. Molybdena can now no longer be confounded with that of ore, of which drawing-pencils are made, called black-lead; the differences are so obvious, that no doubts can remain. Molybdena is composed of hexagonal scales, of greater or less size, very slightly adhering to each other: it is soft and fat to the touch, soils the fingers, and leaves traces upon paper, which are bluish, or of a silvery grey colour; the traces from plumbago are darker and rougher. When it is reduced to powder, which is difficult to be performed, on account of the elasticity of its scales, it has a bluish colour; it yields easily to the knife, is not brittle, and has not the granulated texture of black-lead, now called carbure of iron. In order to pulverize the ore of molybdena, it is necessary, after the process of Scheele, to throw a small quantity of sulphat of potash into the mortar along with it; the powder must afterwards be washed with hot water, which carries off the salt, and the mineral remains pure. By calcination it gives a sulphuric smell, and the residue is a whitish earth. The nitric and arsenical acids are the only kinds which attack it; it dissolves with effervescence in soda, with the help of the blow-pipe; it makes a detonation with nitrat of potash, and the residuum is reddish; exposed to the blow-pipe in a metallic spoon, it emits white fumes.

Molybdena is found in Iceland, Sweden, Saxony, Spain, and France: in Iceland it is in thin plates, in red feldspar mingled with quartz. William Bowles speaks of molybdena found near the hamlet of Real de Monasterio; it is in stone-quarries, sometimes mixed with granite. Molybdena, according to Mr. Hatchett, in his valuable analysis of the Carinthian molybdat of lead, (*Phil. Trans.* for 1796,) seems to exist in four different degrees of oxygenation. The first is that of the black oxyd, the second the blue oxyd, the third the green oxyd, which seems to be an intermediate degree between the blue oxyd and the fourth and last state, that of the yellow acid.

Molybdena cannot be reduced in close vessels, and is very hard to work upon. Muriatic acid has no action on this mineral; but nitric acid attacks it very violently; emits a great quantity of red vapours, and the molybdena is directly converted into a white powder. Thirty parts of nitric acid will be required to one of molybdena: distil at five successive operations, that is, using six parts of the acid at a time. When all the acid is used, and no more vapours are perceived, take out the white powder remaining in the retort; wash it with a little distilled water, to separate the last portions of sulphuric acid which might adhere; but it will be proper, previous to washing it, to warm it in a retort. The oxygen of the nitric acid attacks the molybdena and the sulphur, converting the one into a metallic oxyd, the other into sulphuric acid. These are the means to be used for obtaining the *molybdic acid*.

The acid of molybdena obtained by calcination, or the action of the nitric acid, cannot be reduced, if treated with

with the black flux, alkali, carbon, or the other saline solvents; but, with the addition of oxyd of lead or copper, the metals that arise are mixed with a portion of molybdena, which may be separated. Let oxyd of molybdena, made into a paste with oil, and dried by fire, be put into a close crucible, and urged with a strong heat for two hours: the substance will be found glutinous, black, breaking easily in the fingers, and having a metallic brilliancy; seen through a magnifier, little round grains of a greyish metallic colour may be discerned. This is true molybdena in the metallic state.

When calcined, it changes into an oxyd more or less white. It detonates with nitre; and the residue is oxyd of molybdena mixed with alkali. The nitric acid converts it into a white acid oxyd. Treated with alkalis, in the dry way, hydrogen gas is disengaged, and the residue is only the molybdena in the oxyd state, combined with the alkali. It mixes with metals in various ways: combined with iron, copper, and silver, it is very friable. Lastly, treated with sulphur, it re-produces the mineral molybdena, or sulphure of molybdena.

Molybdic Acid.—This acid is of a light yellow colour, leaving on the tongue an acidical metallic taste: its specific gravity, according to Bergman, is to that of pure water, as 3·46 to 1·00. The air occasions no change in it; but it cannot be sublimed without air. It tinges the native phosphat with a fine green. Under the blowpipe, it is volatilized in a white fume, which is condensed in needle-formed crystals, at the same time that part is melted on the sides of the crucible. Distilled with three parts of sulphur, sulphure of molybdena is reproduced. It dissolves in 576 parts of water at a mean temperature. It decomposes the solutions of soap, and precipitates alkaline sulphures.

The molybdic acid dissolves in great quantities in the concentrated sulphuric acid, by the assistance of heat. This solution assumes a fine blue colour, and becomes thick by cooling. Both phenomena may be made to disappear by heat, and re-appear again in proportion as the fluid cools. If the combination be strongly heated in a retort, the sulphuric acid is volatilized, and the molybdic acid remains in a dry state at the bottom of the vessel. The nitric acid has no action on the molybdic acid. The common muriatic acid dissolves a large quantity by ebullition. This solution affords a residue of a fine deep blue colour, when distilled to dryness. If the fire be more strongly urged, the residue affords a white sublimate, and another bluish; a grey residue remaining in the retort. The sublimate is deliquescent, and colours metals blue: the muriatic acid passes oxygenated into the receiver. It is easy to understand, that, in this operation, the muriatic acid deprives the molybdic acid of a portion of oxygen, and that a portion of this acid passes to the state of molybdena. The molybdic acid, by the assistance of heat, decomposes the alkaline nitrats and muriats, by disengaging their acids, and forms with their bases neutral salts, whose properties Scheele did not examine. This acid likewise disengages the carbonic acid from the three alkalis, and forms neutral salts with their bases.

Though Scheele has not made us acquainted with all the properties of the neutral salts which we design by the names of molybdats of potash, of soda, of ammoniac, &c. he has nevertheless pointed out three, which are sufficient to characterize their state of neutralization. He has discovered, 1. That fixed alkali renders the acid of molybdena more soluble in water. 2. That this salt prevents the acid of molybdena from volatilization by heat. 3. That the molybdat of potash falls down by cooling in small crystalline grains, and that it may likewise be separated from this solvent by the sulphuric and muriatic acids.

The acid of molybdena decomposes the barytic nitrat and muriat. The barytic molybdat, formed in these operations, is soluble in water. The acid of molybdena appears partly to decompose the sulphat of potash by a strong heat. The molybdic acid dissolves several metals, and assumes a blue colour in proportion as this acid abandons to them part of its oxygen.

The affinity of molybdena for oxygen seems to be very weak, for considerable changes are produced in it by only a small difference in the proportion of the acids or alkalis with which it is combined, or the temperature to which it is exposed. In confirmation of this it may be remarked, that all metals, gold and platina excepted, deprive the molybdic acid of a portion of its oxygen, so as to cause it to become blue. Pelletier observed, that a solution of molybdic acid became blue, when hydrogenous gas was passed through it. Klaproth remarked, that light, in certain circumstances, changed the colour of molybdic acid to blue. The same phenomena were observed by Mr. Hatchett. Molybdic acid yields its oxygen in distillation to arsenic, by which the arsenic is converted into the white oxyd. The molybdic is also the only metallic oxyd which is deprived of its oxygen by distillation with sulphat of ammoniac.

The *blue carmine* is prepared by precipitating tin from its solution in muriatic acid by the molybdat of potash. The muriatic acid unites with the alkali, and the molybdic with the tin, to form the blue precipitate.

Of CHROME.

This metal, newly discovered by Vauquelin, is found in the acid state in the red lead of Siberia, and in the oxyd state in the emerald, and in the green lead which is found among red lead. It was thought proper to give a name to this metal, from its principal distinguishing properties. For, the combinations of this metal with oxygen, give a green oxyd, or a red oxyd, according to the proportions of each principle, and these substances communicate the same colour to all the combinations they enter into: the name *chrome*, from χρωμα, therefore, which signifies *colour*, is very properly applied to this substance.

To obtain this acid, boil the red-lead, reduced to powder, with two parts of carbonat of potash. The lead combines with the carbonic acid of the potash; the alkali unites with a particular acid, which gives it an orange colour, and the property of furnishing crystals of the same colour. This new combination is afterwards decomposed by the mineral acids, and by evaporating the liquor used in the operation, we obtain, 1. The salt produced by the mineral acid which was formed. 2. Acid of red lead, in the form of lengthened prisms of a ruby-colour.

Another method, not less easy than the foregoing, consists in pouring upon one part of red-lead in powder, the same quantity of muriatic acid, mixed with an equal part of water: a muriat of lead is thus formed, which is deposited in the form of white crystals, and the liquor assumes a beautiful orange colour. In this operation the native acid of the red lead is separated, and remains dissolved in the water of the muriatic acid. By evaporating the liquor slowly in the dark, crystals of the acid of lead are formed, which are of a ruby-red colour. But if the muriatic acid be in too great quantity, or too highly concentrated, or if the operation be conducted in a strong heat, instead of a red acid, a deep green liquor is formed by the combination of the oxyd of the new metal with the muriatic acid. Sulphuric acid also decomposes the red lead, but it is difficult to separate the products which are formed. Nitric acid produces no change in the nature of red lead.

Chromic Acid.—This is of an orange-red colour, with a pungent metallic smell; it is very soluble in water; and the solution, evaporated with a gentle heat, or spontaneously in the air, crystallizes in small lengthened prisms, of a ruby-red colour. If paper be wet with this acid, and exposed for some days to the rays of the sun; it assumes a green colour, which does not alter in the dark. A thin piece of iron or pewter, put into the solution

tion of this acid, gives it the same colour. Ether and alcohol, boiled a short time in this substance, produce the same effect. The muriatic acid, heated in a retort with this acid, either solid or in solution, produces a brisk effervescence; a quantity of oxygenated muriatic acid is produced, and the liquor assumes a fine dark-green colour. This acid, mixed with a solution of hydro-sulphure of potash, is precipitated in the form of greenish-brown flakes. Heated with the blow-pipe, it boils up, and leaves a green infusible matter. Melted with phosphoric glass and borax, it produces vitreous pearls of a beautiful emerald-green.

Earthy and Alkaline Chromats.

Chromat of Barytes.—The chromic acid easily unites with barytes; it forms with this earth a salt very little soluble in water; for, by pouring liquid chromic acid into a solution of this earth, a precipitate of a pale citron colour is produced; but the salt is not entirely insoluble, for the liquor still preserves a slightly-yellow colour, though the two principles of the salt be reciprocally saturated. This pulverulent salt has no sensible taste: it is decomposed by mineral acids; gives out vital air, or oxygen gas, by means of heat; and there remains an earthy mass of a green colour.

Chromat of Lime.—This salt, formed by the combination of lime with the chromic acid, differs from the barytic chromat only in having a less degree of solubility, and by different affinities and proportions in its principles. With fire, and with acids, its effects are the same.

Alkaline Chromats.—The most simple process for preparing these salts, is to boil one part of red-lead in fine powder, with two parts of alkali, (whether potash, soda, or ammoniac,) and forty parts of water. Hereby a double affinity is put in action; by which carbonat of lead is formed, which falls to the bottom, and a combination of the acid of the lead with the alkali employed, which combination, being soluble, remains in the water. The colour of these combinations of the acid with the alkalis, is a pale yellow; that with ammoniac is in yellow laminæ, shining like gold. Their solutions produce crystals of nearly the same colour, but rather darker; their shape has not been ascertained.

These salts are decomposed by barytes, lime, and strontian. The mineral acids decompose them also. They give out oxygen gas by the action of fire, and the residue is a green mass; but that with ammoniac must be again excepted, for its base is partly decomposed by the oxygen of the acid, and it leaves in the retort a pure green oxyd, because that portion of the ammoniac which is not decomposed flies off in vapours. By double affinity, these salts decompose the calcareous, barytic, magnesian, and aluminous, salts.

To reduce this acid to the metallic state, take seventy-two parts of the chromic acid; put it into a crucible of charcoal, enclosed in another crucible of porcelain, filled with charcoal-dust; place the apparatus in a forge-furnace, and heat it for an hour with a very brisk fire. In the hollow of the charcoal will be found a metallic mass of a light-grey colour, formed of needles interwoven together. From seventy-two parts, Vauquelin obtained forty-four parts of metal.

This metal is very brittle, infusible, fixed, and crystallized in needles. Exposed to heat with a blow-pipe, a lilac-coloured crust is formed over it, which grows green in cooling. Heated in the same manner with borax, it does not melt; but part of it, after being oxydated, dissolves in the salt, communicating to it a very beautiful green colour. Acids have but very little effect upon it, the nitric acid only producing any remarkable change; by distilling five or six times successively, to dryness, twenty parts of concentrated nitric acid with one of the metal, it is converted into an orange-coloured powder, which at first is green. This powder has all the properties of the chromic acid. The uses of this metal are not yet known. Perhaps it may afford beautiful and durable colours to the painter and enameller.

Of TITANIUM.

The substance whence titanium is extracted, is the red schorl, principally found in Hungary; but it has since been found in France, in the province of Brittany, canton of St. Yrieux. It also appears to be the same substance with that which Mr. M'Gregor found in an iron ore, from Menakan in Cornwall, and of which he establishes an interesting account, in Crell's Journal for 1791. The red schorl found in France is in some specimens of a bright red colour, in others darker. It is found at the surface of the soil, in lumps never more than an inch in diameter, and generally appear rubbed or worn on the surface; some preserve a regular crystalline form. It is very hard, will cut glass, and is difficultly reduced to powder. The pieces which fly off under the hammer are very bright, with polished surfaces. This oxyd, melted with smalt, gives to porcelain a pure regular straw-colour. It has been long used at the manufacture of Sevres, to give porcelain a brown colour.

If red schorl be mixed with carbonat of potash, the schorl separates from the potash a certain quantity of carbonic acid. For this purpose, 100 parts of red schorl, found in France, were reduced to powder and melted in a crucible with 600 of carbonat of potash; the mixture acquired a greenish colour. By dilution with boiling water, this melted mass afforded a whitish precipitate, which, after being washed and dried, weighed 137 parts. The alkaline liquor contained only a small portion of silex and alumine, which it seemed to have taken from the crucible; it held caustic potash in solution, and the precipitate itself possessed the property of effervescing with acids. This precipitate lost 0·25 of its weight by exposing it simply to a strong heat. Vauquelin and Hecht, therefore, consider this precipitate as a combination of the metallic oxyd with carbonic acid, and call it the *carbonat of titanium*.

To reduce this oxyd in the dry way, take carbonat of titanium, prepared as above; make it into a paste with fish-oil; place it in a hollow formed of finely-powdered charcoal with a little alumine; expose it for an hour and a half to a very strong heat: a blackish irregular mass will be produced, some of whose points have a reddish metallic colour. This is the titanium in the metallic state.

Acids have a sensible action upon this metal. If a small quantity of the metallic titanium be boiled with pure nitric acid, there is not much action between these two bodies; yet the metallic brightness disappears from the surface, and is occupied by a whitish substance. With the nitro-muriatic acid, a white powder is formed, which spreads all over the liquor; the surface of the titanium is covered with a white pellicle. With sulphuric acid, as soon as ebullition begins, sulphureous acid vapours are disengaged, and the matter changes into a white powder, of which a part remains in solution in the sulphuric acid.

Although the matter of red schorl has not yet been completely melted and reduced, yet those who carefully examine the experiments of Klaproth, Vauquelin, and Hecht, must conclude, that red schorl is a distinct metallic substance, existing in nature in the oxyd state, and whose general properties place it among brittle and oxydable metals.

Of URANIUM.

This metal was lately discovered by Klaproth; it has not yet been found native. Klaproth called *uranite*, or *uranium*, from *uranus*, the name which Bode gave to Herschel's newly-discovered planet, by us called the *Georgium sidus*. Klaproth detected this metal, combined in a certain mineral, found in a mine belonging to George Wagsford, at John-Georgenstadt, in Germany. Its discoverer, Klaproth, to whom we owe its analysis also, first extracted

extracted it from sulphur; then he dissolved it in the nitric and nitro-muriatic acids, and precipitated by alkalis; he obtained precipitates of a lemon or orange colour: with ammoniac, the precipitate is of a dirty yellow.

For the reduction of this metal, separate the yellow precipitates from the solution by means of acids; make a paste of them with linseed-oil, which put into a roasting-furnace; a black powder is obtained, which is to be put in a crucible, well secured with charcoal; and exposed to a strong heat.

This metal is of a dark-grey colour at the surface; within it is of a pale-brown; its specific gravity is 6·44. It possesses a considerable degree of hardness. It is less inclined to fusion than manganese. Dissolved in strong acids, it gives a precipitate with alkalis; with prussiats, the precipitate is of a brownish red; with ammoniacal sulphure, it is obtained of a brownish yellow. These experiments are not very conclusive, because the metal has never been yet obtained in large quantities; so that it is not easy to discover all its properties.

Of NICKEL.

It appears that nickel had been used by the Chinese, before the European discovery of this metal, since an alloy is known in that country under the name of *pakfoud*, which contains nickel. Engestroem discovered that it was a mixture of copper, zink, and nickel; and that the proportions of the last were various, according to the use for which is was intended; they make false jewels of it. Hyerne is the first who wrote of nickel under the name of *kupfer-nickel*, or false copper, in 1694. Hencker regarded it as a species of cobalt, or arsenic mixed with copper. Cramer considered it also as a copper ore. It was not till 1751 that Cronstedt extracted a new metal from this supposed mixture. Kupfernickel is found in Germany, Dauphiny, and the Pyrenees; also at St. Sauveur, near Barege, in calcareous stone. The discovery of this metal, then, is due to Cronstedt. Several mineralogists have denied its existence, regarding it as a mixture of several metallic substances; but Bergman and other chemists have proved, that this substance, so difficult to obtain pure, possesses all the properties of a metal.

To obtain pure nickel, the ore is first to be roasted, to separate the sulphur and arsenic; it changes into a greenish oxyd; the greener it is, the more nickel it contains, according to Bergman and Arfvidson. Mix the oxyd with two or three parts of a black flux; put the mixture into a crucible, cover it with muriat of soda, and urge it to fusion with a very strong forge-furnace fire. Breaking the crucible, there will appear, under the scoria, which are brown, blackish, and sometimes blue, a button weighing a tenth, a fifth, or even one half, of the rough ore. Still this is far from being pure. Bergman and Arfvidson took peculiar pains in the purification of this metal; these chemists have shewn that it is impossible to separate all the iron it may contain; for sulphur, sulphure of potash, detonation with nitre, solution in the nitric acid and in ammoniac, all successively employed by Arfvidson, would not succeed; the button still continued to be attracted by the magnet. Perhaps this property may belong to the metal itself, since the purest cobalt has a magnetic property as strong as iron.

The experiments of La Grange, in the humid way, shew that keepfernickel may be dissolved in nitro-muriatic acid. By diluting the muriatic solution with six parts of water, a slight precipitation is obtained; separate this first precipitate, add pure carbonat of potash to the liquor, and another precipitate is made, of a blue-grey colour; heat the mass to drive off the excess of carbonic acid, and add pure potash, the precipitate will then be of a light grey. The precipitate being separated, a very alkaline liquor remains; saturate it with muriatic acid, and pour on lime-water to excess; a very plentiful precipitate will be obtained.

At present, it does not seem possible to determine absolutely the nature of nickel, since it always participates of iron, which contaminates its properties. The following description of it is collected from Bergman, Arfvidson, Cronstedt, and La Grange. Its texture is not plated, as Cronstedt asserted, but granulated, as its fracture shows. It is nine times heavier than water. It is not brittle, but, on the contrary, sufficiently ductile to make it a question with Bergman, whether he should rank it among the metals or semi-metals. It is nearly as difficult to melt as forged iron, is extremely fixed in the fire, and becomes calcined when heated with access of air, affording an oxyd of a green colour, which is deeper in proportion to its purity: Guyton says this oxyd is fusible into glass. The fluxes and combustible matters commonly used in reducing the metals, produce their effect with this. The action of air and water on nickel are not known: its oxyd, when melted with matters proper to form glass, gives them a hyacinthine colour, more or less red. The action of lime, magnesia, and the three pure alkalis, on nickel, are still unknown.

Nickel is soluble in all the acids, and communicates to them a green colour. Salts, more or less coloured, some of them in crystals, may be obtained from these solutions; but the properties of these salts have not yet been examined.

The oxyd of nickel partly decomposes muriat of ammoniac. This metal combines readily with sulphur by fusion; Cronstedt, who made the experiment, says also, that it dissolves in the alkaline sulphures, and produces a combination like the yellow ores of copper. Nickel unites readily with gold, and renders that metal white and brittle. It may be separated from the gold by oxydation. Nickel melts also with platina. Silver melts easily with nickel, without losing much of its colour or ductility. If this mixture be detonated with nitrat of potash, the nickel will be oxydated, and the silver remain unchanged. Nickel precipitates silver from its solution in nitric acid. Nickel does not amalgamate with mercury. In the heat it disengages the mercury from cinnabar, by uniting with the sulphur. Nickel unites likewise with arsenic. But in general all the properties we have mentioned require the test of fresh experiments.

Of COBALT.

Cobalt was employed in manufactories to give a blue colour to glass, long before it was suspected to be a peculiar metal: this was first discovered by Brandt, a Swede. It has never yet been found pure and native; but mostly oxydated, and united with arsenic, arsenical acid, sulphur, iron, &c.

To assay cobalt ore, it is pounded, washed, and afterwards roasted to dissipate the arsenic. The cobalt remains in a state of black oxyd, more or less deep with respect to colour; this is mixed with three parts of *black flux*, and one part of decrepitated marine salt; some add one half part of rosin. Put the whole into a crucible, which should be only two-thirds full; place it in a furnace; heat gently till the rosin ceases to burn; then use the bellows to increase the fire by degrees, and bring the crucible to a white heat; keep it thus till every thing is perfectly melted; let the crucible get cold, then break it, and separate the metallic button from the scoria, which are always of a blue colour.

It has never been possible to obtain cobalt in a state of purity; but Tassaert's method of treating the cobalt of Tunaberg, as inserted in the Annales de Chimie, may answer for fixing precisely the characters of this metal. Having obtained the oxyd of cobalt in a very pure state, his mode of reducing it is as follows: Take a porcelain crucible, which is to be lined with carbon obtained from carbonic acid; put in the oxyd of cobalt, and expose it for an hour and a half to a forge-furnace; let it cool, then break it, and a button will be found, of the colour of

of iron, brittle, which being broken exhibits a foliaceous texture like fern-leaves, of an iron-grey colour, without much metallic brilliancy. The specific gravity of this very pure cobalt, according to Hauy, is 8·5384; and this metal, though entirely deprived of iron, is still strongly attracted by the magnet. As this gentleman has not set down the other characteristics of this metal thus purified, our following remarks must be taken to refer to cobalt procured by the usual methods.

In the arts, and in the large works, cobalt is not extracted in the metallic form: after pounding and washing the cobalt ore, it is roasted in a furnace, which terminates in a long horizontal flue, that serves instead of a chimney. In this flue, the oxyd of arsenic, being sublimed, becomes condensed into the semi-vitrified substance, which is improperly called *white arsenic*. If the ore contain bismuth, this very fusible metal is collected at the bottom of the furnace; the cobalt remains in the state of an obscure grey oxyd, called *zaffre*. The zaffre, in commerce, is never pure, but is mixed with three times its weight of pulverised flints. In this state, if it be exposed to a strong fire, it melts into a glass, of a dark blue colour, called *smalt*. This is reduced to powder in mills, and mixed with water. The first portion which falls down is the largest grained, and is called *coarse smalt*; the turbid water being decanted off, affords a second precipitate; and this decantation is repeated four times in the whole: the last deposition, which is finer than the rest, is improperly called *azure of four fires*. This azure is used in many arts to give a blue colour to metals, glasses, &c.

The zaffre of commerce, fused with three times its weight of black flux, a small quantity of tallow and marine salt, affords the semi-metal, known by the improper name of *regulus of cobalt*. The reduction of zaffre is very difficult. A large quantity of flux must be used, and the crucible must be kept a considerable time in a white-red heat, that the matter may become very fluid, and that the scoria may be completely fused into a blue glass; at this period the cobalt sinks to the bottom, in the form of a button; this is what modern chemists call *metallic cobalt*.

Cobalt, exposed to heat, does not melt till it is well ignited. This metal appears to be very fixed in the fire, and it is not known whether it can be volatilized in close vessels. If it be suffered to cool slowly, it crystallizes in needle-formed prisms, placed one on the other, and united in bundles. It considerably resembles masses of basaltes, which are separated from each other, as Mongez observes. To succeed in this crystallization, the cobalt must be melted in a crucible till it appears to boil; and, when the surface of the semi-metal becomes fixed, on withdrawing it from the fire, the vessel is to be inclined. The metal, which still remains fluid, runs out; and that portion which adheres to the sides of the kind of geodes, formed by the cooling of the surface of the cobalt, is found to be covered with crystals.

Cobalt, melted and exposed to the air, becomes covered with a dull pellicle, which is an oxyd of the semi-metal, formed by its combination with oxygen. A larger quantity of the oxyd of cobalt may be more easily had, by exposing the pulverized semi-metal, in a shallow vessel, under the muffle of a cuppelling furnace, and stirring it up, from time to time, to renew the calcining surface. This powder, after remaining ignited for some time, loses its brilliancy, increases in weight, and becomes black. This black oxyd requires a most violent heat to convert it into glass, which is then of a deep blue colour.

Cobalt becomes slightly tarnished by exposure to air, and is not attacked by water. It does not unite with sulphur without difficulty; but, with the addition of an alkali the combination is very strong, so that they cannot be separated without solution in acids. For this purpose melt in a crucible equal parts of the calcined ore of cobalt, potash, sulphat of lime, and rosin; when the mixture is melted, let it grow cold, and a considerable quantity of cobalt will be found combined with the sulphure formed during the operation; this combination generally swims above the scoria; the remainder, collected at the bottom of the crucible, seems composed of several metallic substances separated from the cobalt. This sulphurated cobalt dissolves easily in nitric acid, and throws down a white powder containing sulphur, and some other metallic substances.

To obtain phosphorated cobalt, melt a mixture of one part of phosphorated glass, one part of metallic cobalt in powder, and one-eighth part of charcoal. The product of this fusion is a layer of phosphorated cobalt covered with a beautiful blue glass. This phosphoration may be produced by making cobalt red-hot in a crucible, and throwing in little bits of phosphorus up to the point of saturation. Phosphorated cobalt differs from common cobalt in colour; it is white, more inclined to blue; it is brittle, and in breaking shews a crystalline form. It loses its brightness. Under the blow-pipe, the phosphorus burns on the surface, and the residue is a small vitreous globule of a dark blue colour.

The action of barytes, magnesia, and lime, on cobalt, is not known. Alkalis dissolved in water manifestly alter it; but these changes have not been accurately described. This metal dissolves in all the acids, but with different phenomena, according to its own state and that of the acid. It is not soluble in sulphuric acid, unless it be concentrated and boiled. This solution is made in a glass phial or retort; putting in one part of cobalt in powder, and pouring over it three parts of concentric sulphuric acid. Place the retort in a sand-bath, fit on a receiver, and proceed to distillation, first with a gentle fire, which is to be increased by degrees till the acid boils; a quantity of sulphurous gas passes over. When the acid is almost entirely evaporated, the residue must be washed; a portion dissolves in the water, and communicates a rosy or greenish colour; it is the sulphat of cobalt. The other part consists of cobalt, oxydated by the acid, whose oxygen has combined with the metal. Beaumé affirms, that by sufficiently evaporating the sulphuric solution of cobalt, two sorts of crystals are obtained by cooling; the one white, small, and cubical; the other greenish, quadrangular, six lines in length, and four in breadth. He considers these last as the sulphat of cobalt. The former are produced by certain foreign matters united to the cobalt. The crystals of the sulphat of cobalt most commonly obtained have the form of small needles, described by Sage as tetrahedral-rhomboidal prisms, terminated by a dihedral summit, with rhombic faces. They are decomposable by fire, and leave an oxyd of cobalt, not reducible alone. Barytes, magnesia, lime, and the three alkalis, likewise decompose this salt, and precipitate a rose-coloured oxyd of cobalt.

This salt attracts the moisture of the air; and is decomposed by heat. Nitric acid dissolves it with the assistance of caloric: Put cobalt in powder into a matrass; pour over it five or six times its weight of nitric acid at 40°; place the matrass on a sand-bath, and heat it till the cobalt is dissolved; let the solution stand to settle, then draw it off; the solution, when at the point of saturation, will be of a rosy brown, or else a bright green. Evaporate this solution over a sand-heat to one-half; in cooling, it furnishes crystals in small-connected needles: this is nitrat of cobalt. This salt is very deliquescent, boils up on hot coals, without detonating, and leaves a deep red oxyd. It is decomposed by the same saline intermediums as the sulphat of cobalt. If more alkali be added in these decompositions than is necessary to precipitate the oxyd of cobalt, the precipitate disappears, by solution in the excess of alkali.

The muriatic acid does not dissolve cobalt in the cold, but takes up a portion by the assistance of heat. This acid acts more strongly on the oxyd, forming a solution of a red brown, which becomes green when heated. By evaporation, it affords a muriat of cobalt crystallized

tallized in small needles, very deliquescent, which becomes green when heated, and is soon after decomposed.

If the solution be not evaporated, it forms what is called *sympathetic ink*. This ink may be prepared also with nitro-muriatic acid; or thus: Put into a matrass one part of cobalt, or rather zaffre, with four parts of nitric acid; let the mixture digest in a hot sand-bath for three or four hours, or till the dissolution is almost complete: then add as much muriat of soda as was used of of cobalt, and of water four times the quantity of the nitric acid; filter the liquor through paper, and you have a sympathetic ink, with which, if you write upon white paper, no mark will be visible; but, by slightly warming it, the characters will appear of a beautiful sea-green colour; as the paper gets cold, the colour disappears, but may be revived again by heat.

The action of the other acids on cobalt is not known. The boracic acid is the only one which seems capable of combining with it; and this must be by the action of double affinity: Mix a solution of borat of soda and a solution of cobalt in one of the foregoing acids, and a double decomposition takes place. The soda unites with the acid which held the metallic oxyd in solution, and the boracic acid, combined with that acid, forms a salt which is precipitated. The borat of cobalt is separated by filtration.

Nitrat of potash oxydates cobalt: Mix one part of cobalt with three of nitrat of potash: make the mixture detonate by throwing it in spoonfuls into a red-hot crucible; a small detonation is heard each time. When all the mixture is in the crucible, urge it with a strong heat; then take the crucible off the fire, pour out the contents, wash them in plenty of boiling water, and strain the liquor. The powder remaining after filtration is oxyd of cobalt, which has different degrees of red, but is often greenish. Cobalt detonates under the hammer, when mingled with the super-oxygenated muriat of potash: if this mixture be brought in contact with sulphuric acid, it burns with great rapidity, and the smoke rises in the air assuming the form of a crown, in the same manner as phosphorated hydrogen gas burning spontaneously in a tranquil atmosphere.

Cobalt unites by fusion with gold; but the poperties of the mixture are little known. It precipitates gold from its solution in aqua regia. Cobalt also melts with platina, and precipitates it from its solution in aqua regia. Silver does not unite by fusion with cobalt. The solution of silver in nitric acid is precipitated by cobalt, thirty-seven parts of cobalt only being required to precipitate one hundred of silver. Mercury does not appear to amalgamate with cobalt. It is precipitated from nitric acid by cobalt in its metallic state. Lead, according to Gmelin, unites by fusion with cobalt, and is precipitated by this metal from its solution in acids. Bismuth does not unite by fusion with cobalt. It also is precipitated by the cobalt from its solutions in acids. Nickel unites readily by fusion with cobalt, and is separated from it with great difficulty. This separation is effected by melting it with a sulphure of potash, which dissolves the cobalt more easily than the nickel. The affinity of these two metals for acids has not been determined, though there is reason to think that the affinity of the cobalt is strongest. When a bit of nickel is introduced into a solution of nitrat of cobalt, a change in the colour is produced, but without any evident precipitation of cobalt. Copper melts with cobalt. They may be separated by sublimation with muriat of ammoniac. Copper is precipitated from its solution in acids by cobalt. From a solution of copper and cobalt in aqua regia, the copper may be precipitated by zink, which produces no change in the solution of cobalt. Arsenic and its oxyd unite with cobalt. They may be separated by roasting them with charcoal. The arsenic does not precipitate cobalt from acids, though it seems to have a greater affinity with these substances than cobalt. Iron melts easily with cobalt. Neither of these metals seem to precipitate the other from its solution in acids. Tin produces a slight precipitation from muriat of cobalt.

The oxyd of cobalt dissolves in caustic ammoniac, but not without the assistance of heat; and the liquor assumes a beautiful rose colour. Only the oxyd of cobalt is employed in the arts, not the metal. It is used in painting earthen ware and porcelain; former painters used it ground with oil, hence that very rough blue visible in the ground-work and draperies of old pictures; for the colour grows darker with age by contact with air. It is a colouring matter for glass and enamel. Azure is used in dying cloth, in making starch, &c.

Of MANGANESE.

This was long unknown as a metal, though much used in the arts; it has been employed in glass works for more than two thousand years. This mineral has the property of whitening glass, or rendering it colourless; whence it has been called *soap of glass*. Only Scheele, and the chemists of his day, have shewn that this substance is a metal of a peculiar nature. Native manganese is said to have been found by Picot la Peyrouse, in iron-mines in the valley of Vicdelos, in the ci-devant county of Foix, in France. It was in globules, somewhat flatted, malleable, and of a lamellated texture.

Manganese, however, is generally in the oxyd state, presenting several varieties. The oxyd is either black, red, or white, compact, friable, in long four-sided crystals like needles, particularly in the heavy spar; some is globulous, stalactiteous, and pulverulent, like black dust which soils the fingers. The white is the most weakly oxydated; it is found in iron-mines, but not mixed with the iron. The black oxyd of manganese is often found among hematites. The carbonat of manganese contains a good deal of iron, carbonic acid, lime, &c. Scheele has proved that the ashes of vegetables contain manganese; it is separated by treating with nitrat of potash; urging the mixture to fusion, a coloured glass, either blue or green, is obtained.

To reduce manganese to the metallic state, line a crucible; put in at the hole a globule of oxyd of manganese softened with oil or gum-water, and cover the whole with a layer of charcoal; fix another crucible over this, and urge the fire very strongly for an hour, or an hour and a half. The metal which results generally has inequalities on its surface. The reduction is rather difficult; this metal is very refractory, and requires a strong heat; it is, besides, much disposed to vitrify, which is another difficulty: so vitrifiable indeed is it, that Guyton, who enclosed a button of this substance in a small crucible well luted, and urged it with a strong fire in Macquer's furnace, could obtain but one-half metal; the rest was scoria and vitreous matters. It is said in Crell's Journal, that, by mixing carbonat of magnesia with charcoal, pouring in nitric acid, and then evaporating to dryness, a dry matter would be produced, which, being well washed and separated, would give a complete metal, very beautiful, which is metallic manganese. If this be true, it is a reduction in the humid way. Gahn is one of the first who succeeded in reducing the oxyd of manganese.

The metal manganese is white; its fracture is granulated, irregular, of a metallic whiteness, shining, but soon growing dull in the air. Reduced to powder, it is easily oxydated by air. If it be heated in contact with air, it is converted into an oxyd, at first whitish, but which becomes more and more black in proportion as the calcination proceeds, and finally turns green. It requires an excessive degree of heat to melt it. The sulphuric acid attacks this metal. Scheele and Bergman say, that, during the solution, there is an effervescence which arises from the disengagement of a certain quantity of hydrogen gas. Fourcroy, on the contrary, asserts, that the sulphuric acid is decomposed by the manganese: this, therefore,

therefore, requires fresh experiments. Nitric acid dissolves it, throwing off red vapours. The muriatic acid dissolves it also; this solution crystallizes very difficultly. The alkalis, and even water, precipitate the metal from this solution. It is said that it mixes with other metals. But all that is known of this metal, is at present very uncertain: it is not even known, perhaps, at all in a pure state; for Bergman is doubtful whether it can be completely separated from the iron it contains. To obtain manganese as free from iron as possible, Richter recommends the following process: A saturated solution of sulphat of manganese is to be mixed with a solution of tartarit of potash, and the mixture placed on a sand-bath. In the course of a few minutes, a white precipitate is formed, which increases in proportion as the fluid is evaporated. When the evaporation has been carried so far on, that the sulphat of potash is disposed to crystallize, the clear liquor is to be decanted off, and the precipitate well edulcorated with a small quantity of water. The water used for edulcoration, together with a fresh quantity of the tartarit of potash, is to be added to the liquor, in order that any manganese which they contain may be precipitated. The precipitate, which is a pure tartarit of manganese, may be decomposed by a strong fire, and subjected to the usual process for obtaining this substance in its metallic state.

The properties of the native oxyd of manganese are, however, better known. The accurate experiments of Scheele, and those of Bergman, Gahn, Rinman, Engestroem, Ilseman, La Peyrouse, and Fourcroy, have thrown great light upon the properties of this metallic substance. The pure oxyd of manganese is pulverulent, soft to the touch, and soils the fingers. Melted under the blow-pipe, with microcosmical salt, a transparent glass is obtained, of a bluish red colour; if left to grow cold and melted again, slowly, the colour disappears; melted afresh with the outward flame of a blow-pipe, the colour may be made to come and go alternately.

By heating the native oxyd alone in the pneumatic apparatus, very pure oxygen gas is obtained. It is this oxygen or vital air alone, which can be used to advantage by patients whose disorders require the administration of this fluid. It is to be remarked, that in distilling the native oxyd of manganese, in order to obtain vital air in a very pure state, the retort must be completely filled with this substance, so as to allow no atmospherical air to remain in the retort. It is in this way that the vital air intended for the use of the sick, or for the composition of water, ought to be prepared. Without this precaution, a considerable quantity of nitric acid will be formed, or a mephitic residue produced, which stops the combustion of the hydrogen gas, and renders it necessary to empty the receiver. After the operation, a grey matter remains in the retort; this, if exposed to the air, will attract oxygen, and become of the natural black colour of the oxyd. By distilling oxyd of manganese with charcoal, the product is carbonic acid gas. The action of other combustible bodies with it is not known.

Gmelin, it is said, succeeded in forming a mixture of oxyd of manganese and sulphur. If sulphuric acid be poured on oxyd of manganese, with the help of a very gentle heat, oxygen gas is disengaged. See on *Oxygen Gas*, page 193, for the manner of the operation. If a larger quantity of the acid be poured in, the oxyd dissolves: the solution is coloured, but is deprived of colour by the addition of a combustible body, as sugar or honey; it furnishes a transparent sulphat of manganese in parallelopiped crystals. This sulphat is decomposed by fire, and gives out oxygen gas. The alkalis separate an oxyd from manganese, in form of a whitish gelatinous matter, which becomes brown by exposure to the air: this change of colour is owing to the absorption of oxygen.

The oxyd of manganese is not attacked by the nitric acid, because the acid finds the manganese already oxydated; nor is it much affected by the fuming or hot acid of Boyle; but, by the addition of a combustible body, as sugar, honey, &c. the dissolution is complete. This salt has not yet been obtained in crystals. Alkalis precipitate from its solutions a white oxyd, soluble in acids, which, when heated, becomes black, and is oxydated still more. Bergman thinks that this metal has a greater affinity with salts than most metallic substances; he places it in his table, near the top of that column which contains the elective attractions of acids. The muriatic acid likewise dissolves manganese; and, when digested, it seizes on the oxygen, and passes in vapours through the water: this is what is called *oxygenated muriatic acid*. See the section on that acid, page 218. Muriat of manganese is decomposed by alkalis also.

Fluoric acid forms with oxyd of manganese, a salt soluble with difficulty; but, by decomposing the sulphat, nitrat, or muriat, of manganese, with the fluat of ammoniac, a fluat of manganese is precipitated. The carbonic and acetous acids have little effect upon the oxyd of manganese. Its action with terrestrial substances has not been fully examined. Combined in a large proportion with gold and silver, manganese renders these metals very brittle. It precipitates silver from acids in a state nearly approaching to the metallic. Mercury and manganese do not enter into combination. Manganese precipitates mercury from its solution in acids; oxyd of manganese has no action on the oxygenated muriat of mercury; but, distilled in the proportion of two to one with ordinary muriat, it converts the mercurial muriat into the oxygenated. During its distillation with cinnabar, sulphuric acid gas, and fluid mercury, are disengaged. Lead, according to Gmelin, unites with great difficulty to manganese. The properties of the lead, by this admixture, are but little changed. Copper unites, by repeated meltings, with manganese, and forms with it a white malleable metallic mass. Manganese does not precipitate it from its solution in acids. Arsenic forms a metallic mixture by melting it in close vessels with manganese. In distillation together, the white oxyd of arsenic passes over unchanged.

The oxyd of manganese combines very well with alkalis; it is revived by combination with ammoniac. In this combination a peculiar gas is disengaged, which appears from the discovery of Berthollet to be azotic gas, and that the hydrogen of the ammoniac combines with the oxygen, and takes it from the manganese, which is thus reduced, and becomes white.

Scheele has given the name of *cameleon mineral*, to a combination of potash and oxyd of manganese in the dry way: Reduce the oxyd of manganese to powder, and mix it with the potash; put the mixture into a crucible, and urge the fire. The product is a kind of vitreous frit, soluble in water. Put an equal weight of this matter into two glasses, and pour hot water upon one, and cold water upon the other; and you have at the same time a solution of a red colour in the cold water, and of a beautiful green in the hot. The same matter in the same water at different temperatures will assume various colours: this arises from the several degrees of oxydation; for, at the end of four-and-twenty or six-and-thirty hours, all the liquors are as colourless as water, and the manganese is equally precipitated in both glasses. The same phenomena arise from nitrat of potash mixed with oxyd of manganese. The nitrat is decomposed by caloric; and the oxyd with the potash form a soluble mass, of a dark green colour, shewing the same properties as mentioned above.

Borax, melted with oxyd of manganese, assumes a brown or violet colour. Muriat of ammoniac, distilled with this metallic oxyd, affords ammoniac in part decomposed; in which process water is formed by the union of hydrogen, one of the principles of this salt, with the oxygen of the oxyds, while the azot, or the other principle of the ammoniac, is disengaged in the aeriform state.

ftate. Nitric acid is likewife formed during this procefs. See the fection on *Ammoniac*, page 226, for the manner of making this experiment with liquid ammoniac, rather than with muriat of ammoniac.

By adding oxyd of manganefe to the materials ufed in making glafs, it is rendered of a clear white: the addition of nitrat of potafh gives the glafs a violet-colour, which will be fo much the ftronger, in proportion as the oxydation of the metal by the nitric acid was the more complete. Thus the oxyd of manganefe is ufed in glafs-works, either to take away the yellow, green, or blue, tinge, from glafs intended to be of a clear white; or in other proportions to give the glafs a violet colour. The affinity of manganefe for the principle of combuftion ferves likewife to guide modern chemifts in a great number of cafes, and may lead to difcoveries concerning the nature of many fubftances at prefent unknown.

OF BISMUTH.

Bifmuth is often found native in the bowels of the earth; or combined with fulphur, arfenic or oxygen. The primitive form of the metal is a regular octahedron. To reduce, or fmelt, the ore of bifmuth, a cavity is made in the earth, which is covered with billets of wood placed one on the other; the wood is fet on fire, and the ore, being broken fmall, is thrown in it. The bifmuth melts, and runs into the cavity, where it takes an orbicular form. In other places the trunk of a pine tree, hollowed into the form of a gutter, is placed in the earth in an inclined pofition, and wood laid over it; the bifmuth is thrown on this combuftible matter, after it is fet on fire: the metal melts, falls into the channel, which conducts it into a cavity made in the earth, over which the extremity of the trunk is placed. The bifmuth, thus obtained, is poured into iron moulds. It is then of a light yellow colour, of a lamellous texture, and brittle; its metallic brilliancy is changed by expofure to the air, and it affumes a violet tinge; and at length a white powder is formed on the furface, which is bifmuth in the oxyd ftate.

Bifmuth is extremely fufible, and melts long before the red heat commences. The following is the mode of obtaining it in cryftals. Enclofe it in a crucible, and melt it; when melted, take the crucible off the fire, and let it ftand a fhort time to cool; then pour it off; the liquid part runs off; but the congealed part, adhering to the crucible, fhews the metal in cryftals at the lower part and at bottom. Another mode of operation, according to Monges, is to ufe a crucible with a hole and ftopper at the bottom. When the metal is melted, let it coagulate at the furface; when it begins to adhere, remove the ftopper from the bottom, and the liquid part runs out; then the fides of the crucible, and the under part of the upper furface of congealed matter exhibit cryftals, fometimes cubical, fometimes octahedral.

If bifmuth be kept in fufion with contact of air, its furface becomes covered with a pellicle, which changes into an oxyd of a greenifh grey, or brown, named afhes or calx of bifmuth. Nineteen drachms of bifmuth calcined in a capfule of glafs, afforded Baumé twenty drachms thirty-four grains of oxyd. Bifmuth heated to rednefs, burns with a fmall blue flame, fcarcely fenfible. Its oxyd evaporates in the form of a yellowifh fmoke, which condenfes on the furface of cold bodies. The experiment is performed as follows: Put the bifmuth into a crucible, and urge it with a ftrong heat: as foon as the blue flame arifes, take the crucible off the fire, and fix over it a glafs funnel, in which the bifmuth will fublime in the oxyd ftate. When the bifmuth no longer fmokes, heat it again to the fame degree; and repeat the experiment till the bifmuth will no longer volatilife: this was formerly called *flowers of bifmuth*. The oxyd of bifmuth is very fufible; it melts alone by the action of fire, and is converted into a yellow tranfparent glafs: this glafs corrodes and vitrifies the crucible. This oxyd may be reduced, or reftored to the metallic ftate, by being made into a pafte with black foap, and melted in a crucible.

Hydrogen gas alters the colour of bifmuth, and gives it a violet tinge. Sulphur combines with this metal by fufion, and produces a fort of ore of bifmuth, fulphureous, artificial, blackifh, and porous, which, when melted again, becomes grey, fhining, ftriated, and is even fufceptible of cryftallization.

Bifmuth has, according to Pelletier, very little affinity for phofphorus. Of the experiments made for phofphorating bifmuth, the following fucceeded the beft: A little bifmuth was melted in a crucible; when melted, fome little bits of phofphorus were thrown in, one after the other: the crucible was then taken off the fire, and the phofphorated bifmuth was found to adhere very ftrongly to it. It is very brittle, like bifmuth; under the blow-pipe, it emits a fmall green flame in the inftant of fufion; by expofure to the air, it affumes a varied colour; throwing fome filings of it upon burning coals, fmall greenifh flames will arife with a phofphoric fmell.

Concentrated and boiling fulphuric acid acts on bifmuth; the acid is partly decompofed, and fulphureous gas is exhaled. The mafs remaining in the veffel, after the decompofition of a part of the acid, is white; that portion which is in the faline ftate may be feparated by means of water, from the other portion which is oxydated, and does not contain any acid; the lixivium, by evaporation, affords a fulphat of bifmuth in fmall deliquefcent needles. This falt is decompofable by fire, by the falino-terreftrial fubftances, by alkalis, and even by water alone, in large quantities.

The nitric acid diffolves bifmuth with an aftonifhing rapidity; or rather this metal decompofes the acid, and very quickly takes from it a part of its oxygen; the mixture becomes very ftrongly heated, and emits denfe red vapours. If the combination be made in the pneumatic apparatus, a large quantity of nitrous gas is obtained; and this procefs is one of the readieft and moft convenient for procuring this gas. During the folution, a black powder is precipitated, which Lemery fuppofed to be bitumen, and Pot confidered as calcined oxyd of bifmuth; Baumé fufpected it to be fulphur; perhaps it may be charcoal.

The nitric folution of bifmuth is without colour, and, when it is much faturated, it affords cryftals without evaporation. Evaporation, and cooling, afford a nitrat of bifmuth; it is a white very fhining falt, concerning the form of which chemifts differ. Fourcroy, by flow evaporation, obtained flattened rhomboids, very large, and perfectly fimilar to the calcareous fpar of Iceland. The nitrat of bifmuth detonates feebly, and with reddifh fcintillations, after which it melts and fwells up, leaving an oxyd of a greenifh yellow, not reducible without addition. This falt expofed to air, lofes its tranfparency, at the fame time that the water of cryftallization is diffipated. If water be added, inftead of diffolving it, the fluid becomes white, milky, and an oxyd of bifmuth is precipitated. The fame thing happens, if the nitric folution of bifmuth be poured into water, the greateft part of the oxyd of this metal being precipitated under the form of a white powder, called *magiftery of bifmuth*. If it be defired to be very white and fine, diffolve the bifmuth in the nitric acid as mentioned before, dilute it in twice its weight of water, then let it fettle well, and draw it off to feparate the black precipitate. Pour the folution into a large quantity of frefh water, and a white precipitate will take place; when this has well fettled, filtre the liquor; wafh the depofit remaining after filtration in feveral waters, to feparate all the acid, and then dry it: this is what is called *magiftery of bifmuth, white faint*, and *pearl-powder*. By the ladies it is ufed as a pigment for rendering the fkin white; but it has the inconvenience of becoming black when in contact with odoriferous or combuftible matters. This property has occafioned many a painful ftruggle between black, white,

 and

and red. If sulphure of potash, or hydro-sulphure, be poured into a solution of nitrat of bismuth, precipitated by water, the oxyd is changed from white to a deep black. The magistery of bismuth should be very white and compact.

The muriatic acid acts with difficulty on this metal. It is necessary that the acid should be very concentrated, and be kept in digestion on the bismuth for a long time; the solution succeeds still better, when a large quantity of muriatic acid is distilled from the metal. The mixture has a fetid smell; the residue is to be washed with water, which becomes charged with a portion of the metallic oxyd united to the acid. The muriat of bismuth crystallizes with difficulty; it may be sublimed into a kind of soft salt, improperly called *butter of bismuth*; it strongly attracts the humidity of the air; and, lastly, water decomposes it, and precipitates it in the form of a white oxyd. The nitro-muriatic acid dissolves bismuth also; the solution is at first greenish, but afterwards it grows white.

Bismuth makes no detonation with nitre; yet that salt converts it into an oxyd. Bismuth in powder, mixed with the super-oxygenated muriat of potash, detonates with a blow. Muriat of ammoniac is decomposed by the oxyd of bismuth, but not by the metal; the product is what was formerly called *bismuthical flowers of sal ammoniac*, and a large quantity of ammoniacal gas is disengaged. Mix together one part of the oxyd of bismuth, and two parts of muriat of ammoniac; put the mixture into a glass retort, and proceed to distillation with the pneumatic apparatus: some ammoniac passes over; and a little oxyd of bismuth mixed with undecomposed muriat of ammoniac, rises and sticks to the neck of the retort; the residue is a combination of the metallic oxyd with the muriatic acid. The oxyd of bismuth may be separated from the muriat of ammoniac by simple solution in water.

Bismuth unites, by means of fluxes, with gold, and forms with it a pale, brittle, heavy mass. When this mass is exposed in an open fire, the bismuth is oxydated, and leaves the gold unchanged. Bismuth precipitates gold from its solution in aqua regia. Platina melts with bismuth, and the mixture becomes fusible in proportion to the quantity of bismuth which it contains. The bismuth is oxydated by exposure to an open fire, but it is difficult to separate it completely from the platina, for the mixture becomes insoluble in proportion as it is separated. Bismuth precipitates platina from its solution in aqua regia. Bismuth unites easily with silver, which becomes brittle, and loses its brilliancy. By exposing the mixture in an open fire, the bismuth is vitrified, and the silver left unchanged. Bismuth precipitates silver from its solution in nitric acid, first in its metallic state, and at last in the form of an oxyd. Bismuth amalgamates easily with mercury, and is often used to adulterate that fluid. It is difficult to separate the bismuth again, even by distillation and filtration through leather. Mercury dissolved in nitric or sulphuric acid is precipitated in its metallic state by bismuth. If three parts of bismuth and seven of oxygenated muriat of mercury be distilled together, a butter of bismuth will be formed, and the mercury will pass over in a fluid state into the receiver. By the assistance of heat, bismuth separates the mercury also in a fluid state from cinnabar. The result is a sulphure of bismuth. Lead unites easily by fluxes with bismuth, and by this union becomes harder, more brittle, and more fusible. These metals may be separated from each other by solution in aqua-fortis, and dilution with water; for the water precipitates the oxyd of bismuth, and leaves the lead in combination with the acid. Lead precipitates bismuth from its solution in acids. The lead has also a stronger affinity in the dry way for sulphur, and separates it from the sulphure of bismuth.

Bismuth may be used for making a sympathetic ink. Any of the solutions of bismuth will do; but we should choose in preference an acid which will not corrode the paper, as the acetit of bismuth. Write the characters on the paper, and they will be invisible; to make them appear, take an alkaline sulphure, (the sulphure of ammoniac in preference;) putting this in contact with the paper, the vapour disoxygenates the bismuth, and blackens it, forming a sulphure of bismuth. The experiment may be made by putting the sulphure of ammoniac in a glass, and inverting the paper over it; the vapours of the sulphure will rise, and soon render the characters visible. Bismuth is employed by the pewterers to communicate hardness to tin. It may be substituted instead of lead, in the art of cupelling the perfect metals, because, like that metal, it has the property of flowing into a glass, which is absorbed by the cupels. Geoffroy the younger has observed and recorded many circumstances in which this brittle metal resembles lead. The effects of bismuth on the animal economy can only be conjectured; but there is reason to think that its use, like that of lead, would be dangerous; and there are some instances of bad effects arising from the external use of this metal. We have already observed, that the oxyd of bismuth is used as a pigment for the skin, and that strong smelling matters alter its colour; such smells as are fetid more particularly produce this effect. The vicinity of slaughter-houses, of common sewers, and almost every other strong smell, has that effect on this oxyd, and causes its colour to become more or less black; and hence it injures the skin. The vapour of alkaline sulphures, or the smell of eggs, produce this effect quickly. A very common experiment in natural philosophy shews this property in a striking manner. If characters be written with a solution of bismuth on the first page of a book of fifty leaves, and the last page be impregnated with a small quantity of the liquid alkaline sulphures, a short time afterwards, the hepatic vapour carried by the air, which circulates between all the leaves, arrives at the other extremity of the book, and converts the colourless characters marked even on the first page, into a deep brown. It is affirmed, that the sulphurated hydrogen, or hepatic gas, passes through the paper; but Monge has proved, that it is the air which carries it in this manner, from one leaf to another, since the effect does not take place, when the leaves are glued together.

Of ANTIMONY.

The Latins called this metal *stibium*: it was first called *antimonium*, or antimony, in England, from its having been given to some *monks*, as a purgative. The prior of a monastery at Canterbury had given some of it to his hogs, and he found that it purged them and increased their appetite; he essayed to do as much by his monks, a lazy crew, who were often ill, and lost their appetites for want of exercise; but the greater part of them died. No metal has given so much employment to alchemists, and volumes have been written upon it. Alchemists have given it various names, as *root of metals*, *sugar of lead*, &c.

To separate the antimony from its gangue, and other metallic matters with which it may be mixed, two earthen pots are taken, one of which is pierced at the bottom in many places; into this the ore is put; another pot, placed below the first, for the purpose of receiving the sulphure of antimony in proportion as it melts, being sunk in the earth. A fire is then made round the superior pot, so as to produce gentle heat at the beginning, because the antimony is very fusible; but towards the end the heat is raised, that the whole of the antimony contained in the mineral may be melted out. The scoriæ remain in the upper pot. This substance is of a blackish grey colour, in thin plates, or needles of different sizes, and friable.

To obtain the oxyd of antimony from the native sulphure, break the sulphure into small pieces, and expose it

it to heat, which volatilizes a part of the sulphur. A very gentle heat must be used to reduce the grey oxyd of antimony: Take eight parts of the sulphurated grey oxyd of antimony, six of tartar, and three of nitrat of potash; put these together into a crucible. The product will be, according to the different affinities of the substances employed, carbonic acid and azot, which are disengaged, a little carbonat of potash, sulphure of potash containing a little antimony, and lastly sulphat of potash; these three products are found in the crucible, besides the antimony which lies at the bottom. This reduction may be effected with equal parts of grey oxyd of antimony and black flux, mixed with a little black soap. The black flux, in this operation, answers two intentions; the alkali which it contains unites to the sulphur, which has not been dissipated from the ore by the action of the fire, and the coaly matter favours the reduction of the metallic oxyd. This is the method of preparing, what is called the *regulus* of antimony in the large way, for commercial purposes.

Antimony, when pure, is brittle, of a brilliant white, composed of plates or leaves lying upon each other; it is generally made up in round flatted lumps, which present upon their surface a sort of crystallization in the form of leaves of fern. The air changes it but little; sometimes the surface becomes a little tarnished or dull. This metal has a very sensible taste oraction on the stomach, being both emetic and purgative. It dissolves in the gastric juice; and hence it was supposed that antimonial pills would be a good purge: these were called *perpetual pills* by the ancients.

Antimony, melted in an open crucible, and then left to cool slowly, will be found crystallized in regular pyramids; but, if strongly heated in closed vessels, it is entirely sublimed without decomposition or alteration. But, when the evaporation is made in open vessels, it becomes oxydated at the surface, and converted into a white fume. To obtain this oxyd, place the crucible in the furnace, not upright, but sloping, or nearly horizontal, so that its rim applies to the opening or door of the furnace; it must be luted with clay; apply another crucible to its aperture to receive the oxyd. Heat the crucible to a white-red heat; remove the second crucible every half-hour, and apply another in its place: it is commonly filled with a white shining substance; clear it out, and detach with a feather what adheres to the crucible: this is what is improperly called *silvery flowers of regulus of antimony*, or *snow of antimony*. It is a sublimed metallic oxyd, in very slender, white, brilliant, needles. This substance has saline properties; is not easily soluble in water; and may be reduced to the metallic state by combustible bodies. This oxyd may also be melted into an orange-coloured glass, paler and more transparent than is made with the grey oxyd and sulphure of antimony. All combustible matters act more or less on antimony. Hydrogen gas alters its surface, and gives it a darker colour. It acts in a much more efficacious manner on its solutions.

Antimony unites with phosphorus: Mix equal parts of phosphoric glass and antimony; add one-eighth part of charcoal in powder, and melt the whole in a crucible. The result is a white metallic brittle substance, which breaks into small cubes: this is phosphorated antimony. Phosphure of antimony may be produced also by putting in the phosphorus over the antimony: the crucible must be taken off the fire as soon as the last pieces of phosphorus are thrown in, or all the phosphorus would be volatilized.

Sulphur also combines very readily with antimony, and forms an artificial ore, perfectly similar to native sulphure of antimony. To obtain this combination, equal parts of sulphur and of the antimony in powder are to be quickly melted in a crucible. A mineral in the form of needles of a dark grey is produced, which never contains so much as the half of its weight of sulphur, unless one part and a half of the latter substance be used with one part only of the metal. Alkaline sulphures, or *livers of sulphur*, completely dissolve antimony, and form a yellowish mass, from which antimoniated sulphur may be precipitated by any acid, which gives it immediately an orange colour. *Hepatic*, or sulphurated hydrogen gas, acts on the solutions of this metal absolutely in the same manner as the hydrogen gas. This experiment may be made by pouring water charged with sulphurated hydrogen over the white oxyd of antimony. By either method a yellow precipitate is formed.

Arsenic, nickel, cobalt, and bismuth, unite with antimony; the properties, however, of these several mixtures, have not yet been sufficiently examined. But the action of acids on this metal has been more attended to. When concentrated sulphuric acid is slowly boiled on the regulus, the former is decomposed, and the latter partly oxydated; a large portion of sulphureous gas is exhaled, and towards the end a small quantity of sulphur sublimes, a brownish mass remaining after the decomposition of the acid, which consists of much metallic oxyd, crystallized in needles, and a small proportion of metal, combined with the acid in the state of sulphat of antimony. The saline part may be separated by means of distilled water. This salt, when brought to a dry state by evaporation, is very deliquescent, and cannot be made to afford crystals. Fire easily decomposes it; pure water, the terrestrial substances, and alkalis, likewise separate these principles.

The nitric acid acts in the same manner as the sulphuric acid, but with more energy: the salt which is produced has the same properties as the sulphat of antimony. The muriatic acid, when hot, seems completely to dissolve the antimony; but, in cooling, the calcined part is precipitated, and muriat of antimony is retained, which may be separated by evaporating the liquor, but it is very deliquescent. The nitro-muriatic acid dissolves antimony better than the other acids; yet still a part of the oxyd is precipitated in cooling. The oxygenated muriatic acid burns antimony with great ease; to this end it is reduced to powder, and thrown into a jar filled with this gas; the jar must be very dry; the metal burns rapidly, with a bright white flame. Super-oxygenated muriat of antimony may be obtained by mixing super-oxygenated muriat of mercury with antimony, in the manner to be related when we come to treat of mercury. Phosphoric acid also attacks antimony; but the salt thence arising has not been yet ascertained.

The action of alkalis with antimony is but little known. Nitrat of potash is decomposed very readily by antimony. When equal parts of this metal and of nitre in powder are thrown by small portions at a time into a red-hot crucible, a strong detonation takes place, and the metal is burned by the assistance of the oxygen afforded by the nitre. After this operation, the crucible is found to contain the fixed alkali or base of the nitre, and the antimony in the state of a white oxyd. This oxyd is called *diaphoretic antimony*; modern chemists call it *oxyd of antimony by nitre*. Antimony is not usually employed in this operation, but the native sulphure of antimony, or its ore; in which case, a larger quantity of nitre is required to be added; as for example, three parts to one of this mineral, in order that not only the metal may be burned, but likewise all the sulphur to which it is united. The reason why the ore is preferred in this process is, that the sulphur renders the detonation of the nitre more rapid, and singularly facilitates the combustion of the antimony. The matter that remains in the crucible after the detonation, is composed of the oxyd of antimony, united partly to the fixed alkali of the nitre, and partly to a portion of the nitre which escaped the detonation. It likewise contains a small quantity of sulphat of potash, formed by the acid of the sulphur, and the fixed alkali of the nitre. This compound is called the *solvent of Rotrou*, or *unwashed diaphoretic antimony*. The matter being thrown into hot water, the saline part is dissolved, and the metallic oxyd remains suspended. The water is poured

poured off before subsidence, and the white and fixed oxyd is then suffered to fall down; this is called *washed diaphoretic antimony*. It must be carefully dried, and then moulded into little square pieces. The water, which floats above, holds in solution the saline matters which were contained in the mixture, and also a portion of the metallic oxyd, almost acidified, united to the alkali of nitre. This kind of antimoniat of potash is susceptible of crystallization, according to Berthollet. Acids decompose it, and precipitate an oxyd of antimony, called *cerufs of antimony*, or the *materia perlata* of Kerkringius. The liquor which remains after the precipitation contains a small quantity of nitre which had escaped the detonation, a small quantity of sulphat of potash produced during the detonation, and the neutral salt formed by the union of the acid to the alkali, which holds the metallic oxyd in solution. Though the last salt varies according to the acid made use of, it is very improperly called *antimoniated nitre* of Stahl. This salt in general is not nitre, because the sulphuric or muriatic acids are usually applied to precipitate the oxyd of antimony; and, when the precipitation is well made, no part of the oxyd remains in the salt.

Equal parts of super-oxygenated muriat of potash, and of antimony in powder, smoke under a blow of the hammer, but only produce reddish sparks with sulphuric acid.

Antimony appears capable of decomposing muriat of soda; for, if a mixture of these two substances be heated in a retort, sublimated muriat of antimony passes over into the receiver, according to the observation of Monnet. This chemist has not described the residue of the operation. This metal does not readily decompose muriat of ammoniac, according to Bucquet, and the *butter*, or sublimated muriat, of antimony, is not obtained in this process, as Juncker affirms.

Antimony unites by fusion with gold, and renders it pale and brittle. It may be separated from gold by a violent heat in the form of a white sublimate. Antimony precipitates gold from its solution in aqua regia, but it falls along with the gold in the state of an oxyd. Platina and antimony combine easily together. The mixture is hard, brittle, and fine grained. It is difficult to free the platina from this metal again, for it becomes infusible in proportion as the antimony is separated. Platina is precipitated from aqua regia by antimony, but the antimony falls down along with it in the form of an oxyd. Silver melts easily with antimony, and forms with it a very brittle mixture. Antimony precipitates silver from nitric acid. Silver takes sulphur from the sulphure of antimony by fusion. Mercury does not amalgamate easily with antimony. Distilled with cinnabar, the antimony unites with the sulphur, and allows the mercury to pass over into the receiver. If three parts of antimony, with eight of oxygenated muriat of mercury, be distilled together, the muriat, usually termed *butter* of antimony, passes over into the receiver, and the reduced mercury, with some antimony, remains in the retort. If instead of the metal, sulphure of antimony be used in this process, cinnabar will be sublimed into the neck of the retort. Lead and antimony form by fusion a brittle mass. It is a mixture of this kind which is used for making printers' types, in the proportion of eighty parts of lead, to from twenty-five to fifteen of antimony. Lead has the strongest affinity for acids, and takes by fusion the sulphur from sulphure of antimony. Bismuth and antimony form a brittle mass. Bismuth has the stronger affinity for acids, and takes sulphur by fusion from the antimonial sulphure. Antimony forms a lead-coloured mixture with nickel. It has a less affinity than nickel for acids and sulphur. Copper becomes pale and brittle by its union with antimony. It precipitates antimony from acids, and takes by fusion sulphur from the sulphure of antimony. Arsenic forms a brittle mass with antimony. The oxyd of arsenic melts with it into a flux. Iron melts with antimony into a hard white brittle mass. The antimony may be separated from this combination by fire, or by solution in aqua regia, and subsequent dilution with water. Iron having a stronger affinity for sulphur than antimony, is commonly used to free it from that substance. Cobalt and antimony form by fusion a brittle mass. The cobalt has the strongest affinity for acids and sulphur. Tin melts with antimony into a white brittle mixture. Antimony is also used to harden tin. It yields to tin in its affinities for acids and sulphur. Zink forms with antimony a brittle mass. In precipitating antimony from aqua regia, a portion of the oxyd of zink falls along with it. The zink has an inferior affinity for sulphur.

Having now examined the principal properties of the metal antimony, it is necessary likewise to consider its ore, which is improperly called *antimony*, or *crude antimony*; but which modern chemists call *native sulphure of antimony*. At the beginning of this article it has been shewn how to separate a portion of sulphur from this sulphure, and that a grey oxyd results from the operation. If instead of melting this grey oxyd with combustible matters, it be brought alone in fusion, it is converted into a vitreous transparent matter, variously coloured, from a faint yellow to a very strong hyacinth-red. This is called *glass of antimony*. To perform this operation, put the sulphurated grey oxyd of antimony into a crucible; place it in a furnace, and urge the fire till the matter be in perfect fusion: to know when it is sufficiently melted, put in an iron wire; if it draw out a transparent thready matter, like common glass, it is well; take off the crucible, and pour its contents on a plate of copper: this is glass of antimony: it is very brittle, and breaks of itself in cooling.

There is another preparation, called *liver of antimony*, from its dark colour like the liver of animals, which only differs from the preceding in the oxyd containing much more sulphur; so that the glass proceeding from it is more fusible and more opaque. Calcine, for this purpose, the antimonial sulphure, but much less than when it is intended to convert the oxyd into glass. Then melt the oxyd in a crucible, which is easily done: pour it into an iron mortar, and you have a vitriform matter of the colour of liver. If the antimony should be too much calcined, a substance would be produced partaking of the nature and transparency of glass of antimony; but this may be remedied by adding a little sulphure of antimony in powder.

Sulphure of antimony, or the natural combination of sulphur with the metal, is in general more soluble, and is less oxydated by acids than the metal itself. It seems as if the sulphur partly defended the antimony from the action of these saline substances. The action of the sulphuric, nitric, and muriatic, acids, on this sulphure, has not been sufficiently examined; it is known only that a small portion of *kermes* is formed by the solution of sulphure of antimony in muriatic acid, which proves that the water has been decomposed. The nitro-muriatic acid has a moderate action on this substance; some sulphur is separated and precipitated. Reduce the sulphure of antimony to a gross powder; put it into a matrass; pour over it four times its weight of nitro-muriatic acid; heat the matrass slightly, if necessary; but, if the acid be good, the solution may be made without heat; the antimony dissolves, and the sulphur forms a white precipitate, which becomes yellow after being washed and dried. If lime-water be poured over sulphure of antimony in powder, a yellowish precipitate will be formed in a few hours; if left in digestion for several days, it affords a golden sulphur of a beautiful red colour.

The mixture of sulphure of antimony with potash, form a preparation known under the name of *kermes mineral*. The name of *kermes* was given to it by a Chartreux friar, named Simon, doubtless on account of its colour, which resembles that of the animal called kermes, which is employed in dying. Kermes mineral has likewise been called *Poudre des Chartreux*, because it was first prepared by persons of that religious order. The discovery

very of this medicine is due to Glauber, who prepared it with sulphure of antimony, and a solution of nitre fixed by coal; but he has described his process in an unintelligible manner, and almost entirely under alchemistical emblems. Lemery, who laboured much with antimony, and who has given us a preparation analogous to *kermes*, under another name, may be regarded as the true inventor. This remedy, however, was offered to the public as an entirely new invention many years after the publication of the works of that chemist, and, in fact, owes its celebrity to the singular cures effected by means of it in the hands of brother Simon. This friar had the composition from a surgeon, named La Ligerie, who was not himself the inventor. This last affirmed that he received it from Chastenay, lieutenant in the army at Landau, to whom it had been communicated by an apothecary, who pretended to be a disciple of Glauber. Dodart, then first physician to the French king, applied to La Ligerie to publish the receipt of *kermes*, which he accordingly did in the year 1720. Lemery the younger claimed the discovery in the name of his father in the Memoirs of the Royal Academy, and with great justice, as most chemists still make use of the process invented by him for the preparation of this remedy.

The process described by La Ligerie, consists in boiling for two hours a pint of rain water, with four ounces of the liquor of nitre fixed by charcoal, and a pound of sulphure of antimony broken into small pieces. The boiling liquor is filtered, and the same ore is again boiled with three ounces of fresh lixivium, diluted in a pint of rain water. Lastly, the second residue is boiled a third time with the preceding lixivium; two ounces of liquor of fixed nitre, and a pint of rain water, being added. It is then filtered, and the *kermes* suffered to settle, which being washed till it is insipid, is then dried; and, lastly, after spirit of wine has been burned upon it, it is reduced to powder. This process is very long, and affords but a small quantity of *kermes*, not more than two or three drachms from a pound of sulphure of antimony. It is, moreover, very troublesome, on account of the long ebullition, and the evaporation of the water. It also occasions a loss of more than three quarters of the ore of antimony, on account of the small quantity of alkali employed in proportion to that of the mineral.

Baumé, who adopted the process of Lemery, gives two methods for the easy preparation of a large quantity of the red sulphurated oxyd of antimony or *kermes*, in a short time; the one by the dry, the other by the humid, way. According to the first method, one pound of sulphure of antimony is melted in a crucible, together with two pounds of very pure salt of tartar, and one ounce of sulphur, the whole being previously well pulverized. This melted mixture is poured out into an iron mortar, and is of a deep red colour; it is pulverized grossly when cold, and is then boiled in a sufficient quantity of water. The liquor being filtered thro' paper, affords a *kermes* of a red brown in cooling, which, being first washed with cold and afterwards with boiling water, till it is deprived of all saline matter, is dried, pulverized, and passed through a fine sieve. By the humid way, according to the same chemist, a lixivium of five or six pounds of caustic fixed alkali is boiled with fifteen or twenty pounds of river water. Four or five ounces of sulphure of antimony, previously levigated, is thrown into this boiling liquor, and the mixture being well agitated, and suffered to boil for a short time, is poured on the filter. This liquor deposits much kermes during its cooling, which is to be washed in the same manner as the *kermes* produced by fusion. According to Baumé, this last process affords twelve or thirteen ounces from a pound of antimony, and he assures us that the two kermes are perfectly similar. Chaptal has also, in his Elements of Chemistry, given a method of procedure, which he says succeeded the best: Boil ten or twelve parts of the pure liquid alkali, with two parts of sulphure of antimony; keep up the ebullition for half an hour; then filtre, and a quantity of kermes is obtained by cooling. Digest some fresh alkali over the antimony, till it is exhausted; then wash it, and let it dry.

Here we shall add the process of M. Deyeux, which will be found very useful to those who prepare kermes as a medicine in the large way: Take nitre fixed by charcoal and then purified, or carbonat of potash, one part; sulphure of antimony, broken in small pieces, four parts; filtrated river-water, eight parts. Boil the whole in a very clean iron vessel for a full quarter of an hour; then take out a little of the liquor with a spoon; if, as it cools, it grows turbid, and deposits a red sediment, be assured that it holds kermes in solution: if otherwise, keep up the boiling longer, till the above appearance takes place; then pour the boiling liquor into a filtre of paper, laid on a cloth drawn moderately tight: the liquor passes off very clear; but, as it gets to the bottom of the earthen vessel, it grows turbid, and deposits a plentiful sediment. Some persons recommend the putting in water, to hasten the separation of the precipitate; but, besides that it will not have that effect, it has the inconvenience of weakening the colour of the kermes. During the filtration of the liquor, pour over the sulphure of antimony which remains in the vessel, either fixed nitre, or potash and water, as much of either as was employed at first; and repeat the process as before. This may be continued even four times, taking care to keep each filtration separate. During the fourth operation, the filtrations of the two first liquors have time to deposit the kermes they contained; draw them off carefully, and boil them afresh with the sulphure of antimony remaining in the iron vessel. The same mode is to be pursued with the third and fourth liquors; but, as the water and alkali diminish as the operations are multiplied, a solution of potash in water is to be added from time to time, observing only that the potash be not in too great quantity, for then the kermes would remain in solution in the liquor, and would not be precipitated in cooling. The filtering-papers must also be renewed frequently, for they soon clog up; return the matter they are covered with into the iron vessel.

The kermes deposited in each earthen pan should be kept separate till the desired quantity is obtained; then you have only to separate the alkali, which still keeps it moist, and to proceed to entire desiccation. For this purpose, having drawn off, with all possible care, the little fluid which remains floating, pour into the precipitate a great quantity of clear river-water, cold; let it settle, then draw it off, and pour on fresh water; continue the washing till the water has no longer an alkaline taste; then give it a final washing with hot water. The precipitate, which is collected at the bottom of this last fluid, should be laid over several filtres of paper, placed either in funnels, or on cloths, so that between each filtre there may be about two fingers breadth. It dries very slowly, diminishes, cracks, and acquires a sort of consistence: a little of it is to be taken up from time to time for examination; when, on moving it with a spatula, it seems to break away, and not to run into a paste, it must be speedily put between blotting paper, and placed in a press wrapped up in linen. It must at first be pressed very gently, leaving a quarter or half an hour between, otherwise the filtre and linen will both be torn. It may be known when the matter has been pressed enough by the extremities of it feeling solid to the fingers: then loosen the press, and take off the cloth and paper, which will come away easily enough. Divide the kermes as much as possible with a wooden spatula, and put it in a hair-sieve lined with blotting-paper: this should be exposed in the sun, or put into a stove slightly heated: thus will the kermes be very thoroughly dried, especially if care be taken to break the larger clots with a glass pestle, or a spatula. Once dried, the division is completed with the help of porphyry; and then it is to be put into bottles closely corked; these bottles should not be much exposed to the light, as that will weaken the colour of the kermes by degrees. "This process," says Deyeux, "is indeed longer and more expensive

pensive than those commonly used; but it always produces the best kermes, which may be relied on, especially if the materials be of a good quality."

One remarkable thing, first noticed by Rouelle, is, that the kermes precipitated at each filtration is seldom of the same colour, whatever may be the process: sometimes the colour is dark, sometimes lighter; and although the same matters have been employed, the same vessels, and the boiling continued the same time, a precipitation exactly similar can never be obtained. And this variation is the more remarkable when the air is moist, or when it is very dry. But this chemist observed, that there was some difference between operating in a free air, and in that under the chimney of a laboratory. Upon the whole these differences are of little importance with respect to the virtue of the medicine, if all the precipitates are mixed together; for thus, the high and low coloured being united, there is equal colour through the whole, and you are sure of having a kermes possessing uniform properties.

There is yet another process, used by M. Dizé, compounder of medicines for the military hospitals of France: Mix twenty-five parts of caustic soda, with 150 parts of the pure soda of commerce, called crystals of soda, and add twenty-five parts of pulverised sulphure of antimony. Boil the mixture in a sufficient quantity of water; by filtration and cooling a great quantity of kermes is obtained; which is to be well washed, and then dried.

If any acid be poured into the liquor from which kermes has been produced, after it has been entirely separated by cooling, and will furnish no more, this liquor becomes again troubled, and a yellow orange precipitate of sulphurated oxyd of antimony, called the *golden sulphur of antimony*, is produced. The liquor being filtered, the orange-coloured sulphurated oxyd of antimony may be precipitated anew by means of acids; but this second precipitate will by no means have so bright a colour as the first.

It will now be easy to understand the theory of this operation, especially after the judicious remarks of Berthollet on sulphurated hydrogen, who asserts that the whole process depends on the union, more or less immediate, of the oxyd of antimony with sulphurated hydrogen. The principal difference between golden sulphur, and kermes, is that the latter contains only the hydrosulphure of the antimony, while the former contains besides, some of the sulphurated oxyd of antimony; and it is not to be doubted that the kermes-mineral owes its medicinal virtues to the presence of the sulphurated hydrogen.

The caustic alkalis act with much more strength upon the sulphure of antimony than do the effervescing alkalis; but, to produce a greater quantity of kermes, the liquor must be kept boiling longer.

The sulphure of antimony decomposes nitrat of potash, as we have already shewn in the preparation of diaphoretic antimony. This substance, calcined seven times successively, with fresh nitre each time, and lixiviated after each operation to separate the salts, produces an oxyd of antimony, known by the name of *poudre de Chevalleray*.

For the combination called *liver of antimony*, mix equal parts of nitrat of potash and antimony; throw the mixture by spoonfuls into a red-hot crucible; a detonation takes place at each projection for some time. When the detonation ceases, the fire is increased so as to melt the whole; and, instead of a diaphoretic antimony, a brown opaque brilliant brittle mass is found in the crucible, which is glass of antimony covered with scoriæ. In this operation the nitre is not sufficient in quantity to burn all the sulphur; the remainder therefore holds an oxyd of antimony in solution. When the mixture is not heated sufficiently to melt it, nothing is obtained but a vitreous scoria, to which the name of *false liver of antimony of Ruiland* is given. This matter reduced into powder, and washed with water, forms *crocus metallorum*; which is merely oxyd of vitreous antimony pulverized and separated from the saline matters produced by the detonation of the nitre.

There are two other preparations analogous to the foregoing, which are true glasses of sulphurated antimony; the one is the ruby of antimony, or *magnesia opalina*, made by melting together equal parts of decrepitated muriat of soda, nitre, and sulphure of antimony. This fusion, which takes place without detonation, affords a vitreous mass of a brown colour, very brilliant, and covered with white scoriæ. The other, improperly called the *medical regulus*, is prepared by fusing a mixture of fifteen ounces of sulphure of antimony, twelve ounces of decrepitated muriat of soda, and three ounces of tartar. The result is a black shining very opaque dense glass, not at all metallic in its appearance.

Antimony has been long employed in the arts, and in medicine. It was formerly used as a purge. Wine or water was poured into vessels made of this metal, and suffered to stand for the space of a night, and the following day the liquor was drunk: but as variations of the temperature of the place in which this operation was made, and of the acidity of the wine made use of, must have necessarily produced differences in the quantity of metal taken up, it is with justice that this medicine was abandoned, as not being to be depended on. For similar reasons, the perpetual pills, or small balls of this metal, which were swallowed as purges, have been renounced. The state of the digestive juices, the nature of the mucus in the first passages, and the sensibility of different individuals, must have rendered their effects uncertain, and often dangerous.

Crude sulphure of antimony, Rotrou's solvent, oxyd of antimony called *diaphoretic*, kermes mineral, and the golden sulphur, are the antimonial medicines at present mostly used. Sulphure of antimony is employed as a sudorific in cutaneous disorders. It is suspended in a linen bag in the vessels in which the ptisans appropriated to these disorders are prepared; but many physicians deny it to have any virtue when administered in this manner. It is likewise taken in substance, being first finely levigated, and made up into pills for the same purpose.

The solvent of Rotrou, or the alkaline oxyd of antimony, is greatly recommended in lymphatic disorders, produced by the congelation of that liquid, as in scrophulous affections, and in general in all glandular tumours. Many physicians have no confidence in the effects of washed diaphoretic antimony. They consider this medicine as a pure oxyd of antimony without any virtue whatsoever. We cannot, however, forbear observing, that this oxyd, in which Rouelle the younger has observed a remarkable degree of solubility, may produce singular effects in consequence of this property. It is likewise certain, that, as the action of the gastric and intestinal juices on metallic oxyds are not known, it cannot therefore be determined whether a substance insoluble and insipid to all appearance, has any virtue or no. Observation, however, teaches us, that this medicine produces but slight effects in eruptions, and in the most obstinate disorders of the skin, though employed for a long time. The unwashed diaphoretic antimony, or solvent of Rotrou, which is much more active than the before-mentioned preparation, by reason of the alkali it contains, deserves to be preferred. In these affections the medicine, called *Poudre de Chevalleray*, is used. It does not sensibly differ from the washed diaphoretic antimony, because the metal, once well oxydated, as it is when detonated with three times its weight of nitre, cannot be further oxydated, and for that reason in this preparation no succeeding detonation takes place. The present medicine is observed to be absolutely ineffectual when deprived of the alkali.

Kermes mineral is one of the most valuable antimonial remedies we are in possession of; it is attenuating, and is employed with the greatest success in pituitous affections of

of the stomach, the lungs, the intestines, and even the urinary passage. It is most commonly used in disorders of the breast to assist expectoration. It ought not, however, to be administered, till after the inflammation is abated. It has likewise great success when given in repeated small doses in catarrhs of the breast, the humid asthma, maladies of the skin, glandular swellings, &c. It is administered in a dose from half a grain to two or three grains in proper liquids, or made up in pills. It sometimes causes vomiting, and very frequently acts as a sudorific or a diuretic.

The golden sulphur, on account of its being a violent emetic and cathartic, is not much used. It was formerly given in the same disorders as the kermes, but its effects are much more uncertain. There are also many other preparations of antimony, which are used in medicine to great advantage. This metallic substance is one of the most important in the Materia Medica, and physicians cannot pay too great an attention to its properties. It is one of those upon which the alchemists, and even the chemists, have bestowed great labour, which has given rise to the numerous preparations above described.

Of TELLURIUM.

We are indebted to Klaproth for the discovery of this metal: he found it in an ore of white gold, called the auriferous ore, otherwise *aurum paradoxicum* or *problematicum*. It exists, 1. In the mine called *miriabilf*, in the Fatzebay hills, near Zalethna, in Transylvania. 2. In the graphic gold of Offenbanza. 3. In the ore from the yellow mine of Nagyag. 4. In the ore from the mine known by the name of the mine of grey foliated gold of Nagyag.

To obtain this metal from the ore, the ore is gently heated with six parts of the muriatic acid; three parts of the nitric being then added, the mixture is boiled, upon which there arises a considerable effervescence, and a complete solution is obtained. The filtered solution is diluted with as much water as it can bear without becoming turbid, which is a very small quantity, and a solution of caustic potash is then added to the liquor until the white precipitate which is at first formed disappears again, and nothing remains but a brown flaky sediment. This last precipitate is the oxyd of gold mixed with the oxyd of iron, and a separation is effected by the common means. The muriatic acid is added to the alkaline solution in sufficient quantity to saturate the alkali entirely. An excess of the acid must be avoided. A white precipitate, which by heat settles at the bottom of the vessel under the form of a heavy powder, is produced in great abundance. After the precipitate has been washed and dried, it is formed into a kind of paste with a sufficient quantity of any fat oil, and this mass is put into a small glass retort, to which a recipient is slightly fitted. When this arrangement is made, it is gradually brought to a red heat, and in proportion as the oil is decomposed, there are observed, as in the distillation of mercury, brilliant and metallic drops, which cover the upper part of the retort, and which at intervals fall to the bottom of the vessel, and are immediately replaced by others. After it is cooled, concreted metallic fixed drops are found adhering to the sides of the retort and at the bottom of the vessel, and the remainder of the metal is reduced and melted, with a brilliant surface, and almost always crystallized.

Essential character of this new metal: It has the white colour of tin approaching to the grey colour of lead. Its metallic splendour is considerable, and its fracture laminated. It is highly brittle and friable. By suffering it to cool quietly and gradually, it readily assumes a crystallized surface. Its specific gravity is 6·115. It belongs to the class of the most fusible metals. When heated with the blowpipe upon charcoal, it burns with a very lively flame, of a blue colour, inclining at the edges to a green. It is so volatile as to rise entirely in a whitish grey smoke, and exhales a disagreeable odour like that of radishes. On ceasing to heat it, without having entirely volatilized the small portion subjected to this operation, the button which remained retained for a long time its liquidity, and by cooling it was covered with a radiated vegetation.

This metal amalgamates easily with mercury. With sulphur it forms a grey sulphure, of a radiated structure. A solution of it in the nitric acid is transparent and colourless. When concentrated, it produces in time small white light crystals in the form of needles, which exhibit a dendritic aggregation.

This metal dissolves in the nitro-muriatic acid. When a large quantity of water is added to such a saturated solution, the metal is precipitated in the state of an oxyd under the form of a white powder, which in this state is soluble in the muriatic acid. By mixing cold, in a well stopped vessel, a small quantity of this metal with 100 times its weight of concentrated sulphuric acid, the latter gradually assumes a beautiful crimson red colour. By means of a small quantity of water added drop by drop, the liquor disappears, and the small quantity of the metal dissolved deposits itself under the form of black flakes. Heat destroys the solution; it makes the red colour disappear, and disposes the metal to separate in the state of a white oxyd. When, on the contrary, the concentrated sulphuric acid is diluted with two or three parts of water, and a small quantity of the nitric acid has been added, a considerable quantity of the metal will then be dissolved. The solution is transparent and colourless, and is not decomposed by the mixture of a larger quantity of water.

All the pure alkalis precipitate from acid solutions of this metal an oxyd of a white colour, soluble in all acids. By an excess of alkali, the precipitate which is formed is entirely re-dissolved. If carbonat be employed instead of pure alkali, the same phenomenon takes place, with this difference, however, that by excess of the latter the precipitate formed is re-dissolved only in part. Exceedingly pure prussiat of potash produces no precipitate in solutions of this metal.

Alkaline sulphures mixed with acid solutions occasion a brown or blackish precipitate, according as the metal is combined with more or less oxygen. It sometimes happens that the colour of the precipitate has a perfect resemblance to mineral kermes, or red sulphurated oxyd of antimony. When the sulphure of tellurium is exposed on burning charcoal, the metal burns with a blue colour conjointly with the sulphur. The infusion of nutgalls, combined with the same solutions, gives birth to a flaky precipitate, of an Isabella colour.

Iron and zink precipitate tellurium from its acid solutions in a metallic state under the form of small black flakes, which resume their splendour by friction, and which on burning charcoal melt into a metallic button. Tin and antimony produce the same phenomenon with the acid solutions of this new metal. The precipitate formed by the antimony proves, in a striking manner, that tellurium is not a disguised antimony, as has been supposed. A solution of tin in the muriatic acid, mixed with a solution of tellurium in the same acid, produced also a black and metallic precipitate.

The oxyd of tellurium obtained from acid solutions by alkalis, or that from alkaline solutions by acids, are both reduced with a rapidity resembling detonation, when they are exposed to heat on charcoal. It burns and is volatilized. By heating for some time this oxyd of tellurium in a retort, it melts and appears after cooling with a yellow straw colour, having acquired a sort of radiated texture. Mixed with fat bodies, the oxyd of tellurium is perfectly reduced.

This is all at present known with regard to this metal: when a large quantity of it shall have been obtained, its characters and properties may be more fully established. The communications of Klaproth have however sufficiently proved it to be a distinct metal.

Or

Of MERCURY, or QUICKSILVER.

Mercury, so named by the alchemists, is not found abundantly in nature. It is met with in the earth, either in the virgin state, possessing all its usual properties, or in the state of an oxyd, or combined with acids, sulphur, or other metallic matters in the mineralized state. Running mercury is found in globules, or larger masses, in friable earths and stones, and most commonly exists in the clefts or cavities of its ores. At Idria, in Spain, and in America, it is collected in the cavities and clefts of rocks. It is likewise found sometimes in clay at Almaden, and in beds of chalk in Sicily. It is found likewise in silver and lead ores, and mixed with the white oxyd of arsenic.

Sage mentions an ore of mercury, in the state of an oxyd, at Idria, in Friuli; it is of a brown red, very soft, and granulated in its fracture; some globules of running mercury exist in it, and it is reducible by mere heat, without addition. Kirwan considers it as the combination of mercurial oxyd and carbonic acid; one hundred parts of the ore afford ninety-one parts of mercury. In 1776, Mr. Woulfe found, at Obermuschel in the duchy of Deuxponts, a crystallized, ponderous, spathose, white, yellow, or greenish, ore of mercury, in which, by means of alkalis, he discovered the presence of the sulphuric and muriatic acids. It is a compound of sulphat of mercury, and corrosive mercurial muriat. Sage affirms, that it contains eighty-six parts of mercury in the hundred. This chemist has described a corneous brown ore of mercury, from Carinthia. Mercury is most commonly found naturally combined with sulphur; it is then known by the name of *cinnabar*. This mineral substance is red, and has not a metallic appearance, though the quantity of sulphur is but small in comparison to the mercury; a proof that the combination of these two bodies is very intimate. Cinnabar is found in the duchy of Deuxponts, in the Palatinate, in Hungary, in Friuli, and Almaden in Spain, and in South America, especially at Guamanga in Peru. It is sometimes compact, and its colour varies from a pale red, to a deep and blackish red. Sometimes it is found in transparent ruby-coloured crystals, and often in a kind of scales, or flattened laminæ. It is called *native vermillion*, and *cinnabar in flowers*, when it is in the form of a very brilliant red powder. It is also found dispersed with different earths in sulphat of lime, mixed with iron, with pyrites, and with silver. Mr. Cronstedt in his Mineralogy, speaks of an ore of mercury, in which that substance is united to sulphur and copper; it is of a blackish grey, brittle and ponderous; its fracture is vitreous, and it decrepitates in the fire. It is found at Muschel Lansberg. The same mineralogist affirms, that mercury amalgamated with virgin silver, has been found in the mine of Sahlberg in Sweden. Monnet, in his System of Mineralogy, speaks of an ore brought from Dauphiny, by Mr. Montigny, in 1768, which contained mercury, sulphur, arsenic, cobalt, iron, and silver. It is grey, whitish, and friable. He found it to contain one pound of mercury and three or four ounces of silver per quintal. The mine which furnishes it in greatest quantity is that of Almaden in Spain.

It was long taken for granted, that mercury could not be deprived of its fluidity; but the academicians of Petersburg have proved the contrary. These learned men availed themselves of the excessive cold in the year 1759, to try many important experiments. They increased the natural cold by the assistance of a mixture of snow and fuming spirit of nitre, and by that means succeeded in causing a mercurial thermometer to fall to 213 degrees, according to the graduation of De Lisle; which answers to forty-six degrees below freezing of the gradation of Reaumur. These philosophers, observing that at this degree the mercury descended no longer, broke the ball of glass, and found the metallic fluid frozen in the form of a solid, which, on trial, proved capable of extension under the hammer. This experiment demonstrated that mercury, like all other metallic substances, is capable of assuming the solid form, and that it is then in a certain degree ductile. They could not determine the degree of ductility it is susceptible of, because every stroke of the hammer communicating heat to some part of the metal, melted it, and caused it to flow in that point.

Pallas, who succeeded in congealing mercury in the year 1772, at Krasnejark, by the natural cold of 55 degrees and a half, observed that it then resembled soft tin, and was capable of being beat out into plates, that it broke easily, and that the pieces being brought together united again. In 1775, Mr. Hutchins observed the same phenomenon at Albany fort, and Mr. Bieker at Rotterdam in 1776, at the fifty-sixth degree below zero. This congelation was also effected in 1783, in England, at a more moderate degree of cold; and it was determined that 32 degrees below 0, or zero, of the thermometer of Reaumur, is the term at which this congelation takes place. If therefore the mercury descended lower in the early experiments, the phenomenon must be attributed to the condensation of the solid metal. Hence we see that this metal is the most fusible of any we know. The greatest cold known in the countries from whence it is obtained, cannot render it solid. It is probable that if in the preceding experiments the cold by which the mercury was frozen had been produced by insensible degrees, that metallic substance would have taken a regular crystallized form.

The presence of mercury may be ascertained by subliming a piece of ore, and bringing a damp glass in contact with the fumes; a white powder will be collected, with which rub a piece of gold; if it whitens it, there is no doubt but it contains mercury. An ore of mercury is known by pounding and mixing it with lime or alkalis; this being thrown on a hot brick, and the whole covered with a glass or jar, the mercury is reduced into vapours, and condenses on the sides of the vessel. If the object be to discover the quantity of mercury it contains, the ore, after being pulverized and washed, must be distilled with such additional matters as are capable of seizing the sulphur, and disengaging the mercury. If the ore be carefully weighed before the assay and likewise the mercury obtained by distillation, the proportional quantity, which may be expected from any other mass of the ore, will be known.

There are several processes for extracting the mercury from the ores in which it is contained. The usual way is by raking among the ore, and drawing off the water. Some employ what are called draining galleries. Sometimes the ore is mixed with lime, and distilled in iron retorts: these retorts are immoveably fixed in the furnace; the matter is put in at the neck, and the mercury is received in vessels filled with water. The mercury obtained by distillation is always pure, because it is not then mixed with volatile bodies. Mercury differs from other metallic substances by its fluidity, which has caused it to be esteemed a peculiar metallic water, called *aqua non madefaciens manus*, "water which does not wet the hands."

The mercury met with in commerce is seldom pure, as it is almost always mixed with pewter, or foreign metallic matters, whence it appears tarnished, and instead of dividing itself into neat globules, it flattens, and seems to be covered with points: the merchants then say it *draws a tail*. When pure, and especially when obtained from cinnabar, which is called *mercury revivified from cinnabar*, it possesses an extreme degree of divisibility; and its globules always run into a convex form.

Mercury has no taste that the nerves of the tongue and palate can distinguish, but it produces a very evident effect on the stomach and intestines, as well as on the surface of the skin. Insects and worms are infinitely more sensible of this taste than other animals, and for that reason it very soon kills them; and physicians administer it as an excellent

lent vermifuge. It is by virtue of this property likewise that it cures the itch, and other cutaneous disorders. Rubbed for a short time between the fingers, it emits a slight peculiar smell. When it is very pure, and is agitated, it is sometimes observed, more especially in hot weather, to shine with a small phosphoric light clearly discernible. This phenomenon has been shewn with the mercury of the barometer by several natural philosophers. If the hand be plunged in this metallic fluid, a sensation of cold is perceived, which seems to shew that its temperature is much beneath that of the atmospheric air; yet, by plunging a thermometer in the same mercury, it is immediately seen that their temperatures do not differ. This effect, which deceives us, is to be attributed entirely to the great rapidity with which the heat passes from the hand into the mercury, for this metal is known to be a powerful conductor of heat.

Mercury, when divided by continual agitation, such as that of the sails of a mill, changes by degrees into a very fine black powder, called *Ethiops per se*, by reason of its colour. As the mercury experiences a commencement of combustion in this experiment, this powder is called *black oxyd of mercury*. The mercury, by a slight heat, or by trituration in a warm mortar, may be made to resume its usual fluidity and brilliancy; and, if the experiment be made in close vessels, with the pneumatic apparatus, oxygen gas will be obtained: if, after being sprinkled with ammoniac, it be exposed to the sun's rays, it changes into metallic globules.

We have before remarked, that mercury is easily reduced into vapours by the action of fire; hence distillation is the best method of purifying it, and of separating the matters with which it is usually vitiated in commerce. For this purpose, put the mercury into a glass retort, and suspend to its neck a bit of flax, which is just to dip into the water contained in the matrass or balloon adapted to the retort; then proceed to distillation. If the mercury is pure, it passes over entire, without alteration or diminution; if it contained any foreign or extraneous matters, they will remain at the bottom of the retort; often there will be left a small quantity of a grey powder, which is only a little of the mercury oxydated by means of the air contained in the vessels. Boerhaave distilled the same quantity of mercury five hundred times successively, and found it not in any respect altered. It only appeared more brilliant, heavy, and fluid; doubtless because the purification was very accurate. In this distillation he obtained a small quantity of the grey powder just spoken of. It was black oxyd of mercury produced by the air contained in the apparatus.

Mercury, reduced into vapour, has a very considerable force of expansion, and is capable of producing dangerous explosions when confined. Hellot related to the French Academy, that a certain person, being desirous of fixing mercury, had put a quantity into an iron-ball, well soldered together. The ball being thrown into the middle of a heated furnace, had scarcely become red, when the mercury burst through its confinement with a great report, and escaped. Beaumé, in his Experimental Chemistry, relates a similar fact.

Mercury is infinitely more susceptible of oxydation by the contact of air, and many other bodies, than has hitherto been supposed. A grey blackish pellicle is continually formed upon its surface, which is a true oxyd of mercury. Heated with the concourse of air, this metal, at the end of some days, becomes changed into a brilliant red powder, of an earthy appearance, disposed in small scales. This powder, which no longer possesses the metallic aspect, is a true mercurial oxyd. The alchemists, who believed that the mercury was fixed in this experiment, called it, improperly, mercury precipitated by itself, or *precipitate per se*. As mercury, though very volatile, requires nevertheless the concourse of air to calcine it, an instrument sufficiently commodious has been invented for this operation, usually called *Boyle's Hell*. It is a large glass vessel, flat at the bottom, so that the mercury, enclosed within it, forms a very thin stratum, and consequently presents a large surface. It is closed by a large stopper, accurately fitted to its neck, and perforated by an exceedingly small hole. The vessel is placed on a sand-bath, and the mercury heated till it boils. The opening in the stopper, on account of its minuteness, allows the air to have access to the bottle, without suffering the mercury to escape. At the end of several months of digestion, an oxyd, which is formed on the surface of the mercury, may be separated. This is done by pouring the whole into a piece of close linen; the mercury passes through by pressure, and the red oxyd remains on the cloth. This process may be performed with equal success, with a flat-bottomed matrass, into which a sufficient quantity of mercury is poured to form a thin stratum. The neck of the matrass is afterwards drawn out into a capillary tube, and the point broken off. This method, contrived by Beaumé, is better adapted to the oxydation of mercury, because the vessel contains more air. It is likewise more easily heated, less expensive, and less subject to be broken, than Boyle's vessel. To succeed in this experiment, the mercury must be kept in a heat sufficient to make it boil gently night and day for several weeks. By placing a number of such vessels on the same sand-bath, a very large quantity of *precipitate per se*, or red oxyd of mercury, may be obtained, and a certain quantity may be had in fifteen or twenty days. It has been proposed to abridge this labour by using a glass vessel, which has a neck about half an inch in width and four feet long, and of which the bottom part is not more than three or four inches in diameter. Half a pound of mercury having been introduced into this vessel, and its mouth covered loosely with a bit of paper, so as not to exclude the external air, it is to be placed in a sand-bath, and an uninterrupted heat applied to it, sufficient to raise the vapours of the mercury about two feet in the vessel. This process will be facilitated by removing, from time to time, the oxyd which is formed, and which covers the fluid mercury.

The *precipitate per se* is a true oxyd of mercury, or combination of metallic substance, with oxygen, which it gradually seizes from the atmosphere. This is proved in a convincing manner, from the following circumstances: 1. Mercury can never be converted into *precipitate per se*, without contact of air. 2. This combination cannot be made but with vital air, and does not take place in the different gases which are not pure air. 3. The mercury in this experiment becomes heavier. 4. When heated in closed vessels, it may be entirely reduced into running mercury, at the same time that a large quantity of elastic fluid is disengaged, in which combustible bodies burn four times more rapidly in the air of the atmosphere. This is the same fluid that was first discovered by Dr. Priestley, and by him called *dephlogisticated air*, and which we now call *oxygen gas*, or vital air. Before it is entirely reduced, it returns to the orange and the yellow colour; and, if the operation be stopped at the moment it is on the point of being reduced, it will be found in a black powder.

The red oxyd of mercury may be turned black also by contact with pure ammoniac; in which operation azotic gas is disengaged, proceeding from the decomposition of the ammoniac. This oxyd may also be reduced by light. If this red oxyd of mercury be triturated with running mercury, a black oxyd of mercury is produced; the extinction is very quick, and may be used with advantage, whenever it is desirable to bring mercury to this state to combine it with fat substances, or indeed any other.

Mercury combines very readily with sulphur. When one part of this metallic fluid is triturated with three parts of sulphur, the mercury is gradually extinguished, and a black powder is produced, being the black sulphure of mercury, formerly called *Æthiops mineral*, and whose colour becomes deeper some time after it is made. This

This combination is more quickly effected, by mixing mercury with melted sulphur. The mixture being stirred up immediately, becomes black, and very readily takes fire. In order to preserve it black, it must be taken from the fire, the flame extinguished as soon as it begins to appear, and the matter must be stirred till it becomes solid, and in lumps. It must then be pulverized, and passed through a fine sieve. When this compound (four parts of powdered sulphur to one of mercury) is exposed to a considerable degree of heat, it takes fire, the greatest part of the sulphur burns, and after the combustion a matter remains, which, when pulverized, is of a violet colour. This powder is put into matrasses, which are heated till their bottoms become red, and kept in this state for several hours, till it appears that the matter is entirely sublimed. An artificial cinnabar, or red sulphure of mercury, is found sublimed to the upper part of the matrass, in crystalline needles, of a reddish brown. It is of a lighter and more lively colour, when sublimed in retorts. The Dutch prepare in the large way the cinnabar employed in the arts; it is made in loaves of various thickness, and divided by layers which mark the different sublimations made in the same vessel, without separating the cinnabar from the preceding sublimations.

The sulphure of red mercury, or cinnabar, levigated with water on marble, loses much of the intensity of its colour, and becomes of a fine bright red, by reason of its extreme division; afterwards it is put into a large quantity of water, and the powder left to settle; then draw off the water, and dry the powder: this is called vermilion; it is much used in painting, and sometimes in medicine.

If the black sulphure of mercury be boiled with potash, it is converted into cinnabar: Berthollet, who repeated the experiment, says he used pure potash, but that it required a long ebullition to produce the effect. Cinnabar is not decomposed by the action of fire in close vessels; when heated in open vessels, the sulphur burns gradually, and the mercury is volatilized. Many substances are capable of decomposing red sulphure of mercury, by virtue of their affinity to sulphur. Lime and alkalis have this property; when these are heated in a retort, with twice their weight of cinnabar, running mercury is obtained, and the residue is found to be an alkaline or earthy sulphure. Many brittle metals, such as cobalt, bismuth, and antimony, have likewise the property of depriving mercury of its sulphur. And almost all the ductile metals, lead, tin, iron, copper, and silver, have likewise a stronger affinity with sulphur than mercury, and consequently decompose cinnabar. But iron is principally used to separate the mercury from this compound. The metallic fluid obtained by these processes is perfectly pure, and is distinguished by the name of *mercury revived from cinnabar*.

Mercury immediately decomposes alkaline sulphures, but produces different phenomena, according to the nature of these compounds. With a solution of hydrogenated sulphure of potash, it is reduced to a black sulphure, which in the course of several days becomes red. With hydro-sulphure of ammoniac, it becomes a black powder. The hydrogenated sulphure of ammoniac changes the mercury itself into a black powder; but in a few days this powder assumes a beautiful red colour; the supernatant liquor becomes at the same time colourless. It may be decomposed by muriatic acid; and much sulphurated hydrogen gas is disengaged, without any precipitation of sulphur.

From this experiment it appears, that the mercury combines at first with the sulphur and sulphurated hydrogen; but the ammoniac regains by degrees the sulphurated hydrogen, by giving out sulphur; so that, at the end of the operation, the sulphur is found entire with the mercury, and the sulphurated hydrogen with the ammoniac. The new combination is black, because it contains sulphurated hydrogen; it becomes red, because the sulphurated hydrogen has been taken away by the ammoniac, which has given out sulphur in exchange; but with the hydro-sulphure of ammoniac this exchange cannot take place. This difference there is then between the black sulphure of mercury and the red, that the first contains more or less of sulphurated hydrogen, while the last is an unmixed sulphure; the first is hydrogenated sulphure, the last is sulphure of mercury. Fourcroy discovered, that by stirring mercury in water charged either naturally or artificially with sulphurated hydrogen gas, it would be quickly decomposed, and converted into a black sulphure.

To phosphorize mercury, put into a matrass equal parts of the red oxyd of mercury and phosphorus; add a little water, and then place the matrass over a warm sand-bath: shake the matrass from time to time, and keep it a long while on the fire. The oxyd of mercury becomes black, and then unites with the phosphorus; the water becomes acid, and contains phosphoric acid. In this experiment, the oxygen contained in the oxyd of mercury, quits the metal to attack a portion of the phosphorus, which it changes into phosphoric acid; then the mercury, deprived of its oxygen, is in a state of extreme division, and thus it unites with phosphorus, forming a peculiar combination, in which the phosphorus predominates; this product softens in boiling water, and takes a consistence as the water cools. This phosphorated mercury is to be put into a bag of chamois leather; hold it in boiling water, and squeeze it gently; a little transparent phosphorus comes through; and there will remain in the bag phosphorated mercury, of a firm consistence, black colour, breaking under the knife; on examination, it will appear to consist of little molecules of mercury not well combined. This phosphure of mercury, exposed to a dry air, emits white vapours with a phosphoric odour. The combination is broken by distillation: the phosphorus passes over first, then the mercury; and both will be found in the receiver, entirely separate.

Mercury does not seem to dissolve in water. Physicians are, nevertheless, in the habit of causing a bag full of this metal to be suspended in vermifuge decoctions during their ebullition; and experience has shewn, that this practice is attended with good effects. Lemery affirms, that mercury loses nothing of its weight by this decoction. It is probable, that a principle, similar to that of smell, emanates from the mercury, a principle so fugitive and subtle, that its weight cannot be found. It is perhaps this principle that communicates the anthelminthic virtue to water.

Neither arsenic nor cobalt will unite with mercury. Bismuth, however, unites completely; hence arises a bright friable matter, more or less solid, according to the proportion of bismuth: this amalgama crystallizes in four-sided prisms, which sometimes unite in octahedrons. When heated in a retort, this mixture parts with its mercury with great difficulty. There is no union with nickel, or with antimony.

The sulphuric acid does not act on this metallic substance but when it is well concentrated and hot. To make this solution, one part of mercury is poured into a glass retort, and one part and a half or two parts of concentrated sulphuric acid are added; the mixture is heated, and a violent effervescence is soon after excited; the surface of the mercury becomes white, and a powder of the same colour is separated, which renders the acid opake; and a large quantity of sulphureous gas is disengaged, which may be collected over mercury. This method, as we have seen in speaking of the sulphuric acid, is most commonly used to obtain that gas. A portion of water, charged with sulphureous acid gas, likewise passes over. When this distillation is urged till the sulphureous acid no longer passes over, a white opake very caustic mass is formed at the bottom of the retort, which weighs one-third more than the mercury made use of, and strongly attracts the humidity of the air. The greatest part of this mass is an oxyd

oxyd of mercury united to a ſmall portion of the ſulphuric acid. It is conſiderably fixed, according to the obſervations of Kunckel, Macquer, and Bucquet. In this operation the ſulphuric acid is decompoſed by a double elective attraction; the mercury, which is a combuſtible ſubſtance, unites to the oxygen contained in the acid, while the heat diſengages the ſulphureous gas and the water. The metal muſt therefore be in the ſtate of an oxyd, and muſt conſequently have much more fixity than fluid mercury.

A portion of this ſulphuric mercurial maſs is ſoluble in water. When a large quantity of water is poured upon it, it mixes with the maſs, and a white powder precipitates if the water be cold; but, if boiling water be uſed, the powder is of a beautiful brilliant yellow colour; draw off the liquor, and ſet it aſide; then pour over the yellow powder a freſh quantity of boiling water, which is to be decanted in the ſame manner; and continue to waſh the powder till the water comes away quite inſipid. This was anciently called *turbith mineral*, or *yellow precipitate*. We now call it *yellow mercurial oxyd*. This oxyd has no taſte. Melted by the blow-pipe with phoſphoric glaſs, it acquires a green colour. When urged by a ſtrong fire in a retort, it gives out at firſt a little ſulphureous acid, and is then reduced into running mercury, giving out a great quantity of vital air. In a ſlow fire it is converted into the red oxyd of mercury. The water which has been poured on the white ſulphuric mercurial maſs, is loaded with a portion of the acid which was not decompoſed; but, as oxyd of mercury is very ſoluble in that acid, a certain quantity is always taken up, ſo that the water holds in ſolution a true ſulphat of mercury. By evaporating the water, this ſalt is depoſited in ſmall needles, the form of which has not been determined, becauſe they are ſcarcely conſiſtent, and quickly attract humidity. When boiling water is thrown on the cryſtals of ſulphat of mercury, they become yellow, and in the ſtate of a mercurial oxyd, becauſe the water ſeparates the acid, which adheres but weakly, and leaves the oxyd pure. The ſame event happens when the water employed for the firſt waſhing of the mercurial maſs is moſtly evaporated, and the remainder is afterwards diluted by the addition of a large quantity of boiling water, inſtead of bringing it to cryſtals. A yellow powder is precipitated in the ſtate of a true oxyd. If cold water be uſed, the precipitate is white; but it immediately aſſumes a yellow colour by the addition of boiling water. In this manner the ſolution of the oxyd of mercury may be rendered decompoſable or not by water. For this purpoſe it is ſufficient to evaporate it nearly to cryſtallization, or to charge the acid with all the mercurial oxyd it is capable of diſſolving; for then the union of theſe two bodies is eaſily deſtroyed by water. If a ſmall quantity of acid be added, water is no longer capable of cauſing a precipitation. Fourcroy proved this in the moſt ſatisfactory manner, by diſſolving well-waſhed turbith mineral in weak ſulphuric acid; the ſolution is not ſaturated with mercurial oxyd, and is at the ſame time not precipitable by water. But if the ſolution be charged with as much turbith mineral as it can diſſolve by the aſſiſtance of heat, which may be done by adding that ſubſtance till it is no longer taken up, then the ſolution being poured into cold water, affords a white precipitate; or if into hot water, a yellow powder. In this ſtate, if a ſmall quantity of ſulphuric acid be added, it ceaſes to afford any precipitate. The white mercurial oxyd which the ſulphat of mercury depoſits when cold water is poured on it, is very ſoluble, and may be made to diſappear, by adding ſulphuric acid to the mixture.

Sulphat of mercury may be decompoſed by magneſia and lime, a yellow precipitate being depoſited; and fixed alkalis ſeparate an oxyd of mercury nearly of the ſame colour. Ammoniac does not precipitate ſulphat of mercury when it contains an exceſs of acid; it forms a triple ſalt, or ammoniaco-mercurial ſulphat. When the ſulphat of mercury is properly neutralized, and without exceſs of acid, only a ſmall portion of black oxyd is ſeparated by the ammoniac, which it renders reducible by the contact of light alone. It forms a triple ſalt with the greater part of the ſulphat of mercury. This ſalt is not fixed by fire, it melts and ſublimes; it is reduced by a ſtrong heat.

Mercury is attacked by the nitric acid both hot and cold; but the differences of temperature make a great difference in the ſolution: when the operation is performed cold, the ſolution cannot be decompoſed by diſtilled water; but, if done with heat, the decompoſition takes place; becauſe that, with heat, the acid is overcharged with the oxyd. To procure the ſolution of mercury in the nitric acid, put into a matraſs of a proper ſize, one part of mercury, with one and a half of the acid; when the firſt effervеſcence has ceaſed, place the matraſs on a ſand-bath, in order to aſſiſt the ſolution by heat; but, if the acid be good, the ſolution will take place without fire. A great quantity of nitrous gas is diſengaged; and the mercury, reduced to an oxyd, remains in ſolution. This ſaline metallic ſubſtance is exceedingly cauſtic, and capable of corroding and deſtroying our organs. When it falls on the ſkin, it forms ſpots of ſo deep a purple, that they appear almoſt black; theſe ſpots cannot be diſſipated but by the ſeparation of the epidermis, which ſcales off. The ſolution is uſed as a powerful eſcharotic in ſurgery, by the name of *mercurial water*. The ſolution of mercury in the nitric acid is capable of affording cryſtals, by a cooling only, in flat needles, very long and very ſharp, ſtriated all their length. This ſalt is very cauſtic, and corrodes the ſkin in the ſame manner as the ſolution; it detonates on burning coals. When very dry, a ſtrong whitiſh flame eſcapes, which ſoon ceaſes. Expoſed to the air, it becomes yellow, and is decompoſed very ſlowly.

The nitrat of mercury melts when heated in a crucible, and emits very thick red vapours. In proportion as it loſes its water and nitrous gas, it takes a deeper yellow colour, which is afterwards converted to an orange, and laſtly to a brilliant red. In this ſtate it is called *red precipitate*. We term it *red oxyd of mercury by the nitric acid*. Inſtead of uſing the nitrat of mercury, the mercurial ſolution may be evaporated to dryneſs: pulverize the maſs in a glaſs mortar, put it into one matraſs or ſeveral; place them in a ſand-bath; heat the veſſels, and calcine the contents, till they preſent an orange colour on the ſurface; let the veſſels cool, and then break them: the contained matter will be found in layers of different colours; the under part of a bright red, the upper part orange colour. Then pulverize the red part, which is the red oxyd of mercury. Melt this oxyd under the blow-pipe with phoſphoric glaſs, and it communicates various colours to it. Mercurial nitrat diſtilled in a retort affords a ſub-acid phlegm, and nitrous gas at firſt, after which it becomes red oxyd; and a ſtronger heat being applied, occaſions a large quantity of vital air, with a ſmall portion of azotic gas, to be diſengaged, the mercury being ſublimed in the metallic form. This ſalt is ſoluble in diſtilled water, in a larger quantity when boiling, than in the cold, and conſequently cryſtallizes by cooling. When this ſalt is diſſolved in water, a portion remains, which is of a yellowiſh colour, and is not taken up. Monnet calls this matter *nitrous turbith*, and obſerves, that a larger quantity may be obtained by boiling water. If it be intended that the mercurial nitrat ſhall be entirely diſſolved, water muſt be employed, in which aqua-fortis muſt be poured, until the precipitate appears. We have obſerved, that when boiling water is poured on the pureſt nitrat of mercury, it immediately becomes yellow, and affords an oxyd of a deep colour, which, when expoſed to fire, becomes red more quickly than that which is made by the ſulphuric acid.

Barytes, ſtrontian, magneſia, lime, and alkalis, decompoſe nitrat of mercury, and precipitate the metal in the ſtate of oxyd. Theſe precipitates are of different colours, weight,

weight, and quantity, according to the state of the solution. Caustic fixed alkalis afford a yellow precipitate, more or less brown, or of a brick colour, according as their causticity is more perfect. Ammoniac precipitates the nitric mercurial solution, of a grey slate colour, provided it be of that kind which water cannot decompose; but the same salt produces a white precipitate, in a saturated solution of mercury, such as water can precipitate. The precipitates are mere oxyds of mercury, more or less oxygenated; they are all reducible without addition, and by mere heat in closed vessels, and all afford pure air during their reduction. Those which have been precipitated by alkaline carbonats, afford a certain quantity of carbonic acid by the action of heat. Those which, without having been precipitated by carbonats, have been merely exposed to the contact of atmospherical air, exhibit the same phenomenon, because they always absorb this acid from the atmosphere; a property common to all the oxyds of mercury, and even to those of several other metals. The oxyds of mercury, by alkaline intermediums have a property, discovered by Bayen, which must not be passed over in silence. They detonate like gunpowder, when exposed in an iron-spoon to a gradual heat, after having been triturated in the quantity of half a drachm, with six grains of flowers of sulphur; after the detonation a violet-coloured powder remains, which may be sublimed into cinnabar.

The sulphuric acid, and the salts into which it enters, likewise decompose nitrat of mercury, on account of the stronger affinity of the sulphuric acid to mercury. If sulphuric acid, or a solution of sulphats of potash, soda, &c. or of any other sulphuric salt, be poured into a solution of mercurial nitrat, a whitish precipitate is formed, if the nitric solution be not saturated; but it is yellower in proportion as the nitrat of mercury contains less acid, and more mercurial oxyd. This precipitate is sulphat of mercury neutralized in the first instance, and with excess of oxyd in the second. Bayen found that it always retains a portion of nitric acid.

The muriatic acid has no sensible action on mercury, though it be one of those which have the strongest affinity with the oxyd of that metal; but its action on mercurial oxyd, with which it forms a peculiar neutral salt, is very powerful. This combination takes place whenever the muriatic acid is brought into contact with the oxyd, in a state of extreme division. If a small quantity of muriatic acid be poured on a nitric solution of mercury, this acid seizes the oxyd of the metal, and forms a salt which is precipitated in a kind of whitish coagulum, called *white precipitate*; the muriatic salts, says Dupont, with base of alkali, or of any salino-terrestrial substance, abundantly produce the same effect, and form besides nitric salts, differing according to the nature of the base. But it must be observed, with respect to this precipitation, that it does not take place when the oxygenated muriatic acid is used; because, though this acid takes the oxyd of mercury from the nitric acid, the salt which it forms with that oxyd is very soluble in water; whereas the salt formed by the common muriatic acid is not at all soluble. This acid has a stronger affinity than the sulphuric acid with the oxyd of mercury, and occasions the same precipitate in the sulphuric solutions of that metal, as it does in the nitric solutions. The compound of muriatic acid and oxyd of mercury may exist in two states, as we have before observed, according to the simple or oxygenated state of the acid; the latter constitutes the oxygenated muriat, or corrosive, and the former the mild, mercurial muriat.

There are several processes for preparing *Corrosive sublimate*, or corrosive mercurial muriat; in general, equal parts of dried mercurial nitrat, decrepitated muriat of soda, and calcined sulphat of iron, or white martial vitriol, are mixed and put into a matrass, two-thirds of whose capacity are left empty. This vessel is plunged into a sand-bath, and gradually heated till its bottom becomes of an obscure red; the sulphuric acid disengages the muriatic acid from the soda; the latter separates the mercury from the nitrous acid, from which it takes a portion of its oxygen, so that it becomes oxygenated muriatic acid; it then combines with the oxyd of mercury and forms corrosive mercurial muriat, which is sublimed in the form of flattened and pointed crystals to the upper part of the matrass; the nitric acid being dissipated in the form of nitrous gas. The residue is reddish or brown, and contains oxyd of iron, and sulphat of soda, formed by the union of the sulphuric acid with the base of the marine salt. This salt is prepared in the large way in Holland, by triturating equal parts of mercury, muriat of soda, and sulphat of iron, together, and exposing the mass to a violent fire. In this operation the oxyd of iron, deprived of the sulphuric acid by heat, and highly oxygenated, appears to cause the muriatic acid to pass into the oxygenated state, since this last only is present in sufficient quantity perfectly to dissolve the mercury made use of. The corrosive mercurial muriat may likewise be obtained by sublimation, from mixtures of sulphat of iron, muriat of soda, and mercurial precipitates, by fixed alkalis, or from every kind of oxyd of mercury.

Boulduc has given a very good process for preparing corrosive mercurial muriat; but Spielman remarks, that it was before described by Kunckel, in his Chemical Laboratory. It consists in heating equal quantities of sulphat of mercury, and decrepitated muriat of soda, in a matrass; the muriat of mercury is volatilized, and the residue consists of sulphat of soda. Monnet affirms, that he has likewise obtained this salt, by treating, in a retort, very dry muriat of soda and mercurial oxyd, precipitated from its nitrous solution by fixed alkali. In all these preparations of mercurial corrosive muriat, care must be taken not to break the sublimatory vessel till it is entirely cool, in order to avoid the vapours of the sublimed salt. There is another way of preparing the corrosive mercurial muriat more readily; it consists in pouring into a solution of nitrat of mercury a quantity of oxygenated muriatic acid, and evaporating slowly the mixture. When the nitrous acid is disengaged the liquor affords, by cooling, crystals of corrosive mercurial muriat. Chaptal proposed to mix the red oxyd of mercury with muriatic acid. Or a super-oxygenated muriat might be used; with a salt whose base is mercury.

The salt, called corrosive mercurial muriat, or corosive sublimate, deserves to be carefully attended to by chemists and physicians; it possesses a great number of properties which are highly necessary to be known, and of which we shall proceed to give a sketch. Its taste is exceedingly caustic: the smallest quantity being laid upon the tongue, leaves for a very long time an highly disagreeable styptic and metallic taste. This impression is carried even to the larynx, which it contracts spasmodically for a long time, especially in delicate persons. The action of this salt is still stronger on the tunics of the stomach and the intestines. When it is applied to these for any length of time, it corrodes them, and destroys their substance, for which reason it is one of the most violent poisons we know. The causticity of corrosive mercurial muriat appears to depend on the state of the mercury, as Macquer has very ingeniously observed. It cannot be attributed to the muriatic acid, as some authors have thought; for the mercury is more than treble the quantity of the acid. On this account the salt renders syrup of violets green, rather than red, according to the observation of Rouelle. The taste of mercurial muriat is besides excessively stronger than that of the muriatic acid. A drachm of spirit of salt, diluted with water, may be taken with impunity; whereas a few grains of corrosive mercurial muriat, dissolved in the same quantity of water, would poison without remedy. Bucquet thought that this extreme strength of taste depended on the combination of the two bodies, and from thence deduced one of his strongest proofs of the law of affinity, which establishes, that

that compounds have new properties, very different from those of either of their component parts.

Corrosive mercurial muriat is not sensibly altered by light; heat volatilizes and semi-vitrifies it. If it be strongly heated with access of air, it is dissipated in the form of a white fume, whose effects on the animal economy are very active, and exceedingly dangerous. When heated slowly, and by degrees, it sublimes in a crystalline and regular form, into prisms, so flattened that it is impossible to determine the number of their faces. They terminate in very acute summits, and have been very properly compared to the blades of poniards thrown confusedly among each other. Fire alone is not capable of decomposing this salt, neither is it susceptible of alteration from the air. It is soluble in nineteen parts of water, and crystallizes by evaporation, in flattened prisms, very sharp, their extremity being similar to those obtained by sublimation.

Barytes, magnesia, and lime, decompose the corrosive mercurial muriat, and precipitate the mercurial oxyd. The *phagedenic water* made use of as a corrosive by surgeons, is made by throwing half a drachm of this salt, in powder, into a pound of lime-water; a yellow precipitate is formed, which renders the fluid opake, and it is employed before this subsides. Fixed alkalis precipitate from corrosive mercurial muriat, an orange coloured oxyd, which becomes deeper coloured by keeping. Ammoniac affords a white precipitate, which after a short time becomes of a slate colour.

Acids and neutral alkaline salts, produce no change in the corrosive mercurial muriat. This salt contracts an intimate union with muriat of ammoniac without decomposition. This very singular saline compound, which was highly esteemed by the alchemists, and called by them *sal alembroth, salt of art, or of wisdom,* &c. is formed either by sublimation or crystallization. The ammoniacal muriat renders the corrosive mercurial muriat very soluble, since, according to Baumé, three ounces of water charged with nine drachms of the former, dissolves five ounces of the latter salt. This solution is made with heat, and affords a solid mass in cooling. A preparation, called *white mercurial precipitate*, is made from this salt. A pound of corrosive mercurial muriat in powder is thrown into a solution of the same quantity of muriat of ammoniac; when the salt is perfectly dissolved a solution of carbonat of potash is added, which forms a white precipitate, which is washed and dried in the form of small lozenges. In this operation the potash disengages the ammoniac, which precipitates the mercury in a white oxyd. Heat, and even light, gives this precipitate a yellow colour.

Corrosive mercurial muriat is altered by hydrogen gas. Sulphur does not change it, but alkaline sulphure decomposes this as well as all the other solutions of mercury; a black precipitate being produced, which arises from the combination of the sulphur with the mercury. Most of the metals we have mentioned are capable of decomposing this salt, and each decomposition exhibits peculiar phenomena, which well deserve to be examined. If two parts of corrosive mercurial muriat, with one of arsenic, be distilled by a mild heat, a transparent substance, of the consistence of oil, passes into the receiver, part of which soon condenses into a kind of white jelly, called *corrosive oil*, or *butter of arsenic*. If the heat be continued after the butter has passed over, running mercury is obtained; so that the process affords a method of determining accurately the principles of corrosive mercurial muriat. The muriat of arsenic does not appear capable of crystallization, melts with a gentle heat, and is so caustic that it instantly destroys the organs of animals. It is soluble in water, which partly decomposes it; but its other properties are unknown. Oxyd of arsenic does not afford it, because in this state the metal, being already combined with a portion of oxygen, cannot take it from the oxyd of the mercury, nor disengage the mercury from its muriatic combination.

The effects of cobalt, nickel, and manganese, on corrosive mercurial muriat, have not been yet examined. Bismuth, antimony, and zink, decompose this last salt with great facility. When two parts of corrosive mercurial muriat, and one part of bismuth, are distilled together, a thick fluid substance is obtained, which congeals into a mass of a greasy appearance, fusible by heat, and precipitable by washing with much water; and in a word, a true solid muriat of bismuth. Poli, who first described this experiment, in the History of the Royal Academy for 1713, affirms, that, when this *butter* of bismuth is sublimed several times, there remains in the vessel a powder of the colour of oriental pearls, very soft to the touch, and as it were glutinous; he proposes this powder to be employed as a pigment.

If twelve ounces of antimony, and thirty-two ounces of corrosive mercurial muriat, be accurately mixed together, heat is excited, which shews that there is a rapid action between them. If the mixture be distilled by a gentle heat, a thick liquor is obtained, which becomes fixed in the receiver, and often in the neck of the retort, in the form of a white mass, called *butter of antimony*. This sublimed muriat of antimony usually weighs sixteen ounces and a few drachms. The residue is composed of mercury, and a grey powder of antimony, which floats on the metallic fluid. If the distillation be continued after the muriat of antimony has passed over, a new receiver being adapted, running mercury is obtained, foiled by a small quantity of the muriat of antimony, which it is impossible to clear entirely out of the neck of the retort. Baumé, who has accurately described this operation, affirms, that by this process two ounces of running mercury may be obtained, one ounce of antimony in powder, mixed with the mercury, and six drachms twenty-four grains of antimony melted in the retort. The latter is partly oxydated, it affords a red oxyd and a white, in part sublimed. In this experiment the antimony is oxydated by the oxygen which is separated from the oxyd of mercury, and unites to the muriatic acid, with which it forms the muriat of antimony. The same decomposition takes place equally well with sulphure of antimony; one part of that mineral in powder being distilled with two parts of corrosive mercurial muriat, affording a sublimed muriat of antimony. But the residue, instead of containing running mercury, exhibits a combination of sulphur with that metal. This combination may be sublimed by a stronger fire into red needles, improperly called *cinnabar of antimony*.

This sublimed muriat of antimony, or the combination of the muriatic acid with antimony, does not take place but in proportion as the muriat takes the oxygen from the mercury, as we have already observed of arsenic. This compound is in a solid form; it crystallizes in thick parallelopipeds; its causticity is sufficiently strong to destroy both animal and vegetable matters in a very short time. The action of light changes it: by a low heat it is melted, and becomes fixed by cooling; for which reason it has been called butter of antimony. It is easily deprived of its white colour, and it may be rectified by distillation. When exposed to the air it attracts moisture, and is dissolved into a thick fluid, apparently oleaginous: it does not completely dissolve in water, the greater part being decomposed by that fluid. When sublimated muriat of antimony is thrown into distilled water, a very abundant precipitate is immediately formed, which is known by the name of *emetic powder*, or *powder of Algaroth*, from the name of an Italian physician who first used it. It has been improperly called *mercurius vitæ*. This precipitate is an oxyd of antimony, which is violently purgative and emetic. The sublimated muriat of antimony dissolves with heat and effervescence in the nitric acid; a large quantity of nitrous gas being at the

the same time disengaged with considerable agitation of the fluid. The muriat of antimony disappears, and the liquid becomes of a yellow reddish colour. It is a solution of oxyd of antimony in nitro-muriatic acid. The oxyd is soon deposited in the form of a powder, or white magma. If the solution of muriat of antimony by the nitric acid be evaporated to dryness immediately after it is made, a very white oxyd is obtained. This oxyd is diluted with its own weight of the same acid, which is likewise evaporated, and the same process is a third time repeated; after which the matter is calcined in a crucible kept red-hot for about half an hour, and affords an oxyd, which, when cold, is found to be white on the upper part, and of a rose colour below. These two portions mixed together constitute the preparation called *Bezoar mineral*.

Corrosive mercurial muriat is decomposed by zink. If a mixture of two parts of this salt, with one part of zink in filings, or coarse powder, be distilled in a glass retort, a very white and solid salt arises, which crystallizes in small united needles, similar to the aggregates of which stalactites are composed. The mercury remains pure in the retort, and passes over after the salt. This muriat of zink fumes slightly when taken out of the receiver, and melts with a mild heat, becomes coloured by inflammable vapours, and is partly decomposed by water, like the sublimed muriat of antimony.

The most singular property of corrosive mercurial muriat, is its combination with running mercury. When saturated with this metallic fluid, it loses most of its properties, especially in its taste and solubility. To make this combination, corrosive mercurial muriat was formerly triturated in a glass mortar with running mercury, added by a little at a time, till no more could be made to disappear. The quantity of mercury, which the salt takes up by this process, amounts to three-fourths of its weight, as Lemery and Baumé have observed. The mixture was placed in small vessels, two-thirds of which were left empty, and in this manner sublimed three times successively, care being taken each time to separate a white powder which is found beneath the sublimed matter, and is very corrosive. The product, called *sweet sublimate*, *mercurius dulcis*, or *aquila alba*, or more properly *mild mercurial muriat*, differs from the corrosive by its insolubility in water, by its insipidity, and by its crystalline form. The crystals obtained by slow sublimation, are tetrahedral prisms, terminated by four-sided pyramids; two very long and tetrahedral pyramids are frequently united at their base, and form a very acute octahedron.

The foregoing process for the preparation of mercurius dulcis, is inconvenient in many respects. The trituration of corrosive mercurial muriat with running mercury, till the latter disappears, is very tedious and difficult; and at the same time a subtle powder rises of so pernicious a quality, that the operator is under the necessity of covering his mouth and nose with a cloth. The mercury is never absolutely made to disappear in the mortar, and the sublimations are very slow. Bailleau, of Paris, has communicated to the Royal Society of Medicine, a process for making mild mercurial muriat, which is free from the imperfections and danger of the common methods. It consists in forming a paste of corrosive mercurial muriat and water, and triturating it with running mercury; the trituration in the course of half an hour causes the mercury to disappear, because the water promotes its comminution, and the combination is completed by digesting the mixture on a sand-bath with a mild heat. The matter, which at first is grey, becomes white, and forms a very mild mercurial muriat, which requires only one sublimation to render it perfectly pure.

The following process described by Scheele for the preparation of the mild muriat of mercury, in the humid way, does not seem liable to any of the objections which Fourcroy states to the preparation of this substance from the corrosive muriat. Introduce equal parts of mercury and common aqua-fortis into a small cucurbit with a long neck, and place this vessel in the heat of a sand-bath. When the acid appears to act no longer on the mercury, the fire is to be augmented so as nearly to make the solution boil. This degree of heat is to be continued for three or four hours, and the vessel now and then to be shaken. Towards the end the heat is to be regulated so, that the solution shall boil gently for a quarter of an hour. In the mean time, four ounces and a half of pure muriat of soda are to be dissolved in six or eight ounces of water. Into this solution, heated to the boiling point, the solution of mercury is to be poured in small quantities at a time, with constant agitation. When the muriat of mercury, which is formed, has subsided, the clear liquor is to be decanted off, and hot water poured on the precipitate, with which it is to be edulcorated till the water standing upon it shall be entirely tasteless. It is then to be dried by a gentle heat. By this process, about eight ounces and a half of the mild muriat are commonly obtained from four and a half of the mercury.

The experiments of Baumé teach us, that it is possible to change the mild mercurial muriat into corrosive, by subliming it with decrepitated muriat of soda and sulphat of iron calcined to whiteness. In this operation the muriatic acid, being disengaged and oxygenated by the sulphuric acid, seizes the oxyd of the mild mercurial muriat, and converts it into corrosive muriat. Baumé has ascertained another circumstance, which shows the great difference between the mild mercurial muriat and the corrosive; namely, that it does not unite with ammoniacal muriat, as corrosive mercurial muriat does, in the preparation of sal-alembroth, or the ammoniaco-mercurial muriat. He therefore advises the washing of mild mercurial muriat with water charged with a small quantity of ammoniacal muriat, in order that all the corrosive mercurial muriat, which is rendered very soluble by this salt, may be carried off. Lastly, He has discovered, that at each sublimation the mild mercurial muriat loses a portion of mercury, and consequently affords a small quantity of corrosive mercurial muriat; so that, by repeated sublimations, mild muriat may be entirely changed into corrosive. From this last experiment it obviously follows, that the preparation known under the name of *panacea mercurialis*, which is made by subliming mild mercurial muriat nine times, is so far from being rendered milder by these operations, as most chemists and physicians have supposed, that it does not at all differ from what it was at first.

Of the other acids, there are several which will not unite immediately with mercury: but most of them will unite by means of the double affinity. The action of the carbonic, fluoric, and boracic, acids, on mercury, are not known. It is known, however, that the alkaline carbonats precipitate mercury from its acid solutions, and that these precipitates are different from those obtained with pure alkalis. It is necessary to employ the combination of boracic acid with a base, for the obtaining of a mercurial borat by the way of double affinity. A saturated borat of soda being poured into a nitric solution of mercury, an abundant yellow precipitate is formed, as Monnet first observed. In this operation the soda of the borax unites with the nitric acid, and forms nitrat of soda, while the acid of the borax combines with the oxyd of mercury, in the form of a neutral salt, which, being sparingly soluble, falls down. The filtrated liquor affords, by evaporation, fine and brilliant pellicles of mercurial borat. Chaussier employed this saline combination with success in the venereal disease. This salt, by exposure to the air, becomes gradually of a greenish hue. Ammoniacal muriat renders it very soluble, and forms with it a compound, analogous to the ammoniaco-mercurial muriat; lime-water throws down a yellow precipitate, which changes to deep red; and potash causes a white precipitate.

Neutral

Neutral salts have scarcely any action on mercury. Though this assertion is more especially applicable to the different sulphats, Fourcroy observed, nevertheless, that mercury becomes very quickly extinguished in sulphat of potash.

Mercury does not appear capable of altering ammoniacal muriat by distillation. Bucquet, who made this experiment, observed, that two parts of mercury are not well extinguished by one part of this salt, and that the mixture does not afford ammoniac by distillation. The count de la Garaye, nevertheless, prepared with these two substances, a medicine, to which he gave the name of *tincture of mercury*. Macquer, who examined his process, found it to succeed perfectly well. It consisted in triturating one ounce of running mercury, with four ounces of ammoniacal muriat, in a marble mortar, moistening the mixture with a small quantity of water, till the mercury entirely disappeared. This matter being left exposed to the air five or six weeks, and from time to time agitated, is then to be triturated afresh, and afterwards exposed in a matrass on a sand-bath, covering the powder to the depth of about two inches with good spirit of wine. The mixture being made to boil slowly, the alcohol assumes a yellow colour, and contains mercury, as appears from its whitening a slip of copper. From this experiment it appears, that the ammoniac is gradually disengaged by the mercury; that ammoniaco-mercurial muriat is formed, part of which is dissolved by the spirit of wine; and that the different quantity of the mercury, and the slow action produced during the maceration, are the causes of the difference between this experiment and that of Bucquet. The red sulphure of mercury may be made to detonate with the super-oxygenated muriat of potash; but does not flame with the sulphuric acid.

Mercury combines with many other substances, as gums, syrups, vegetable acids, &c. as will appear in the course of this treatise. Mercury is of the most extensive use in the arts, such as gilding, silvering of glasses, constructing of meteorological instruments, metallurgy, &c. it is used in medicine in a great variety of forms. Crude mercury was formerly employed in the iliac passion. It is still boiled in water, to which it communicates a vermifuge property. Mixed with fat substances, it forms an ointment used in venereal disorders. Turbith mineral, or yellow oxyd of mercury by sulphuric acid, has likewise been recommended in the same disorders, in the dose of a few grains. This medicine is emetic and purgative in a high degree. Mercurial water, or its nitric solution, is used by surgeons as a powerful escharotic. Red precipitate, or red oxyd by the nitric acid, answers the same purpose. A citron-coloured ointment is prepared with hog's lard and the nitric solution of mercury, which is a certain cure for the itch. Corrosive mercurial muriat has been recommended by Sanches and Van Swieten, in venereal disorders. A few grains are dissolved in brandy, and a spoonful of this solution is taken at a time in a large quantity of mild liquid. The exhibition of this remedy requires great care, more especially with regard to the state of the stomach and lungs. Mild mercurial muriat, given in the dose of twelve or fifteen grains, is a purgative, and in the dose of three or four grains, is an alterative. The phagedenic water is used in surgery to corrode and destroy fungus, or proud flesh, &c. Mercurial borat has been used with success in venereal disorders by Chaussier the younger, of the academy of Dijon. Cinnabar has been considered improperly as an anti-spasmodic and sedative medicine. It enters into the composition of the pulvis temperans of Stahl, which is prepared according to the Pharmacopeia of Paris, by accurately mixing three grains of sulphat of potash, and of nitrat of potash, vitriolated tartar and nitre, with two scruples of artificial cinnabar. This compound is still used, by exposing the patients to its vapour. It then constitutes one of the methods of treatment of venereal disorders by fumigation.

All the preparations of mercury, which are internally given, produce very beneficial effects in other disorders, as well as those of the venereal kind; such as most disorders of the skin, scrophulous disorders, lymphatic swellings, &c. We cannot, however, forbear observing, that these medicines, more especially the saline mercurial preparations, ought not to be applied but by experienced and cautious physicians; and that it is dangerous to the health, and even to the life of men, that mercurial remedies should be in the hands of a great number of persons, who, generally speaking, are deficient, not only in the knowledge which is necessary to administer them with success, but even in that knowledge which might enable them to avoid danger.

OF ZINK.

Native zink is very rare; naturalists even doubt whether it exists at all. The ores of zink are not worked for the purpose of gaining this metal. It is observed, during the smelting of lead-ores mixed with blende, that the zink is sublimed in the chimneys of the furnaces, in the form of an oxyd, and produces greyish incrustations, named *tuttia*, or *cadmia fornacum*. Another portion is obtained in the metallic form, by cooling the anterior part of the furnace. The zink, being driven up in the vapourous form by the action of the fire, is condensed in this place, and falls in small grains into powder of charcoal, which covers a stone placed below. This metal is preserved from oxydation by the powder of charcoal, and is afterwards melted in a crucible, and run into moulds. Such is the process by which the greatest part of the zink found in commerce is obtained at Rammelsburg, whether in the state of oxyd or metal. This zink is always united to a certain quantity of lead: it seems that the zink prepared in China, which comes to us under the name of *tutenag*, is much purer, but the manner of preparing it is unknown with us. Sage states, that the English obtain zink in the large way, from lapis calaminaris, by distillation; but the method is kept a secret.

Zink is a brilliant bluish white metallic substance, crystallized in narrow plates. It has neither taste nor smell. It cannot be reduced into powder like the other metals, but becomes flattened under the hammer, and may even be laminated, provided it has not previously been too much hammered. This experiment was made by Sage. When it is required to have zink in a state of extreme division, it must be granulated, that is to say, poured melted into cold water, or else reduced into filings. It has the inconvenience of choking up the files. Macquer affirms, that, when heated nearly to melting, it becomes very brittle, and may then be pulverized. This property is very different from that of the metals, which become more ductile by the action of heat, and affords an advantageous process for obtaining zink in a state of extreme division. It may likewise be obtained in this state, by triturating it while melted, and keeping its particles asunder by continual motion, before they take the solid form by cooling. This operation must not be made in an iron-mortar, because zink always dissolves a portion of this metal; a mortar and pestle of marble must be used.

Mongez succeeded in obtaining this metal in a regular form; for this purpose he used a vessel pierced at the bottom and at its sides, with a number of holes which he stopped with earth of bones. When the zink cools at its surface, the holes are to be opened gradually, and the metal agitated by a red-hot iron, introduced through one of these openings. This simple process occasions the melted portion of the zink to run out; the vessel is then to be shaken, till no more melted metal runs out, and the cold portion crystallizes. If it be left in the vessel, it retains its metallic colour; but, if it be exposed to air, it takes a tarnish of rainbow colours. When zink is

is melted with contact of air, it becomes covered with a grey pellicle, which is quickly converted into a yellowish oxyd, and easily reducible. This oxyd weighs more than the zink made use of; but, if the metal be strongly heated, it burns with a white or light greenish yellow flame, very brilliant, and similar to that of phosphorus. The current of this flame drives up the oxyd of zink, which is condensed in the air in the form of white and very light flocks, named *flowers of zink, pompholix, nihil album, philosophical wool, or cotton*.

The following is La Grange's process for obtaining this white oxyd: Place a large crucible upon two bricks in a good furnace; let the crucible be inclined at an angle of about 45°; fix the cover of the crucible so that it may easily be closed when necessary. Put zink in the crucible, and urge it to fusion with a fire capable of maintaining a white heat, and keep the crucible shut. When it is very hot, uncover the crucible, and a perfect white flame, very vivid, rises from the surface of the zink; at the same time arises a very white flaky matter like cotton: this is white oxyd of zink. Take this away with a long-handled iron-spoon; more is immediately formed, which is to be taken away in like manner, till all the zink is converted into oxyd. This oxyd is not volatile, though it rises in the manner of volatile bodies; it is, on the contrary, extremely fixed by fire. This oxyd may be melted into glass, but it requires an intense heat: the vitrified oxyd will be of a fine yellow colour, and not reducible by charcoal, or any other combustible body. Zink is scarcely alterable by the air. Its surface tarnishes a little, and appears to suffer a slight beginning of oxydation.

Phosphorus may be united to zink: Put into a stone retort two parts of zink-filings, and one of phosphorus: proceed to distillation, having first adapted a receiver to the neck of the retort. The product is a little phosphorus; and in the neck of the retort, 1. Zink in the metallic form. 2. A red efflorescent sublimation. 3. White oxyd of zink. 4. A sublimation in needles, of a metallic appearance, a little bluish and rainbow-coloured. A blackish matter, like scoria, remains in the retort. Pelletier regards the red efflorescence, and the needled sublimation, as a phosphorated oxyd of zink. But this combination is most easily effected, by throwing at different times small pieces of phosphorus upon zink, heated in a crucible, and by covering the mixture with resin to prevent the oxydation of the metal. Phosphure of zink has a metallic lustre, not unlike that of lead; it is slightly malleable, burns in the fire like zink, and leaves behind it a spongy residue.

Zink dissolves in hydrogen gas: Put four parts of the roasted blende, with one part of decrepitated charcoal, into a retort: adapt a recurved tube, which goes into water under a jar in the pneumatic apparatus. When the temperature is not strong enough to reduce the zink, the gas which is disengaged has no other properties than carbonated hydrogen gas; but, as soon as the reduction begins, the hydrogen gas holds zink in solution, which is easily perceived by the bluish yellow flame it emits in burning. The nearer the operation draws to a conclusion, the heat being maintained, the more the gas is loaded with zink. During the experiment, then, there is produced carbonic acid gas, and zinkated and carbonated hydrogen gas.

This compound gas is much heavier than common hydrogen gas; but it is lighter than atmospherical air, and gives way to it. If this gas be set on fire, there is no sensible residue on the sides of the vessel, as happens with sulphurated hydrogen; but, if the vessel be presently filled with water, the surface of the liquid will be charged with a shining pellicle of a light grey colour, which if collected, will be found to possess all the properties of metallic zink. Only a part of the zink therefore is burnt with the hydrogen gas, since part escapes in combustion, and is found in the metallic state. Zinkated hydrogen gas is not decomposed by the oxygenated muriatic acid, like the sulphurated and phosphorated hydrogen gas. If the mixture be set on fire in the air, the combustion is more rapid, the flame is whiter, and no metallic zink is deposited; on the contrary, the zink is combined with the muriatic acid in the oxyd state, as may be shewn by an alkaline carbonat, or a hydro-sulphure. Vauquelin could not discover the presence of zink in the hydrogen gas produced by dissolving that metal in acids weakened with water.

The metallic zink does not appear to combine with sulphur but with the greatest difficulty. When these two substances are melted together, they remain distinct without contracting any kind of union. Dehne, however, observed, that, if they be kept for a certain time in fusion together, the zink is partly oxydated, assuming at the same time a brown or greyish colour, and becoming heavier. Morveau discovered, since the time of the remark of Dehne, that the oxyd of zink unites easily with sulphur by fusion, and that a grey mineral is produced very similar to the blende of Huelgoet, from which yellow and prismatic needles are sometimes sublimed, and fix themselves to the cover of the crucible.

Malouin has not succeeded in his attempts to combine zink with the alkaline sulphure, whether by the humid or by the dry way, or by varying the proportions of these two substances to each other.

The same chemist combined zink with arsenic. He observed, that this metal does not unite so well with zink, as the oxyd of arsenic does; nevertheless, in an experiment, wherein he distilled a mixture of this oxyd with tallow and zink, he obtained a blackish mass resembling blende, but less consistent. It likewise appears that the zink seizes the oxygen of the oxyd of arsenic when they are distilled together, and that a portion of this metal is burned, at the same time that a portion of the oxyd of arsenic is revived. A series of experiments, made with a view to discover the reciprocal action of metallic oxyds and metals on each other, and to determine the elective attractions of the oxygen with these substances, could not fail of proving highly instructive.

It is not known whether zink is capable of being alloyed with cobalt.

It does not combine with bismuth, and when these two metals are fused together, the bismuth takes the lower place on account of its greater weight, and they may be separated by a stroke of the hammer.

Zink, fused with antimony, affords a hard and brittle alloy, which Malouin simply mentions, without pointing out any of its other properties.

Mercury combines with zink by fusion; but the zink must not be very hot; the proper degree of heat is that which will singe a card without burning it. The amalgam it forms with this metal is solid, but becomes fluid by trituration; when melted, and left to cool slowly, it crystallizes in plates, which have a square appearance, rounded at the edges.

Water is decomposed by zink. When this metal begins to be red-hot, it is then easily oxydated, and a large quantity of inflammable gas is given out; a proof that the water is decomposed by the zink, which seizes its oxygen by the assistance of an elevated temperature. Lavoisier and Meusnier have ascertained this fact in their experiments concerning the decomposition of water. The hydrogen gas obtained in this process, holds a small quantity of charcoal in solution, which comes from the zink.

Sulphuric acid acts very well upon zink, even in the cold: Put one part of granulated zink into a matrass, and pour over it two parts of sulphuric acid diluted with water: if it be desired to collect the gas which is disengaged, adapt a recurved tube, which is to go under a jar of water in the pneumatic apparatus. In proportion as the acid exerts its action, the metal becomes of a blackish grey,

grey, much heat is produced, and a black powder is precipitated, which was long unknown, but is found to consist of carbure of iron, or plumbago. A large quantity of hydrogen gas, holding a small quantity of charcoal in solution, is disengaged. It affords a white sulphat of zink by evaporation, rather more soluble in hot than in cold water, and of which a portion crystallizes by cooling. Very regular crystals of this salt, known in the arts by the name of *white copperas, white vitriol*, or *Goslar vitriol*, are easily obtained by exposing for some days to the air a solution of the salt made in boiling water, and a little evaporated: tetrahedral prisms are then formed, terminated by pyramids of four sides. Monnet, however, affirms, that this salt crystallizes with great difficulty, and requires much evaporation, and sudden cooling, to afford regular crystals without consistence. The white oxyd of zink likewise dissolves in the sulphuric acid, and affords sulphat of zink.

This salt has a strong styptic taste. According to Hellot, it loses a part of its acid by the action of fire, and then appears to be converted into sulphit of zink, whose properties are not well known. The sulphat of zink is very little altered by exposure to air, when it is very pure: in the course of time its oxyd becomes calcined still more by absorbing oxygen; it assumes a yellow colour, and is no longer perfectly soluble in water. Sulphat of zink is decomposable by alumine, barytes, magnesia, lime, and the three alkalis. The oxyd of zink precipitated by these substances, may be re-dissolved in acids, and even in alkalis. Ammoniac becomes of a dirty brown colour after dissolving it. The sulphat of zink decomposes nitre, and is itself decomposed by this neutral salt. By distilling this mixture, two kinds of nitrous acid, which do not mix, are obtained, together with the glacial sulphuric acid; we shall speak more fully on this subject at the article of sulphat of iron, or martial vitriol.

A sulphat of zink, prepared in the large way at Goslar, is met with in commerce under the name of *white vitriol*. It is made thus: blendes are roasted, a portion of the sulphur burns, and furnishes sulphuric acid, which dissolves the oxyd of zink. The roasted ore is then washed, and the lixivium being decanted, is exposed to evaporation, and affords crystals. The salt being melted by a gentle heat, so as to deprive it of its water of crystallization, and then suffered to cool, becomes condensed into white, opake, and granulated, masses, resembling sugar. The *vitriol of Goslar*, when dissolved in boiling water, crystallizes by cooling. Its crystals are somewhat reddish, a circumstance to be attributed to the impurities of the salt, which is supposed to contain a small quantity of lead and iron. To purify it, zink may be thrown into its solution. This metal precipitates the oxyds of iron and of lead, because it has a stronger affinity with the sulphuric acid; and the liquor being filtrated, is consequently found to contain pure sulphat of zink. There is still greater reason to think, that the impurity of the vitriol of Goslar consists in the oxyd of iron, from the circumstance of the zink met with in trade being magnetical, doubtless because it contains iron. Experiments concerning this metal ought therefore not to be made, but with zink prepared by reducing the precipitate of sulphat of zink purified in the manner here shewn. We must, however, observe, that zink is very often magnetical only at that part of the piece which has been cut with scissars, or iron wedges.

Nitric acid dissolves zink with great facility, and is decomposed by it. This acid will dissolve about one-fifth of its weight of zink: Put the zink into a matrass as before, and pour over it weak or diluted nitric acid. A considerable heat is produced in this solution, as well as in that wherein the sulphuric acid is used. The lively effervescence which accompanies this combination, is occasioned by the disengagement of a large quantity of nitrous gas. This experiment shews that zink decomposes the nitric acid, and deprives it of a portion of its oxygen. The nitric acid holds a much larger quantity of oxyd of zink in solution than the sulphuric. The nitric solution of zink is of a greenish yellow, and not perfectly clear when newly made, but it loses this colour, and becomes transparent, after standing for some time. It is very caustic, and quickly corrodes the skin, though made with an acid diluted with water. It furnishes, by evaporation and cooling, crystals in tetrahedral striated flat prisms, terminated by pyramids of four sides, likewise striated. The nitrat of zink, being put on hot coals, first melts and detonates as the portions become dry, and the detonation is attended with a small reddish flame. The same phenomenon does not appear when the fusion is performed in a crucible. It cannot be dried, even by the mildest heat, without alteration; vapours of nitrous gas in this case escape, and it becomes of a brown red, and of the consistence of a jelly. If it be suffered to cool in this state, it preserves its softness for some time; but, if it be kept heated for a sufficient time, it dries entirely, and leaves a yellowish oxyd. Hellot obtained from the distillation of nitrat of zink a very fuming nitrous acid, and observed the red colour it assumes in melting. It may be conceived, that, heat disengaging the nitrous gas of this salt, it passes to the state of nitrat of zink. It likewise affords a certain quantity of oxygenous gas or vital air. The nitrat of zink quickly attracts humidity, and loses its regular form after some days exposure to the air, nothing remaining but striated and pointed prisms, whose figure can scarcely be determined.

The muriatic acid acts on zink as strongly as the nitric. During the rapid effervescence which accompanies this combination, much hydrogen gas is disengaged, which has the same properties as that afforded by the sulphuric acid; and this last is known to be derived from water decomposed by zink. Black flocks are gradually deposited, which is nothing else but a combination of carbon, or charcoal and iron, or carbure of iron. The solution of zink by the muriatic acid is colourless, and does not afford crystals by evaporation; when heated, it becomes of a blackish brown, emits acrid and penetrating vapours of muriatic acid, and becomes very thick. Exposed to the air for eight days in this state, it affords no crystals. By distillation it gives out a small quantity of very fuming acid, and a solid and fusible muriat of zink. There remains in the retort used for this distillation, a blackish vitriform and deliquescent matter.

The liquid carbonic acid in which zink or its oxyd are digested in the cold, dissolves, at the end of twenty-four hours, a considerable quantity of this metal, according to Bergman. This solution, when exposed to the air, becomes covered with a pellicle, which reflects various colours, and is merely a carbonat of zink, according to that celebrated chemist. The action of the other acids on zink are not known.

All the solutions of zink in acids are precipitated by lime-water, magnesia, the fixed alkalis, and ammoniac. Silex and alumine form no combination with zink; but its oxyd enters into vitreous compositions, and gives the glass a red colour. There is no action with barytes, strontian, magnesia, and lime. If liquid potash or caustic soda be boiled over this metal, its surface will be darkened, and assume a dirty yellow colour, holding in solution a certain portion of the oxyd of zink, which cannot be separated by acids. Ammoniac heated does not act so well upon zink, certainly on account of its volatility; but, digested upon zink in the cold way, it dissolves a little; in the three alkaline solutions of zink, a certain quantity of hydrogen gas is disengaged, arising from the decomposition of the water.

Gold and zink melt easily together. Equal parts of these metals form a hard brittle mass, which receives an excellent polish. The zink may be separated from the gold by oxydation in the fire, or by solution in nitric acid. Zink unites easily with platina, and forms with it a brittle hard bluish-coloured mixture. It is very difficult

to separate it entirely from the platina by roasting. Zink precipitates platina from its solution in aqua regia. Four hundred and sixteen parts of zink are required, according to Bergman, to precipitate seventy-seven parts of platina. Silver forms a brittle mass with zink, which, like that with gold, may be decomposed in the fire. The silver is precipitated by zink from its solution in nitric acid, partly in an oxydated, and partly in a metallic, state. A portion of the zink, however, falls along with the silver. To combine lead with zink it is necessary to cover the mixture with charcoal, and to exclude from it carefully the external air. Zink precipitates lead from acids. Very beautiful *metallic vegetations*, as they have been termed, may be produced by suspending a bit of zink in a solution of acetat of lead. It does not appear to be determined whether zink can be made to combine with bismuth. It precipitates the bismuth in its metallic state from acids. Zink unites with nickel. It occasions no perceptible precipitation of nickel from acids. Zink unites difficultly with arsenic, not taking up more than 1-5th of that metal. The mixture is of a grey colour, and brittle. If oxyd of arsenic be melted with zink, the zink is oxydated, and a portion of the arsenic rises in its metallic state. Chemists differ in opinion with regard to the possibility of combining zink with iron, but the difficulty seems to arise chiefly from the volatility and easy oxydation of the zink. Iron is precipitated by this metal from its solutions in acids; the precipitate approaches more or less to the metallic state, according to the previous degree of its own oxydation, and the oxydation of the zink. Zink melts difficultly with cobalt. It does not precipitate this metal from acids, nor change the red colour of its solutions. A very beautiful green paint is produced in precipitating by potash from a mixture of cobalt dissolved in aqua regia, and nitrat of zink, the oxyds of these metals. The presence of iron destroys the beauty of the colour. Zink unites easily with tin, and renders it harder and more brittle. It precipitates tin from its solution in acids. With the muriatic and acetic solutions it produces metallic vegetations.

Zink, in filings, or in powder, causes nitre to detonate with singular rapidity. The mixture being very dry, and thrown by spoonfuls into a red-hot crucible, produces a white and red flame. The activity of the inflammation is such, that portions of burning matter are thrown to a distance out of the crucible, in such a manner as to require some precaution on the part of the operator. The zink burns by the assistance of the oxygen afforded by the nitre, and is afterwards found in the state of an oxyd, more or less perfect, according to the quantity of nitre used. One part of the residue is soluble in water. It consists of the potash combined with a portion of the oxyd of zink, which may be precipitated from its solution by the addition of acids. Respour attributed to this solution the property of dissolving all the metals, if Hellot may be credited, who gives it as the alkahest of that alchemist.

Zink, according to the experiments of Pott, appears capable of decomposing muriat of soda. It especially decomposes ammoniacal muriat with great facility. Monnet affirms, that this metal triturated with ammoniacal muriat, disengages the ammoniac. Bucquet has observed, that when this salt and zink are distilled together, much ammoniac gas and hydrogen gas are produced by the combination of the muriatic acid with this metal: and he was sensible that the facility with which the zink disengages the ammoniac, is a consequence of its strong action on the muriatic acid. The oxyd of zink likewise disengages it, according to Hellot. The residue of this decomposition is muriat of zink, which may be sublimed.

Zink is of great use in the arts. It is employed in many alloys, especially in tombac, ruchbec, or prince's metal. Fine filings of zink are used to produce the white and brilliant stars in fire-works. The German physicians employ the sublimed oxyd of zink with success as an antispasmodic in convulsions and epileptic fits. *Pompholix*, *tutty*, or the different oxyds of zink, are used as excellent desiccative medicines, to be externally applied in disorders of the eyes.

Of Tin.

Most mineralogists doubt the existence of native tin; some authors however affirm that it has been found in Saxony, in Bohemia, and in the peninsula of Malacca. It is strongly affirmed, that it exists in the mines of Cornwall; and Sage has described a specimen of this tin given him by Mr. Woulfe, a chemist of London. This piece is grey and brilliant in its fracture; and, when beaten on the anvil, it forms brilliant and flexible laminæ. There have as yet been no mines of tin discovered in France. Baumé, however, suspects, that it might be found in the neighbourhood of Alençon, and in some cantons of Britany, because rock crystals are found, which appear to be coloured by that metal. The countries where they are the most abundant, and are worked, are the counties of Cornwall and Devonshire, in England; also in Germany, Bohemia, Saxony, the island of Banca, and the peninsula of Malacca, in the East Indies.

To make the assay of an ore of tin, it must be grossly pounded, after dividing it into different parcels, washed and roasted in a covered capsule of earth, care being taken to uncover it from time to time, in order to dissipate the tin as little as possible; for, if it be roasted in an open fire, much of that metal is lost, as Cramer remarks. It must likewise be roasted with expedition, lest the tin should be too much oxydated. Baumé, to obviate these two inconveniences, proposes to mix a quantity of rosin or pitch, which reduces a portion of the oxyd formed in this operation. After the ore is roasted, it is to be quickly fused in the crucible, with three parts of black flux, and a small quantity of decrepitated marine salt. By comparing the weight of the washed and roasted ore with that of the metallic button obtained, the quantity of foreign matter, and the proportion of tin it will afford in the hundred, is known. Cramer proposes to make this assay in a more expeditious manner, and perhaps with less loss, by making use of two large pieces of charcoal: one of them must have a cavity, to serve instead of a crucible, into which the ore is put, with a sufficient quantity of pitch; the other is perforated with a small opening, to give issue to the vapours. This is applied on the former to cover it, and they are tied together with iron wire, after having luted the joinings. These are set on fire before the noozle of a pair of forge bellows, and kept there by means of charcoal placed round them. As soon as a sufficient heat has been given to fuse the tin, the charcoal is to be extinguished with water, and the tin is found within them in the form of a button or globule.

Bergman proposes to assay the ores of tin by solution in sulphuric acid, to which the muriatic acid is afterwards added; and to precipitate it by fixed alkali. If the tin be pure, one hundred and thirty-one grains of the precipitate will be equal to one hundred and six of tin. If it be mixed with copper and iron, these foreign metals are to be removed by means of the nitric and muriatic acids.

The working of ores of tin in the large way is similar to the process before described; it is often necessary to make fires of wood in the mine, to calcine and soften the gangue, which is very hard, by which very dangerous vapours are disengaged. This process is used in the mines of Geyer. In other places the ores are found in sand, at a very small depth, as at Ebenstock. The pounded ore is is waxed in boxes, with little partitions of cloth, to retain the metallic particles; it is then roasted in reverberatory furnaces, to which a horizontal chimney is adapted, to collect the sulphur and arsenic; after which it is fused and poured into moulds, to give it the form of blocks.

blocks. The ores of tin are wrought nearly in the same way in Germany and in England. The purest tin of all is that which comes from Malacca and Banca; the first has been run into moulds, which give it the form of a quadrangular truncated pyramid, with a narrow slope round its base; each ingot weighs about a pound. The second is in oblong ingots, weighing forty-five or fifty pounds; these two kinds of tin are covered with a grey rust, more or less thick.

The tin produced in England, which is much more used than the pure tin of the Indies, its price being lower, is in the form of large blocks, of about three hundred pounds weight. It is alloyed with copper; and, to facilitate the sale, it is afterwards melted into small ingots, or sticks, of nine or ten lines in circumference, and about a foot and a half long. Tin is of a whiter and more brilliant colour than lead, but not quite so white as silver; by the alchemists it had the name of *Jupiter*. It is easily bent, and produces a crackling noise when bent, a phenomenon which we have already observed, though less evidently, in zink, and which has been urged by Malouin, as an instance of similarity between that metal and tin. This noise appears to depend on the sudden separation of the parts of the metal, and seems to shew, that a fracture takes place, though tin resists very little the effort which is made to bend it. Tin is the lightest of all the metals; it is sufficiently soft to be scratched with the nail. In water it loses about one-seventh of its weight. It has evidently a smell, which becomes much stronger by heating or rubbing. It has likewise a peculiarly disagreeable taste, so strong, that some physicians have supposed it to have a sensible action on the animal economy, and consequently have recommended it in several disorders. Its extreme softness renders it scarcely at all sonorous. Tin is the second among metals in the order of ductility; it is reducible beneath the hammer into laminæ, thinner than leaves of paper, which are of great use in many arts. Its toughness is such, that a wire of tin, of the tenth of an inch in diameter, supports a weight of forty-nine pounds and a half without breaking. The abbé Mongez did not succeed in his attempts to crystallize tin; but De la Chenoye succeeded, by fusing the tin for a number of successive times, by which means he obtained a rhomboidal assemblage of prisms or needles, united longitudinally to each other.

The specific gravity of tin, according to Kirwan, is 7·67 times that of water; according to Brisson, 7·29. It is not more elastic than lead. Its fusibility has not been well determined; some equivocal experiments have been made, which fixed it at 168° of Reaumur; in which case its fusibility must be greater than that of lead, which melts only at 258° of the same scale, employing the same means. This fluidity cannot be determined by Wedgewood's pyrometer, because that begins only at 460° of Reaumur's thermometer. It melts, however, at a heat of about 420 degrees, long before a red-heat is produced, and remains fixed as long as the fire is not raised; but a considerable heat volatilizes it. If heated with access of air, its surface becomes covered with a dull greyish pellicle, and assumes a shrivelled appearance. When this is taken away, the tin is seen underneath with all its metallic brilliancy. A new pellicle soon becomes collected, and in this manner most of the tin may be reduced into pellicles, which are nothing else but a metallic oxyd, or combination of the metal with the oxygen of the atmosphere. Then take the vessel off the fire; let it cool; pulverize the oxyd in an iron-mortar; pass it through a sieve, to separate the uncalcined portions of the tin. Take the oxyd thus prepared, and calcine it afresh, in an earthen capsule, in a cupelling or Macquer's furnace, for six or seven hours, taking care to stir it from time to time with an iron hook; the oxyd becomes white, and is more oxydated: in this state it is called *putty of tin*; and is used for polishing looking-glasses, steel, and other hard bodies. If it be exposed to an exceeding strong heat, it melts into glass, which shews the prismatic rays. This oxyd may be decomposed by the addition of animal or vegetable combustible matters, as grease, soap, &c. but not without difficulty.

Tin heated by the blow-pipe, and thrown immediately on the ground, or on a stone, appears sparkling. It resists the action of the air extremely well; its surface becomes a little tarnished, and covered with a greyish powder, which is merely superficial, and never penetrates into the metal.

To phosphorate tin, take equal parts of tin and phosphoric glass, with one-eighth of charcoal; mix them carefully, and melt them in a crucible; some grains of metal, pretty large, will be obtained, which appear like tin; but, when melted under a blow-pipe, the phosphorus will be seen to quit the tin, and to burn at the surface of the metal. Care must be taken in the management of the fire, when tin is to be melted with charcoal-dust and phosphoric glass, because the phosphorus readily quits the metal.

Tin may be easily combined with sulphur, by throwing one or two parts of sulphur in powder, on five or six parts of tin melted in an iron ladle; the mixture, being agitated with an iron spatula, becomes black, and takes fire. If it be melted in a crucible, a brittle mass, disposed in flat needles united together, is obtained. To unite arsenic with tin, put into a retort three parts of tin with one-eighth part of arsenic in powder; fit on a receiver, and heat the retort to redness; very little arsenic rises, and a metallic lump is found at the bottom: this mixture contains about one-fifteenth part of arsenic; it crystallizes in large facets, very brittle, and hard to melt. The arseniat of potash combines much better with tin: Melt equal parts of tin and arseniat of potash in a crucible; the product is a rough lump, brittle, and composed of very brilliant facets. The tin, thus united to arsenic, will not melt under a red heat.

Cronstedt affirms, that nickel united to tin forms a white and brilliant mass, which, when calcined under a muffle, rises in a white oxyd under the form of a vegetation. One-half part of melted tin with two parts of cobalt, and the same quantity of muriat of soda, furnished Baumé with an alloy in small close grains of a light violet colour. From equal parts of tin and bismuth, by fusion, Gellert obtained a very brittle alloy, of a medium colour between those metals, presenting cubic facets in its fracture: but all the bismuth does not mix with the tin, a small part is lost.

Antimony, united to this metal, affords, according to Gellert, a white and very brittle metal, whose specific gravity is less than that of the two metallic substances taken separately. Zink unites perfectly with tin, and produces a hard metal of a close-grained fracture, and more ductile in proportion as the quantity of tin is larger.

Mercury dissolves tin with great facility, and in all proportions. To make this combination, heated mercury is poured on melted tin; the amalgam produced differs in solidity according to the relative doses of these two metallic substances.

An amalgam was formerly made with four parts of tin, and one of mercury, which were cast into balls that became solid in cooling; these balls were suspended in water for the purpose of purifying it. An operation somewhat similar to this is used in silvering looking-glasses: a mixture of tin and mercury is applied, which amalgamates immediately.

Cold water has but little action upon tin, but it tarnishes its surface in time; the well-water of Paris has this property in a peculiar degree.

Tin dissolves in the sulphuric acid, whether concentrated or diluted with water: when concentrated, according to Kunckel, it dissolves half its weight of tin.

The solution is performed very well by the assistance of heat. Sulphureous gas, of a very penetrating smell, is disengaged, without any apparent effervescence or motion,

tion. Sulphuric acid diluted with a small quantity of water, acts likewise on tin; but the solution is more permanent, and affords a less abundant precipitate, on the addition of more water. In this combination the tin seizes the oxygen of the sulphuric acid, in such quantities that sulphur is very suddenly formed. This substance gives the solution a brown colour while it is warm, and is precipitated as soon as it becomes cold. When the solution is more strongly heated, the tin is precipitated in the form of a white oxyd. The same phenomenon takes place without the assistance of heat, though in a much longer time. Tin dissolved in the sulphuric acid is very caustic. Monnet, by cooling, obtained crystals similar to calcareous sulphat, or fine needles, intermixed with each other. The oxyd of tin precipitated from its solution by standing, or by heat, is soluble in the sulphuric acid. If the sulphuric solution of tin be evaporated to dryness, the oxyd it affords is of a grey colour, very difficult of reduction, and no longer soluble in the acid. Alkalis precipitate tin from the sulphuric acid, in the form of a very white oxyd.

Nitric acid is decomposed by tin, even in the cold, with a singular degree of rapidity. This solution is one of the most striking and rapid among chemical phenomena. It appears that tin has a very strong tendency to unite with the oxygen of the nitric acid; and as azot is far from adhering as strongly to the oxygen in this acid, as sulphur to the same principle in the sulphuric acid, it is not surprising that the decomposition of the former by tin should be much quicker than that of the latter by the same metal. Morveau has observed, that, in a solution of tin by the nitric acid, no gas is disengaged, but that ammoniac is formed. We see, therefore, that the tin not only decomposes the nitric acid, but likewise the water, since it can only be the hydrogen of the water, which, uniting to the azot of the nitric acid, forms the ammoniac produced in this operation. The tin is converted into a white oxyd, which Macquer in vain attempted to reduce. The metal in this state appears to be supersaturated with oxygen. The nitric acid holds but a very small quantity of the metal in solution; and when evaporated with the intention of obtaining crystals, the dissolved portion quickly precipitates, and the acid remains nearly in a state of purity. Bucquet however affirms, that a nitrat of tin, whose form he has not determined, may be obtained from this solution; it is very deliquescent. He likewise asserts, that if the oxyd of tin, produced by the decomposition of the nitric acid, be washed with water, the fluid dissolves a small quantity of the nitrat of tin, which may be obtained by evaporation. The nitric acid retains a somewhat larger quantity of tin in solution, when it is used in a very diluted state; but it let its fail by standing, or by the application of heat. Bayen and Charlard, in their valuable inquiries concerning tin, have discovered, that when the nitric acid is charged with all the tin it can oxydate, so as to become thick and incapable of acting on new portions of the metal, a stanno-nitrous salt is obtained, by washing the mass with a large quantity of distilled water, and evaporating the water to dryness, which salt detonates alone in a heated vessel, and burns with a white and dense flame, like that of phosphorus. This salt is not a nitrat of tin, but a kind of triple salt or nitrat of ammoniac and tin. Distilled in a retort, it swells up, boils, and instantly fills the receiver with a white thick vapour of a nitrous smell.

The fuming muriatic acid acts strongly on tin, and dissolves it by the help of a gentle heat, and even in the cold, instantly losing its colour and property of emitting fumes. The very slight effervescence which takes place in this combination disengages a fetid inflammable gas from the mixture, not at all resembling the smell of arsenic, as some chemists have affirmed. The water is therefore decomposed by the tin with the assistance of the acid. The muriatic acid dissolves more than half its weight of tin; the solution is yellowish, of a very fetid smell, and does not afford a precipitate of oxyd of the tin like two last mentioned acids. By evaporation it affords brilliant and very regularly formed needles, which attract the humidity of the air. If this salt be distilled in a retort, with a receiver adapted, the water of crystallization will first appear, then some super-oxygenated muriat of tin will be volatilized, and an oxyd of tin remains in the retort. If to a recent solution of muriat of tin, be added a solution of gold, a purple precipitate is formed, known by the name of *precipitate of Cassius*; but the precipitation will not take place if the oxygenated muriat of tin be used instead of the common muriat.

Oxygenated muriatic acid dissolves tin very readily, and without sensible effervescence, because that metal quickly absorbs the superabundant oxygen from the acid, and does not require any decomposition of the water to effect its oxydation. The solution has then all the characters of the preceding. If a muriatic solution of tin be left in contact with air, it becomes oxygenated; the same effect takes place with the red oxyd of mercury, and the oxygenated muriat of mercury.

Nitro-muriatic acid, made with two parts of nitric acid and one of muriatic acid, dissolves tin with effervescence. A strong heat is excited, which must be checked by plunging the mixture into cold water. To form a permanent solution of tin in this mixed acid, the metal must be added by small portions at a time, one portion being suffered entirely to disappear before a succeeding one be added; if the whole were added at once, great part of the metal would be oxydated. Aqua regia, by this management, will dissolve half its weight of tin. The solution is of a reddish brown, nearly transparent, and frequently, in a few seconds, becomes converted into a tremulous jelly, of the appearance of rosin. Sometimes it becomes concrete, on the addition of half its weight of water, though it was perfectly fluid before; but the jelly formed by the addition of water is of an opal colour, because, according to the remark of Macquer, the solution itself being decomposable by water, a portion of the oxyd of tin is precipitated, and destroys the transparency of the jelly.

Tin decomposes the corrosive mercurial muriat. To effect this, the tin is first divided by the addition of a small portion of mercury; equal parts of this amalgam, and the corrosive mercurial muriat, are triturated together, and the mixture exposed to distillation in a glass retort, by a very gentle heat. A colourless liquor first passes over, and is followed by a thick white vapour, which issues with a kind of explosion, and covers the internal surface of the receiver with a very thin crust. The vapour becomes condensed into a transparent liquor, which continually emits a thick, white, and very abundant, fume. It is called the *fuming liquor of Libavius*, and is the combination of the muriatic acid and tin, the acid appearing to be supersaturated with oxygen. Adet, who read a memoir to the Academy upon *the fuming liquor of Libavius*, has shown, 1. That the effervescence, which takes place as often as it is mixed with water, depends on the disengagement of an elastic fluid, which possesses all the properties of azotic gas. 2. That the fuming liquor, combined with water, in the proportion of seven to twenty-two, forms a solid body, which melts by the action of heat, congeals by cold, and resembles the oxygenated muriat of tin, or *butter of tin*. 3. That the fuming liquor, diluted with water, dissolves tin without the disengagement of hydrogen gas, and affords a salt similar to that which is obtained by the direct combination of the muriatic acid and tin. He concludes, from his various experiments, that the fuming liquor is nothing else but a compound of the muriatic acid in the aeriform state, and the oxyd of tin in which oxygen predominates; and that this salt is the same, with respect to the common muriat of tin, as the oxygenated muriat of mercury is to the muriat of mercury, or *mercurius dulcis*.

The

The residue of the distillation of the *fuming liquor of Libavius*, exhibits phenomena equally interesting with those of the liquor itself. The upper part and the neck of the retort are covered with a light, white, and greyish, crust, which, according to the experiments of Roueile the younger, contains a small quantity of the fuming liquor, concrete muriat of tin, or corneous tin, mercurial muriat, and running mercury; the bottom of the vessel contains an amalgam of mercury and tin, above which is a corneous tin of a light grey, solid and compact, which may be volatilized by a stronger heat.

Fluoric acid dissolves the oxyds of tin, and forms with it a gelatinous mass, the properties of which are but little known. The boracic acid dissolves tin by boiling in water, and shoots with it into small irregular granular crystals. In the fire this salt melts into an opake grey slag. Phosphoric acid combines by the assistance of heat with tin, and forms with it a salt difficultly soluble in water. Phosphat of tin is easily changed into a glass like substance in the fire. Phosphoric acid precipitates tin from its solution in aqua regia; but the affinity of this compared with the other acids is not known. Pure tartaric acid has no perceptible action on tin; but a solution of tartarit of potash boiled with water and tin dissolves a considerable quantity of this metal, and forms with it an easily soluble, permanent, needle-shaped salt. Tin dissolved by heat in oxalic acid at first becomes black, and is afterwards covered with a grey powder. An elastic fluid is disengaged, which does not appear to have been examined. The solution has an austere taste, and affords, by evaporation, prismatic crystals. By quick evaporation a horny-like mass is formed, which gives a copious precipitate with alkalis. Oxyd of tin dissolves easily in oxalic acid. The oxalat of tin has always an excess of acid, and is difficultly soluble in water. Acetic acid dissolves tin only in a small quantity. The solution, which has a metallic taste, soon becomes muddy, and deposits a white oxyd. This combination does not crystallize. The oxyd of tin dissolves readily in acetic acid. If spirit of wine be added to this solution after it has been evaporated to the consistence of a syrup, crystals of acetat of tin are obtained, which are hard, heavy, white, transparent, and tasteless. This salt is decomposed by the sulphuric, muriatic, and nitric, acids, and by fire. The citrat and malat of tin are unknown. The benzoic acid, according to Trommsdorff, acts directly neither on tin nor its oxyd; but benzoat of potash is said to decompose the muriat of tin, and to form with the tin a salt difficultly soluble even in boiling water. Prussiat of potash precipitates tin white from its solution in muriatic acid. The precipitate by the gallic acid is of a white grey colour.

An oxyd of tin is prepared with three parts of putty of tin, and six parts of nitrat of potash: Put this mixture into a crucible, and keep it over a strong fire for four hours: let it cool, and wash it to separate the oxyd of tin; then take six parts of this oxyd of tin, and mix with four parts of sulphur; put this mixture into a wide crucible, which is to be only one-third full; introduce an earthen cover, sloped off so that it may go into the crucible, and leave a hollow of only about eight lines above the contents of the crucible; then lute on a proper head over the crucible. Put the crucible, thus secured, into a larger, which is to contain some sand also; thus the crucible containing the mixture, which is to form what is called *musive gold*, is in a sand-bath. Place the apparatus immediately over the grate of a common furnace, and raise the fire with care. In general, for the formation of fine musive gold, it must be prepared with a gentle heat, long continued: the degree of heat necessary to sublime muriat of ammoniac is what is required here, and it should be kept up for eight or ten hours: it will be no detriment to continue the fire even a longer time, provided it be not increased; for, with this degree of heat, the musive gold will not be decomposed. The addition of a little water to the mixtures will make the operation succeed the better. Or, the experiment may be performed in a glass retort: distil the mixture with a gentle heat; a very small quantity of sulphur will be sublimed, a little sulphureous gas will be produced, and the musive gold will be found in the retort.

The following is another process for obtaining musive gold: Make an amalgam with equal parts of tin and mercury. First heat a copper mortar, and put the mercury therein; when it has acquired a certain degree of heat, pour in the melted tin; agitate and triturate the mixture till it becomes cold; then mix with it six parts of sulphur, and four of ammoniacal muriat. Put the whole into a matrass, and place it on a sand-bath, and heat it so as to make the bottom of the matrass of a dull red; keep up the fire for three hours. This process produces commonly very fine musive gold. But if, instead of placing the matrass on a sand-bath, it be put directly on the coals, and the fire be made fierce, the mixture will take fire, and the musive gold will be sublimed in the neck of the retort.

Pelletier obtained a very beautiful musive gold by distilling together equal parts of mercury, muriat of ammoniac, tin, and sulphur. The explanation which this chemist gives of the different changes which occur in this complicated process is so extremely happy, that we cannot do better than place the whole of it immediately under the eye of the reader. "The previous rubbing with the mercury helps to oxydate the tin. A disengagement of hydrogen gas is produced by the re-action of the muriat of ammoniac on the tin. The oxyd of tin which is formed decomposes the muriat of ammoniac, and the disengaged ammoniac, uniting with the sulphur, passes over into the receiver in the form of an ammoniacal sulphure. The muriatic acid unites with the oxyd of tin, and forms with it muriat of tin, a very small portion of which passes over in distillation; the other portion is afterwards decomposed by the action of the fire, while the oxyd of tin which remains unites with the sulphur to form the musive gold. The muriatic acid, which is volatilized, meeting with the ammoniac, combines with it, and produces muriat of ammoniac. In this process there is a portion of tin which has been simply oxydated, and which in this state unites with the sulphur to form musive gold. There is also a portion of muriat of ammoniac which escapes decomposition, and which of course is sublimed. The mercury combines with the sulphur, and forms with it the sulphure of mercury, which passes over during distillation. A small portion of musive gold, in beautiful plates, is sometimes found in the upper part of the vessel in which the sublimation is performed. The muriat of ammoniac, in being volatilized, carries along with it a small portion of the oxyd of tin; and it is this portion of oxyd which in the moment of volatilization unites to the sulphur it meets with in a state of vapour, and forms with it the musive gold that is attached to the upper part of the vessel. It is very necessary in this process to be cautious in the management of the fire; for, if this be raised too high, sulphureous acid gas will pass over towards the end of the operation, and, instead of musive gold, a black-coloured metallic substance, or common sulphure of tin, will be obtained." The different parts of this explanation will be fully illustrated by the following experiments.

Six hundred grains of sulphur being added to a solution of six hundred grains of tin in four ounces of muriatic acid, and evaporated by a gentle heat, a concrete substance was obtained. During the evaporation, copious vapours of muriatic acid were disengaged. This concrete substance being reduced to a powder, was put into a retort, and exposed to a strong heat. Concrete muriat of tin, and afterwards a little sulphur, were sublimed into the neck of the retort. The residue was musive gold, of a beautiful colour.

A mixture of equal parts of tin-filings, sulphur, and muriat

muriat of ammoniac, afford by distillation a sulphure of ammoniac, sulphurated hydrogen gas, a little sulphur, and muriat of ammoniac. In this process the muriat of ammoniac is decomposed by the tin, and the disengaged ammoniac unites with the sulphur, and forms the sulphure of ammoniac. The muriatic acid unites with the tin, and disengages the hydrogen gas, which, in being volatilized, carries along with it a small portion of sulphur, and forms with it the sulphurated hydrogen gas. The muriat of tin is afterwards decomposed by the fire: the disengaged acid finding again the ammoniac, re-produces the muriat of ammoniac, while the oxyd of tin remaining fixed, unites with the sulphur to form musive gold.

The frequent failure which artists experience in the process for making musive gold, appearing to Pelletier to depend on the too great degree of heat which they employ, he was induced to try the following experiment: Sulphur was added in different portions to one hundred ounces of melted tin, till the tin appeared to be saturated with it. By each addition, the metal seemed to become less fusible. When cooled, the mass weighed 116 ounces and a half. Equal parts of this mass reduced to powder, and muriat of ammoniac, were distilled together in a heated retort. A small portion of ammoniac was disengaged, some drops of sulphure of ammoniac came over; and, lastly, muriat of ammoniac was sublimed into the neck of the retort. The residue was a black iridescent mass, resembling some species of pyrites. To the ingredients of the former mixture, an equal portion of sulphur was added, and the whole subjected to distillation. The products were, sulphurated hydrogen gas, sulphat of ammoniac, a little sulphur, and muriat of ammoniac, having a yellow colour. The residue was musive gold. In this experiment the ammoniac disengaged from the muriatic acid finds a portion of uncombined sulphur with which it unites, and forms the sulphure of ammoniac. The oxyd and muriat of tin which are formed also uncombined, find sulphur; so that the oxyd of tin is eventually fully saturated with sulphur.

Three ounces of sulphure of tin were distilled with three ounces of the oxygenated muriat of mercury. White vapours were disengaged, muriat of tin was sublimed into the neck of the retort, and fluid mercury passed over into the receiver. The residue, a very beautiful musive gold, weighed two ounces and a half. Muriat of tin, in this process, was volatilized, because the quantity of sulphur contained in the sulphure of tin was not sufficient to saturate the whole of the oxyd which had been produced. Perhaps, by diminishing the quantity of oxygenated muriat of mercury, or by adding a little more of the sulphur, it may be possible to prevent altogether the loss which arises from the volatilization of the muriat of tin.

A mixture of equal parts of muriat of tin and red oxyd of mercury, by the nitric acid, were distilled together. Fluid mercury came over into the receiver, and the residue consisted of a mixture of musive gold and undecomposed sulphure of tin.

Six hundred grains of sulphure of tin were distilled with six hundred grains of cinnabar, or the sulphurated oxyd of mercury. Fluid mercury passed over into the receiver; the residue in the retort was musive gold. In this process, the oxygen of the mercury united with the tin to form the oxyd of tin, while this retained not only the sulphur with which it was formerly combined, but also that which had been imparted to it by the sulphure of mercury. But as sulphure of mercury contains twenty per cent. of sulphur, and sulphure of tin from fifteen to twenty, musive gold must necessarily contain from thirty-five to forty per cent. of that substance.

Equal parts of sulphur and oxyd of tin, precipitated from its solution in muriatic acid, were distilled together. Sulphureous acid gas was disengaged, and some sulphur sublimed into the neck of the retort. The residue was musive gold. Similar productions were obtained with an oxyd of tin from the nitric acid.

Sulphat of ammoniac was added to a solution of tin in muriatic acid. A reddish precipitate was formed, which assumed a black colour by drying it. Distilled in a gentle heat, this precipitate gave out a little ammoniac: the residue was musive gold. In this process, the muriatic acid quits the oxyd of tin, to unite with the ammoniac acid, and the oxyd of tin, in its turn, seizes on the sulphur it finds in a state of perfect division, to form musive gold. This last requires only to be heated, in order to exhibit its peculiar colour. It is to be observed, that in this instance the musive gold seems to have been formed in the humid way.

A solution of tin in the muriatic acid was precipitated by a solution of sulphure of potash. The precipitate was of a dark colour, approaching to yellow. By distillation, sulphureous acid was disengaged, and a little sulphur sublimed into the neck of the retort: the residue was musive gold. This, therefore, may be considered as another instance of the formation of this substance in the humid way.

Musive gold was subjected to distillation in a strong heat; a considerable quantity of sulphureous acid gas was disengaged, and some sulphur sublimed into the neck of the retort; the residue was a black shining metallic mass. It seems almost superfluous to remark, that the sulphureous acid gas must have been formed by the combination of a portion of the sulphur with the oxygen of the oxyd of tin. The change which takes place in this experiment, in the order of the affinities, is to be attributed in this, as in many other instances, to a difference in the degree of temperature.

Two hundred grains of charcoal in powder, with 600 of musive gold, were introduced into a retort, and placed in a reverberatory furnace, and the neck of the retort connected with a chemical pneumatic apparatus. By keeping the mixture in a red-heat for three hours, about 100 cubic inches of an elastic fluid were disengaged. The first portion of this gas which passed over, seemed to be carbonic acid, containing about 1-100th of sulphurated hydrogen. This gas had also volatilized, and held as it were in solution, a large quantity of sulphur, which was afterwards deposited on the surface of the water, by which the gas was absorbed. The gas disengaged towards the end of the process contained a greater quantity of sulphurated hydrogen, till at last bubbles of pure hydrogen gas were evolved: the residue was a sulphure of tin divided by charcoal.

Six hundred grains of musive gold were digested for some hours in muriatic acid, but the colour remained unchanged. After being filtered and dried, it weighed still 580 grains. The twenty grains that disappeared were probably a sulphure which had been mixed with the musive gold; for, when this substance was digested a second time with muriatic acid, no loss of weight could be perceived. From these experiments it appears clearly, that tin, whether in its native state, or amalgamated with mercury, or combined with sulphur, is uniformly oxydated during the production of musive gold.

This preparation is used for colouring bronze, and to increase the power of the electric machine, by rubbing the cushions with it. Instead of this, says La Grange, "I have often seen used a substance which is collected in fine powder from the pedicles between the branches of the *licopodium*."

Potash seems to have but little action with tin; but this preparation has not been thoroughly examined. It is the same with ammoniac; it is known only that the metal is attacked by that saline substance, tarnishing its surface, and presenting rainbow-colours.

Earthy matters contract no union with this metal. Its oxyd, which is very infusible, does not form a transparent nor coloured glass with vitrifying substances; but, as it is exceedingly white, it renders the glass of a very opake

opake white colour, by its interposition between the transparent parts. This kind of vitreous frit is called *enamel*. Putty of tin, on account of its infusibility, deprives all glasses of their transparency, and converts them into coloured enamels. The sulphats of potash and soda are decomposed by tin. Equal parts of sulphat of potash and tin being heated in a crucible, afford a greenish melted mass, which no longer exhibits any metal, and is a true sulphure of tin. The tin deprives the sulphuric acid of its oxygen; the sulphur disengaged by this decomposition combines with the potash, and this sulphure dissolves a portion of the oxyd of tin.

This metal causes nitre to detonate with rapidity. For this purpose it is melted, and made obscurely red-hot in a crucible. Dry nitre in powder being then thrown in, produces a white and brilliant flame. Add a fresh quantity of nitre, till there is no longer any detonation. Then take the crucible off the fire, and separate its contents; wash in water, and filtre the liquor, which will be found to contain the potash of the nitrat, and there remains oxyd of tin, which contains a little alkali rendered caustic by the tin. It should therefore be well washed; and, by the addition of an acid, all the oxyd of tin may be precipitated.

The muriat of ammoniac is also decomposed by tin: Take of granulated tin, and of ammoniacal muriat in powder, nearly equal quantities; put the mixture into a retort, and adapt a receiver, with the mercurial pneumatic apparatus; as soon as the retort is heated, caustic ammoniac is disengaged in the state of gas. The residue of the decomposition is a solid muriat of tin, decomposable by water, and similar to that which is formed by this metal with corrosive muriat of mercury.

The uses of tin are very numerous. It is applied to many purposes in the arts, in forming many vessels, organ pipes, decorations, &c. Bell metal, and bronze for statues, are compounds of this metal, with copper. The pewterers mix tin with bismuth, antimony, lead, and copper, to make utensils of all sorts, which are very subject to change by exposure to air. Tin is melted with oxyd of lead and sand, to make enamel, as well as to glaze pottery, &c. The crystallized muriat of tin is useful in the art of calico printing. Its solution in aqua regia, or nitro-muriatic acid, heightens the tincture of cochineal, of gum lac, &c. so as to convert it into the most lively fire colour. The dyers make use of this solution, which they call composition, to make scarlet. When it is mixed in the dyers bath, it forms a precipitate, which carries down the colouring matter, and deposits it on the stuff which is to be dyed. This observation is due to Macquer, whose labours have greatly improved this art.

Many physicians, who have directed their attention to metallic substances, considered as medicines, have acknowledged the innocence of tin, and have even advised its filings to be taken in substance in disorders of the liver, of the matrix, and for worms. Schulz, in his dissertation on the use of Metallic Vessels, in the preparation of food and medicines, recommends pure tin as very wholesome. La Poterie prescribes oxyd of tin as one of the component parts of a preparation called antihectic, which consists of oxyds of antimony and tin, formed by detonation with nitre; the alkali, which the water dissolves, always retains a portion of the metallic oxyd. Tin is recommended as a vermifuge. Some people are in the habit of infusing sweet wine for four hours in the cold, in a tin vessel, and giving a glass of this liquor to their children who are troubled with worms. It acts as a violent purgative.

OF LEAD.

The ores of lead are found in lumps and in furrows, in mountains, soils, and rocks, and in stones of all ages and kinds: its most ordinary gangues are, quartz, heavy spar, calcareous spars, fluor, clay, schistus, &c. sometimes mixed with sulphure of iron, zink, calcedony, and even with jasper. Lead has little hardness, and still less elasticity; it is the sweetest of metals, having a peculiar smell perceptible on rubbing, which arises from a beginning of oxydation; the same may be said of its taste. The softness of lead occasions it to be so little sonorous. To this metal the alchemists gave the name of *Saturn*. Its cohesion is manifest by the adhesion of its parts recently divided, as soon as brought into contact: it is indeed the only metal which can be brought perfectly in contact: if a leaden bullet be cut in two, and the parts immediately put close together, they will adhere very strongly. It easily extends under the hammer, and may be reduced into plates or leaves thinner than paper. To obtain it in grains, it must be melted, and then triturated in an iron mortar.

Lead, exposed to heat, melts long before it becomes ignited. The heat necessary to hold it in fusion, is so inconsiderable, that the hand may be plunged in it when melted without pain; and in this state it does not burn vegetable substances. It is said to melt at 540° of Fahrenheit. If it be suffered to cool very slowly after being melted, and the melted portion be poured off from that which is become solid, it is found to be crystallized in quadrangular pyramids. When melted with the contact of air, it soon becomes covered with a grey and dull pellicle; this pellicle is carefully taken off, and reduced by agitation into an oxyd of a greenish grey, verging towards yellow. When separated by the sieve from the grains of lead with which it is mixed, and afterwards exposed to a more violent red heat, it becomes of a deep yellow, and in this state is named *massicot*. This last, slowly heated by a gentle fire, assumes a beautiful red colour, and is known by the name of *minium*. If massicot be strongly heated, so as to produce a semi-vitrification, its parts agglutinate in little thin scales, which preserve their red colour, but not so bright: this oxyd takes the name of *litharge of gold*, and *litharge of silver* when the colour is paler. This composition is never made on purpose: that which is found in the shops is either procured from the purifying of gold and silver in the large way, or from the works for converting lead into litharge. If red oxyd, or litharge, be exposed to heat in a crucible, it will melt, but not so easily as lead, and is converted into glass; which glass is so fusible, that it penetrates the crucible, and escapes. To avoid this inconvenience, add one part of sand to three parts of the oxyd; put the mixture into a good crucible, place it on the muffle of a furnace, and keep it to a white heat for two or three hours, or till it melts; a fine amber-coloured glass will be produced.

All the oxyds, and even the glasses, of lead, are easily decomposed by combustible bodies. For this purpose it is sufficient to mix them with charcoal, soot, grease, oil, resin, or, in a word, any inflammable substance whatever, and to heat them for a certain time, in order to obtain a button of lead. This reduction may be made either in a crucible, or with charcoal under the blow-pipe.

Hydrogen gas tinges the surface of lead with rainbow colours; it even revives the oxyds of lead. If the red oxyd of lead be put in contact with this gas, it becomes black and dull.

Lead mixed with sulphur produces a true sulphure: Melt three parts of lead and one of sulphur in an iron ladle; stir the mixture; the sulphur quickly combines with the lead, and converts it into a black powder of a scaly texture. If this be put into a crucible, it will not melt at less than a red heat; and the result then is a black, brittle, fragile, mass, disposed in facets; this is sulphure of lead, or *artificial galena*.

Phosphorus enters into fusion with lead: Melt in a crucible equal parts of lead filings and phosphoric glass, with one-eighth part of charcoal: the product appears very little different from lead; it is malleable, easily cut with

with a knife, but loses its brilliancy sooner than lead; and, when melted with the blow pipe upon a coal, the phosphorus burns, and quits the lead.

The alloy of lead with arsenic has not been examined. Nickel, manganese, cobalt, and zink, do not unite with lead by fusion. Antimony forms a brittle alloy with some brilliant facets, similar in texture and colour to iron or steel, according to the proportions of the mixture, and of a specific gravity more considerable than the two metallic substances, separately taken, would compose. Lead also combines with bismuth, and affords a metal of a fine and close grain, which is very brittle. Mercury dissolves lead with the greatest facility; this amalgam is made by pouring hot mercury into melted lead. It is white and brilliant, and becomes solid at the end of a certain time. Lead unites very easily by fusion with tin. Two parts of lead, and one of tin, form an alloy more fusible than either of the metals taken separately, and constitutes the solder of the plumbers. Eight parts of bismuth, five of lead, and three of tin, compose an alloy so fusible, that the heat of boiling water is sufficient to melt it. Tin and lead melted together, become reciprocally oxydated: these two oxyds compounded together form the basis of different enamels, and the glasing of delft-ware. The usual way is to calcine one hundred parts of lead and thirty of tin in an oven; mix the oxyds with one hundred parts of sand and thirty of potash: melt this mixture, and the product will be a white opake glass, called *white enamel*. This enamel may be coloured at pleasure by means of the metallic oxyds.

Lead is not altered by pure water, because the principles of the water are not separated by that metal; yet the internal parts of lead pipes which conduct water are covered with a whitish crust, or a kind of *ceruse*, which doubtless is produced by the action of the different substances contained in the water on this metallic substance. Mr. Luzuriaga has observed, that by agitating granulated lead in a small quantity of water, with the contact of air, the metal becomes quickly oxydated.

This metal is soluble in all the acids; but concentrated sulphuric acid does not attack it, except it be boiling, and the lead be in small pieces. In this process sulphureous acid gas passes over. When most of the acid is decomposed, the mixture is white and dry, and separates into two portions, on being washed with distilled water. The most considerable part is insoluble in water, and is an oxyd of lead containing a little sulphuric acid, formed by the oxygen which the metal has taken from the acid during the time of the disengagement of the sulphureous gas. The other portion, soluble by water, is a combination of sulphuric acid and oxyd of lead; this solution, by evaporation, affords small needles of sulphat of lead. It is decomposed by fire alone, and also by lime and alkalis, and then becomes a sulphure. The nitric acid appears to act very strongly on lead: Pour into a matrass two parts of weak nitric acid upon one of lead-filings; place the matrass on a warm sand-bath: the nitric acid dissolves the lead, and, during the solution a grey powder is precipitated, which Grosse took to be mercury; but Baumé affirms that this matter is nothing but a portion of the oxyd of lead. This solution does not afford a precipitate on the addition of water. Its crystals, obtained by cooling, are of an opake white, in the form of flat triangles, whose angles are truncated; the same solution, by a slow evaporation of several months, affords crystals, the largest one inch in thickness, of the form of hexahedral pyramids, whose three faces are alternately large and small, and whose point is truncated, so that each crystal is an eight-sided solid. The nitrat of lead decrepitates in the fire, and melts with a yellowish flame when laid on ignited charcoal. The oxyd, which is at first yellow, becomes quickly reduced into globules of lead. If this salt be distilled in close vessels with a strong heat, it gives out a considerable quantity of oxygen gas. Mixed with inflammable substances, it detonates in the fire, and has, on that account, been termed *fulminating lead*. This salt is decomposable by lime and alkalis. The sulphuric acid, though it acts but feebly on lead, has nevertheless a stronger affinity to the oxyd of this metal than the nitric acid. If pure sulphuric acid, or any neutral, earthy, or alkaline sulphuric salt, be added to a nitric solution of lead, a white precipitate is formed in a very short time: this precipitation takes place, because the sulphuric acid, seizing the oxyd of lead, forms with it sulphat of lead, similar to that which is prepared by the immediate combination of the sulphuric acid with that metal.

The pure muriatic acid, by the assistance of heat, oxydates lead, and dissolves part of its oxyd; but it is difficult to saturate it completely. This metal becomes more readily and intimately combined with the muriatic acid, by adding the acid itself, or the acid united with an alkaline or earthy base, to a solution of nitrat of lead. A white precipitate is immediately formed, which is much more abundant than that produced by the sulphuric acid, and resembles a coagulum. It is a combination of the oxyd of lead with the muriatic acid, which has separated the oxyd of this metal from the nitric acid. This salt falls down, because it is much less soluble in water than nitrat of lead; if it be exposed to heat, it gives out vapours, whose taste resembles sugar, and melts into a brown mass, called *corneous lead*. It is soluble in thirty times its weight of boiling water. The solution of this salt by evaporation crystallizes into small, fine, and brilliant needles, which form bundles, or unite by one of their extremities in an obtuse angle. This salt has a sweetish taste; it melts easily, and in cooling takes the shape of a *horn*, whence the name *corneous lead*, though Fourcroy gives a different interpretation; it may then be cut and flatted; lime and alkalis decompose it.

The oxygenated muriatic acid dissolves lead; if added in a certain proportion, the solution becomes red: thus may be obtained a super-oxygenated muriat of lead.

Phosphoric acid combines with the oxyd of lead, but not with the metal. Boracic acid will not attack lead; but a borat may be formed by decomposing nitrat of lead; it may be obtained also by means of its oxyds. Fluoric acid has some action on lead, but the effect is much stronger on the oxyds. The oxyds of lead seem to have a strong attraction for carbonic acid; but this acid does not dissolve lead either in its metallic or oxydated state.

Oxyd of lead unites with silex. The same oxyd, added to common glass, does not alter its transparency, but gives it a greater degree of weight, and more especially a kind of unctuousness, which renders it capable of being cut and polished more easily without breaking. This glass is very proper to form achromatic lenses; but it is subject to veins, and to have a gelatinous aspect. It is called *flint glass*.

Lead is oxydated by nitrat of potash, or nitre. With this neutral salt in powder is thrown on the melted metal in a low red heat, it excites scarcely any detonation or apparent flame, though the lead is oxydated and vitrified by the alkali of nitre, and takes the form of small yellowish scales, similar to *litharge*. Lead decomposes ammoniacal muriat by the assistance of heat. For this purpose, take two parts of muriat of ammoniac in powder, and two or three parts of red oxyd of lead: put the mixture into a stone retort, and place it in a reverberating furnace; adapt a balloon to the neck of the retort, and from this must go a tube, which is to be plunged into a Woulfe's bottle, containing a quantity of water equal to the muriat of ammoniac; lute the joinings, and proceed to distillation with a gradual fire, which must be increased towards the end of the operation, so as to make the retort red-hot. Very pure and very caustic ammoniac passes over; when no more ammoniac comes over, the operation is ended. The mass which remains in the retort after the decomposition is muriat of lead, which melts

melts by a moderate heat into corneous lead, and is totally soluble in water. This mass was employed by Margraaf in the process for making the phosphorus of urine. The red oxyd of lead acts in the same manner with muriat of ammoniac in the cold; for, as soon as the mixture is made, the ammoniac begins to come over.

The semi-vitreous oxyd of lead decomposes muriat of soda: Take four parts of this oxyd and one of muriat of soda; reduce the oxyd to powder, and dissolve the muriat in four times its weight of water; mix the two substances together into a light paste. Thus let it remain; and, when the surface begins to whiten, work it with a wooden spatula: if it acquires too much solidity, dilute it with fresh quantities of the solution of muriat of soda; if there is not enough of this solution, then use common water. At the end of a few days the decomposition is complete; and the result is a homogeneous paste, very white, without clods. To separate the soda, dilute the paste in a sufficient quantity of boiling water, stirring the mixture continually; for otherwise the paste will clod, and the lixiviation becomes very difficult. Draw off the floating liquor of soda by decantation, and separate the rest of the alkali by filtration and expression with a cloth: then evaporate the liquor in iron vessels, and thus the soda will remain dry. By calcining the other product of this operation, which is muriat of lead, it gives a yellow, strong, bright, colour, which may be successfully used with oil.

Muriat of lead may be decomposed also with sulphuric acid weakened to 25°; a sulphat of lead is the result, very white, and in a state of extreme division and fineness. Wash it in a great deal of water; triturate it very carefully till it gets a certain consistence; then dry it. This white colour may be successfully used in painting, and never grows yellow with oils. The grey oxyd of lead mixed with super-oxygenated muriat of potash, and laid in a heap, will detonate by an electric shock.

Lead is used in a great number of works. It forms a part of many alloys, and is made into pipes for the conveyance of water. Its oxyds are employed in glass-making, and in the preparation of enamels. It is used to imitate the colour of yellow precious stones, and to give fusibility to the glaze of earthen ware. Utensils and vessels proper for economical uses are made with this metal, but not without danger in their use. Fountains, or vessels of lead, in which water is suffered to remain a long time, often communicate a noxious quality to it. Its vapour is dangerous to the workmen who melt it, and its taste is still more dangerous to such as file and scrape it. This metal, lodged in certain parts of the stomach and intestines, produces violent colics, often accompanied with vomiting a very brown bile, and characterized by the flatness of the belly, and sinking of the navel. It has been observed, that, in such cases, antimonial emetics and purges have been attended with great success. Navier advises the different alkaline sulphures in cases of poisoning by the preparations of lead, as well as in such as are produced of arsenic and corrosive mercurial muriat; and it is more particularly in the palsy and tremblings which commonly remain after the *colica pictonum*, or painters colic, that this physician boasts of the good effects of alkaline sulphure and sulphureous waters. At all events, when these facts are duly considered, we ought to avoid the internal use of preparations of lead, and only apply it as an external medicine; and even in this last case it ought not to be administered but with all that care and caution which are required in the use of a strong repellent.

Of IRON.

This metal, called *Mars* by the alchemists, is very abundant in nature, under different modifications. Various terrestrial substances, contain it in the form of grains which may be extracted; and in a still greater number it is a colouring principle. Pure iron is soft, and soft iron is ductile. Cast iron is that which has been separated from its ore, and rendered fusible by a small quantity of charcoal and a certain proportion of oxygen: there are three sorts, black, white, and grey.

Steel is iron, which, after being cast, is become ductile by hammering; then it is made to re-absorb the charcoal it retains, which greatly increases its weight; it acquires another property also, *temper*. The temper does not increase the density of the iron. By touching steel with an acid, there is a black spot, which is not the case with iron. The process for converting iron into steel, is as follows: Short bars of iron are enclosed in an earthen box or vessel, filled with a cement, commonly composed of very combustible matters, such as soot, or the coal of animal matters, animal oil, to which is usually added, ashes, calcined bones, marine salt, or sal-ammoniac. The box, being well closed, is heated for ten or twelve hours, till the bars become white, and are ready to melt. In this operation the iron becomes purified, and is completely reduced by the assistance of the combustible matters with which it is surrounded; the portions which were not perfectly in the metallic state, assume that state; and the phosphure of iron, if it still remains, appears to be entirely decomposed. The iron being softened and dilated, absorbs the charcoal which surrounds it; and hence the steel of cementation is nothing else but a combination of pure and well-reduced iron with charcoal. It differs from iron in containing charcoal, and from cast iron in this, that the crude iron contains not only charcoal, but a greater or less quantity of oxygen. If cast iron be deprived of its oxygen without separating the charcoal, or by giving it a new quantity, steel will be produced without refining the iron. Clouet says a 1-32d part of charcoal is sufficient to convert iron into steel. In a quantity equal to one 1-6th of the iron it affords a steel more fusible and still malleable, but beyond this term it approaches to cast iron, and has not a sufficient degree of tenacity. Steel is much more fusible than iron, for which reason the bars which are converted into steel by cementation, are softened to that degree, that the carbonic acid, which is disengaged in bubbles during the action of heat, forms small blisters, or very sensible cavities, on its surface. This kind of steel is called *blister steel*. The differences of steel depend upon the greater or less reduction of the iron, the quantity of charcoal which it contains, and the more or less sudden cooling it has been subjected to. The quantity of charcoal contained in steel may be ascertained by pouring sulphureous acid over the metal: the iron and the sulphur remain in solution, and the carbure of iron is precipitated; by drying this last salt, the quantity of charcoal will be known, as the proportions of the constituent parts of carbure of iron are well known.

A new method of preparing cast steel has been lately announced in France by Clouet. His process is the following: Take small pieces of iron and place them in a crucible, with a mixture of carbonat of lime and the earth of Hessian crucibles, six parts of the carbonat of lime, and six of this earth, must be employed for twenty parts of iron. The mixture is to be disposed so, that after fusion the iron may be completely covered by it to prevent the iron from coming into contact with the external air. The mixture is then to be gradually heated, and at last exposed to a heat capable of melting iron. If the fire be well kept up, an hour will generally be sufficient to convert two pounds of iron into excellent and exceedingly hard steel, capable of being forged; an advantage not possessed by steel in the common manner. The oxyds of iron are equally susceptible of passing to the state of soft iron, steel, and cast iron, according to the quantity of carbon employed. The black oxyd, the state of which seems to be the most unalterable, becomes iron when treated in the crucible with an equal volume of charcoal dust. By doubling the quantity of the charcoal, steel is formed, and a progressive increase gives it the characters of

of white and grey cast iron. A fifth part only of cast iron is required to convert iron into steel. The iron and the oxyd do not unite intimately. The black oxyd, mixed with one half less of carbon than is necessary for its reduction, gives a soft iron, but not very tenacious, black, and without a granulated fracture. A sixth part of the oxyd brings back common steel to the state of iron, by treating them together, either in the forge or by cementation.

Magnetism is a characteristic of iron; it appears every where, even in stone, in marble, and in bodies where it exists in very small quantities, and is only a colouring principle. In the green marble of Campan it attracts the magnetic needle; in the green marble it does not, though that contains more iron; but in this last it is more oxydated.

Iron has a considerable smell, especially when rubbed or heated. It likewise has a very evident styptic taste, which acts strongly on the animal economy. Next after tin, it is the lightest of metallic substances; a cubical foot of this metal, when forged, weighs 580 pounds. It may be extended into plates by beating; but as it is very hard, and becomes still harder under the hammer, it cannot be made into leaves. Its ductility, when drawn into wire, is much more considerable; very fine wires being made of this substance for musical purposes: this property appears to depend on its tenacity. In fact, iron is the most tenacious of all metals, except gold. An iron wire, of one tenth of an inch in diameter, sustains a weight of 450 pounds without breaking. Another singular property is that of taking fire, or suddenly melting, by the stroke of a flint; a phenomenon to which the poets universally attribute the discovery of fire by the first men. Another property which distinguishes it is, that it is found with manganese in plants and animals, whose fluids it partly colours. It is likewise susceptible of a regular form, or crystallization. If iron-filings be thrown on burning coals, or even through the flame of a taper, it suddenly takes fire, and produces very brilliant sparkles. These are similar to those produced by the stroke of the steel against flint, and if collected on a white paper, they are found to be melted, and resemble a kind of scoriæ. This metal, exposed to the focus of the lens of De Trudaine, suddenly throws out inflamed and burning sparkles. Macquer, who melted steel and iron in this lens, observed, that steel was the most fusible, which arises from its combination with charcoal. Iron melted and suffered to cool slowly, takes a peculiar crystalline form; Mongez described it to be a pyramid of three or four sides.

The blow pipe, with vital air, causes the filings of iron to burn as rapidly as the focus of a lens. If an iron wire turned in a spiral form, and terminated by a small piece of lighted quick match, be plunged into a vessel of vital air, the metal suddenly catches fire, and burns with a very remarkable degree of rapidity and deflagration. In all these fusions, the iron becomes brittle and is oxydated, at the same time that it assumes a black colour. Iron, though very hard and refractory, is very easily calcined or oxydated; when it begins to grow red, it combines with the oxygen, and burns without any apparent flame. A bar of iron kept red hot for a long time, becomes covered with scales, which may be beat off with the hammer. In these, however, the metal is only partly oxydated, since they are attractable by the magnet. A more perfect oxyd of iron is made, by exposing filings of steel, and still more quickly the scales of hammered iron, to heat under a muffle. They are converted into a reddish brown powder, not attractable by the magnet, and called *astringent saffron of Mars*. We call it the *red oxyd of iron*, and the scales the *black oxyd*, or *hammerings*. This last substance contains from twenty to twenty-five per cent. of oxygen; the red oxyd contains from thirty-two to thirty-four.

The purest iron exposed to moist air, soon loses its metallic brilliancy, becomes covered with a pulverulent crust, of a yellow brown colour. This matter is usually called *rust*. Common iron is much more subject to rust than steel; the more this metal is divided, the more rapid is its alteration by exposure to air. In this manner the preparation, known in pharmacy under the name of *aperitive saffron of Mars*, is prepared. Iron-filings are exposed to the air, and moistened with water, by which means they very quickly rust. Then pulverise the filings in an iron mortar; a yellowish dust appears; this is to be separated by sifting through silk, and will be found to be the *saffron of Mars*, or rather a combination of the oxyd of iron with carbonic acid.

Iron may be united with phosphorus: mix equal parts of phosphoric glass and iron in chips, with one-eighth part of charcoal; melt the whole in a crucible, and the button will be found very brittle, white in its fracture, with a striated and granulated appearance; sometimes crystallized in rhomboidal prisms: this is phosphure of iron. If this phosphure be heated with the blow-pipe, it produces a phosphorous flame. The existence of phosphorus in some species of steel, is fully ascertained by the following experiment of Vauquelin; 576 grains of steel filings were dissolved in sulphuric acid, diluted with five parts of water. From this solution, saturated with carbonat of potash, nineteen grains of a white tasteless powder were deposited, completely soluble in muriatic acid. This matter, by boiling it in a solution of caustic soda, assumed a deep red colour, and was greatly diminished in its volume. The liquor being filtered, and mixed with concentrated muriatic acid, gave no sign of effervescence; and formed, before and after its mixture with muriatic acid, a white precipitate, by the addition of lime water. On examination this precipitate was found to be phosphat of lime.

Charcoal unites with iron, forming carbure of iron, or *plumbago*. Carbure of iron is of a shining blue black, of a greasy feel, and tuberculated fracture; it soils the hands, and makes a black trace on paper. It is not altered by fire in close vessels: Pelletier, who has made experimental inquiries on this substance, which confirm the results of Scheele, exposed 200 grains in a porcelain crucible, accurately closed, to the heat of the furnace of the manufactory of Seve; the loss was no more than ten grains. But, when heated with contact of air, it burns, and is oxydated, leaving scarcely any residue. Quist, Gahn, and Hielm, observed, that one hundred grains, treated in this manner, in a muffle, left only ten grains of ferruginous oxyd. This oxydation is a slow combustion, not easily performed. It does not succeed in a common crucible: a thin layer of carbure of iron must be exposed, in a shallow vessel, to the action of a strong fire, and the surfaces must be often renewed, by stirring the matter. It is in this way that the carbure of iron employed to cover stones, &c. is gradually burned.

Air, water, and earthy substances, have no action on carbure of iron. Alkalis act strongly on this substance. If one part of carbure of iron, with two parts of dry caustic fixed alkali, or *lapis causticus*, be exposed to heat in a retort, with the pneumatic apparatus, the small quantity of water contained in the salt is sufficient to favour the combustion: carbonated hydrogen gas is obtained, the alkali is charged with carbonic acid, and the carbure of iron is found to have disappeared. Among the acids, only the muriatic serves to purify it, because this acid dissolves all the substances with which it is combined.

We have seen that iron readily absorbs charcoal by heat, and that it forms *cast iron* and *steel* by its union with this combustible substance; with this difference, however, that it contains oxygen in the former of these compounds, but not in the latter. In both, the quantity of iron greatly exceeds that of the charcoal. Chemical analysis, which is so much indebted to the labours of Scheele, has proved to this chemist, that *plumbago*, a mineral

neral whose nature and rank among other minerals had long embarrassed philosophers, is nothing more than a natural combination of a large proportion of charcoal with a very small quantity of iron. *Plumbago* was a long time confounded with *molybdena*. Both, without distinction, were called *lead ore*, *English crayon*, *plomb de mer*, *black ceruse*, *mica of the painters*, *crayon of lead*, *false galena*, *talc*, *blende*, *potelot*, &c. The native carbure of iron, a name substituted for that of plumbago, as being more expressive of the nature of the compound, is found in mountains, often between beds of quartz, felt spar, clay, or calcareous earth, in the form of roundish irregular pieces, of different magnitudes; the largest of which weigh from eight to ten or eleven pounds; it is likewise found disseminated in much smaller fragments, and sometimes even in beds or strata. La Peyrouse reckons carbure of iron among the minerals of the Pyrenean mountains. It is likewise found in Spain and Germany, and also in the county of Cumberland in England, where it is made into pencils, which are highly esteemed. North America, and the Cape of Good Hope, likewise afford some specimens. Within these few years, plumbago, crystallized in octahedrons, has been discovered.

Iron has a great affinity, or elective attraction, for sulphur; hence this metal decomposes almost all the metallic sulphures. To make sulphure of iron, take two parts of iron-filings, with one part of sulphur; mix, and melt them together in a crucible. Vauquelin conceives this metal to be only an hydro-sulphure, because, by pouring an acid into the mixture, a great quantity of sulphurated hydrogen is disengaged. Or, this artificial sulphure may be made, by applying a small bar of iron, heated to whiteness, to a roll of sulphur; they both melt. This should be done over a vessel of water, that the portion of sulphur not combined with the iron may be immediately extinguished. The combination in the water is found to consist of blackish brittle globules, similar to *pyrites*, and, like them, formed of small slender pyramids, converging to a centre.

Another way: A mixture of iron filings and sulphur in powder, moistened with a small quantity of water, becomes hot in a few hours, at which time it swells up, its parts adhere together, it absorbs the water, breaks with a perceptible noise or crackling, and emits aqueous vapours, attended with a very manifest odour, resembling that of sulphurated hydrogen gas.

All the pyrites, or native sulphure of iron, are easily decomposed. A small degree of heat is sufficient to deprive them of their sulphur. Exposed to the air, the sulphure of iron undergoes a change, especially when damp; it swells, cracks, loses its brightness, and is covered with an efflorescence of a greenish white colour, which is nothing but sulphat of iron. By melting the sulphure of iron, and sprinkling it with muriatic acid, sulphurated hydrogen gas may be obtained by means of the pneumatic apparatus.

Iron combined with arsenic, affords a brittle alloy, very little known. With cobalt it constitutes a mixed metal, close-grained, hard, and difficult to break. Melt in a crucible one half-part of steel-filings, two of cobalt, and two of muriat of soda: the mixture is soon in fusion. Bismuth will not unite with iron. Antimony combines well with this metal by fusion: in the proportions of one part of iron, and two of antimony, it forms a hard alloy, with small facets, which scarcely yields to the hammer. Iron has a stronger affinity with sulphur than with this brittle metal, and consequently is capable of decomposing sulphure of antimony. To effect this, five ounces of the points of horse-shoe nails are heated red-hot in a crucible; a pound of pulverized sulphure of antimony is then thrown in, and a strong heat suddenly given to melt the mixture: the iron attacks the sulphur. When the mixture is well fused, an ounce of nitre in powder is added, to facilitate the separation of the scoriæ from the antimony. The mixture being suffered to cool, antimony is found in the crucible, which does not contain iron; but, if one part of iron be used with two of sulphure of antimony, the antimony will be alloyed with iron; this was called *regulus of iron*. The scoriæ, which are found above the antimony alloyed with iron, and prepared with nitre and tartar, have a yellowish colour, similar to that of amber, produced by the iron they contain, whence Stahl called them *succinated scoriæ*. He directs them to be reduced into powder, and boiled in water, which takes up the most subtle part of the powder; after which the fluid must be decanted off, filtered, and the powder on the filter detonated three times its weight of nitre: this being washed and dried, is *Stahl's aperitive*, and *antimoniated saffron of Mars*.

It is still uncertain whether zink be capable of uniting with iron. Malouin has shewn, that this metal may be applied, like tin, to the surface of iron, for the purpose of defending it from the contact of air, a circumstance which shews that these two metallic matters are capable of combining. It seems that nickel is capable of being very intimately united with iron, since these two metallic substances can never be perfectly separated, as Bergman has demonstrated.

Mercury does not contract any union with iron in its metallic state; it has in vain been attempted to unite these two metals immediately, but the combination is successfully made by presenting them to each other in the state of oxyds. Navier has observed, that a whitish snowy precipitate is obtained, by mixing a solution of iron and of mercury by the sulphuric acid, and evaporating the mixture; in this operation small flat crystals, similar to those of boracic acid, are formed. Navier affirms, that these crystals are a combination of iron and of mercury. Lead is not capable of uniting with iron.

Iron and tin appear susceptible of union by fusion. The preparation of white iron, or, as it is commonly called, tin, which consists of iron plates covered with a thin stratum of tin, shews that this combination takes place. In order to tin iron, it is necessary that the surface of the metal should be very clear and bright; for that purpose it is corroded by an acid, or sometimes filed or scraped, or covered with a solution of sal-ammoniac; it is afterwards plunged vertically into a vessel of melted tin, moved backwards and forwards, to increase the contact, and when sufficiently tinned, it is taken out and rubbed with saw-dust, or bran, to clear off the fat or pitch with which the melted tin was covered, and which adheres to the surface of the tinned iron. With manganese an alloy or mixture cannot be obtained, but by taking both the iron and the manganese in the oxyd state: Take equal parts of the oxyd of iron and manganese; make them into a paste with oil: put the mixture into a crucible. A metallic button is obtained, brittle, and granulated in the fracture.

By means of water, a preparation is made with iron, known by the name of *martial Ethiops*, or *saffron of Mars*. There are a vast many processes for obtaining Ethiops. The following are selected as most worthy of attention. 1. That of Vauquelin. Take two parts of iron in fine powder, and one part of red oxyd of iron; put the mixture into a covered crucible, and expose it to a strong heat for two hours. In this experiment, the iron takes a portion of oxygen from the red oxyd; and, by the balance which is thus established between the two portions of iron, makes the whole pass into a black homogeneous oxyd. 2. That of M. Save. Take hammerings of iron, and reduce them to powder; triturate this powder on marble with a little water; put the mixture into a crucible, and heat it till it is entirely deprived of moisture; then pour in a few drops of oil, taking care to spread them equally; and a very black oxyd is immediately produced, which is to be left some time longer on the fire, in order to burn all the oil: reduce the clots which may be formed. A third method is, to work a certain quantity of iron-filings into a paste with water; then dry it,

it, and add more water; and repeat the operation till all the paste is reduced to a fine black powder. Throw this powder into boiling water; and, having left it to settle, draw off the water, and dry the precipitate. If, instead of iron filings, iron already oxydated be used, a single operation is sufficient to convert the whole into Ethiops.

For the decomposition of water by iron, see page 207. If concentrated sulphuric acid be poured over iron-filings, sulphureous acid gas is obtained. When this mixture is distilled to dryness, the retort is found to contain flowers of sulphur sublimed, and a white mass of sulphat of iron, partly soluble in water, which, however, does not afford crystals. If this acid, diluted with two parts of water, be mixed with half its weight of iron-filings, it dissolves the metal very readily. The solution is attended with the disengagement of a large quantity of hydrogen gas, which may be made to detonate with a considerable noise, by applying a lighted candle to the aperture of the vessel, after having closed it for a short time with the hand. In proportion as the diluted sulphuric acid acts on the iron, a portion of the metal is precipitated in a black powder, which Stahl supposed to be sulphur, but Monnet found, on examination, to be martial Æthiops. This portion of black oxyd of iron, superabundant to the saturation, frequently contains carbure of iron. The sulphuric acid dissolves more than half its weight of iron, and the solution filtered and evaporated, affords, by cooling, a transparent salt, of a green colour, crystallized in rhomboids, called *martial vitriol*, or *green copperas*; we term it *sulphat of iron*. This salt is not made in the direct way, because it is abundantly afforded by nature, and is easily extracted by art from martial pyrites.

Sulphat of iron is of an emerald green colour, and has a very strong astringent taste; its crystals contain, according to Kunckel and Monnet, more than half their weight of water; if it be heated briskly, it liquifies like all salts, which are more soluble in hot than in cold water; it becomes of a whitish grey by drying, it was called *vitriol calcined to whiteness*. Distilled in a retort placed in a reverberatory furnace, this salt affords first, water slightly acid, called *dew of vitriol*. The receiver is to be changed, in order to obtain separately the concentrated sulphuric acid, which, when the heat is very strong, passes over of a black colour, and exhaling a suffocating smell of volatile sulphureous acid. These characters depend on its being deprived of a part of its oxygen, which is fixed in the iron, according to the doctrine of the gases; towards the end of the operation, the acid which comes over takes a concrete and crystalline form, and is distinguished by the name of *glacial sulphuric acid*. When glacial sulphuric acid is distilled in a small retort, it gives out sulphureous gas, and comes over white and fluid; its concrete state is therefore owing to the presence of this gas; it unites with water with noise and heat, sulphureous gas being at the same time disengaged. The fuming oil of vitriol of Noorthaussen is of this kind, and the concrete salt obtained from it by a gentle heat, of which Fourcroy gave an analysis in a memoir published among those of the Academy for the year 1785.

The residue of sulphat of iron, after distillation, is red. Colcothar is sulphat of iron, calcined to redness: Put sulphat of iron into a crucible; cover the crucible, place it in a furnace, and make it red-hot; keep it in this state for an hour, then let it cool, and it will be of a red colour. When washed with water, a white salt little known, and named *salt of colcothar*, or *fixed salt of vitriol*, is separated; a red insipid earth, which is a pure oxyd of iron, and is called *sweet earth of vitriol*, remains behind.

Sulphat of iron exposed to the air becomes yellowish, and covered with rust; oxygen being gradually absorbed, oxydates the iron more and more, so that it cannot remain united with the sulphuric acid. Thus the green sulphat is changed to red. The same thing may be done by dissolving this salt in aerated water, by agitating its solution in the air, by the action of nitric acid, or of oxygenated muriatic acid; in short, by all those methods which communicate oxygen, and which may increase the quantity of 0·27 of oxygen, which it contained at first, to 0·48, the proportion necessary to constitute the red oxyd.

From these experiments, first made by Proust, it appears, that there are two sulphats of iron, very different from each other. The properties which that chemist discovered in each are as follow: That the green sulphat was crystallizable, and insoluble in alcohol, of a sea-green colour, efflorescing and turning yellow by exposure to the air, not altered by the gallic acid, yielding no Prussian blue with the alkaline prussiats; it gives with caustic alkalis a dark green precipitate which grows black under water when deprived of contact with air, and containing 0·27 of oxygen, and 0·73 of iron. The red sulphat of iron does not crystallize; it is soluble in alcohol, deliquescent, gives a black precipitate with the gallic acid, and blue with the alkaline prussiats, but with pure alkalis a reddish yellow precipitate, no longer oxydable, and containing 0·48 of oxygen, and 0·52 of iron. Hydro-sulphurated water, or sulphureous water, decomposes and precipitates the red sulphat of iron, nitrat of iron, &c. but does not affect the green sulphat: the red oxyd burns the hydrogen, and the sulphur. Thus the mother-water of sulphat of iron, or this salt super-oxygenated, may be restored to the state of a green and crystallizable salt. When this last is precipitated by sulphureous water, the precipitate is brown, which is occasioned by a sulphat of iron, being often mixed with this salt for sale. The presence of copper in this sulphat will be evident upon plunging a bar of iron into the solution, or by means of ammoniac.

Sulphat of iron is decomposed by lime. Lime-water poured into a solution of this salt, forms a precipitate in flocks, of a deep olive green; a portion of this precipitate is re-dissolved in the lime-water, and communicates to it a reddish colour. Potash, saturated with the carbonic acid, or the carbonat of potash, forms a precipitate of a greenish white colour, not soluble in the alkali; this difference arises from the presence of the carbonic acid, which seizes the iron, in proportion as it is itself separated from the alkali by the sulphuric acid. Pure or caustic ammoniac separates from the solution of sulphat of iron a precipitate of so deep a green, that it appears almost black; it is not soluble in the ammoniac.

Vegetable astringent matters, such as nut-galls, sumach, rind of pomegranates, husks of nuts, quinquina, cypress nuts, logwood, tea, &c. have the property of precipitating sulphat of a black colour: this precipitate, which cannot be mistaken for iron, is so extremely divided, that it remains suspended in the fluid; the addition of gum arabic to the mixture, causes the iron to be permanently suspended, and forms the black fluid, called *ink*. We call this salt the *gallic acid*, and shall give an account of it in the vegetable class.

The decomposition of sulphat of iron, by an alkali calcined with bullock's blood, is a phenomenon still more difficult to be understood than the action of the nut-gall on this salt; the precipitate obtained is of a beautiful blue colour, and insoluble in acids. This precipitate is called *Prussian* or *Berlin blue*, from the place of its discovery. To form Prussian blue, four ounces of nitre fixed by tartar, are mixed with an equal weight of dried ox's blood; this mixture is calcined in a crucible till it resembles coal, and no longer produces any flame; a sufficient quantity of water is then added to dissolve all the saline matter, which is called *phlogisticated alkali*, or *colouring lixivium*, or *prussiat of potash with excess of alkali*, and is concentrated by evaporation; two ounces of sulphat of iron, and four ounces of sulphat of alumine, are afterwards dissolved in a pint of water; the solution of these salts is mixed with the alkaline lixivium, a greenish precipitate falls down, which is separated by the filter, and

and, muriatic acid being poured on it, it immediately becomes of a more beautiful and deeper blue, and is to be then dried by a mild heat, or by exposure to the air. Many chemists have, since the time of Woodward, attended to the theory and preparation of Prussian blue. With regard to its preparation, it is now known that a great number of substances are capable of communicating to the alkali the property of precipitating iron of a blue colour. In the manufactories, they take another mode: Equal parts of the blood, horns, nails, and skin, of oxen, are reduced to a coal, of which they mix ten parts with thirty parts of potash; calcine this mixture in an iron pot; in twelve hours the mixture will be in a soft paste; then they are poured into tubs of water; filtre, and mix this solution with another, composed of three parts of alum, and one of sulphat of iron.

Prussian blue takes flame sooner than sulphur. It detonates strongly with the super-oxygenated muriat of potash. Distilled in the pneumatic apparatus, ammoniacal gas, carbonat of ammoniac, and hydrogen gas, are obtained; oxyd of iron and some alumine remain in the retort. Ammoniac heated over Prussian blue, decomposes it by separating the colouring principle. Fourcroy discovered, that lime-water put in digestion over Prussian blue had the property of decomposing it with the help of a little heat. Thus may be prepared the prussiat of lime; for the lime-water saturates itself entirely with the colouring principle, which in this case, performs the office of an acid; hence it has been called *Prussic acid*. Prussiat of lime is the most certain mode of discovering the presence of iron in mineral water. Pure fixed alkalis deprive Prussian blue of its colour immediately, and without heat; they are to be preferred to the alkaline carbonats. Magnesia also attacks the colouring matter of Prussian blue, but much more weakly than lime. Barytes has the same property.

Scheele has shewn, that the red oxyd of mercury separates the colouring matter from Prussian blue; and this is the mode of obtaining the *Prussic acid.* The process consists in uniting in a glass cucurbit, or a matrass, two parts of Prussian blue in powder, one part of red oxyd of mercury, and six parts of water; boil this mixture for half an hour, stirring it continually; it will assume a yellow colour, inclining to green; filtre, and pour over the residue two parts more of boiling water; leave the whole together to crystallize by evaporation. In this experiment, the Prussic acid quits the oxyd of iron to unite with the oxyd of mercury, with which it has a stronger attraction, and forms a soluble salt, which crystallizes in tetrahedral prisms, terminated by quadrangular pyramids, whose planes answer to the angles of the prism. This is *Prussiat of mercury*: it is decomposed neither by acids nor alkalis. To obtain Prussic acid from this, dissolve the prussiat of mercury in water, or take the liquor as above described, previous to evaporation. Pour the quantity obtained in the preceding experiment, into a bottle over 450 grains of iron-filings; add 180 grains of concentrated sulphuric acid (Berthollet prefers the muriatic acid,) and agitate the mixture strongly for some minutes. The whole becomes of a black colour by the reduction of the mercury; the liquor loses its mercurial taste, and assumes that of the colouring lixiviation; the iron unites with the oxygen of the mercury, and combines with the sulphuric acid. Let it settle; then decant the liquor, and put it into a retort on a sand-bath; adapt a receiver with a little distilled water to absorb the acid; then lute carefully. By the help of a gentle heat, the colouring principle passes first, as being more volatile than water: stop the operation when about one-fourth of the liquor has passed over. This liquor will contain a little sulphuric acid; to separate which, re-distil with a very slight heat over pulverized chalk; and then the Prussic acid will be obtained in its greatest purity.

This acid has an odour peculiar to itself, somewhat like bitter almonds; it is of a sweet taste; it does not redden blue paper; it thickens the solutions of soap and of alkaline sulphures. It precipitates alumine from its nitric solution; it decomposes oxygenated muriatic acid, absorbs its oxygen, and becomes fragrant. In this state, it seems to have no great tendency to alkaline substances. It no longer precipitates iron of a blue, but of a green colour; and this green precipitate is soluble in acids. It becomes blue again by contact with the rays of the sun, or by the addition of sulphureous acid and iron.

When, by means of oxygenated muriatic acid, the Prussic acid is brought to the state of making a green precipitate with iron, ammoniac is formed as soon as it is mixed with alkali or lime. An acid, poured into this mixture, no longer restores to Prussic acid its own peculiar odour; Berthollet supposes this acid to be entirely destroyed. Though perfectly-pure potash be used, an acid poured in after it has acted, will produce an effervescence, and disengages carbonic acid which is entirely formed. Berthollet, who has published some very interesting papers on the Prussic acid and its combinations, concludes, from the experiments here detailed, that azot, hydrogen, and carbon, united in proportion, and with a degree of condensation not at present known, form what is called Prussic acid.

Vauquelin has published some remarks on the formation of this acid. To ascertain whether it contains oxygen, he made the following experiments: 1. Put into a retort, one hundred parts of muriat of ammoniac, fifty of lime, and twenty-five of charcoal finely powdered: adapt a receiver containing a slight solution of sulphat of iron, in which plunge the beak of the retort. Give a brisk heat, and continue the action of the fire till nothing comes over. 2. Into the same apparatus put one hundred parts of muriat of ammoniac, fifty parts of the semi-vitreous oxyd of lead, and twenty-five parts of charcoal. Heat as before; agitate briskly the liquors contained in the receivers, and leave them exposed to the air for several days, that the combination may be complete between the oxyd of iron and the Prussic acid, and that the Prussiat of iron may absorb as much oxygen, as is necessary to pass to the state of blue Prussiat, not to be acted upon by acids. Pour into these liquors equal quantities of sulphuric acid much weakened with water, and a Prussian blue is produced whose qualities are as one to six, compared with the preceding experiment, that is to say, the product was six times as plentiful with oxyd of lead, than in that experiment where he used lime to disengage the ammoniac.

What can cause the great difference in the results of these two experiments? says Vauquelin. Can it be the presence of oxygen in the oxyd of lead; or because that oxyd, by disengaging the ammoniac more slowly, gives time for dissolving more carbon? These questions we readily set down as he has left them, because they may awaken the attention of future chemists, and lead to new experiments and useful conclusions. Though Vauquelin has not resolved these questions, yet it appears certain, that, whenever a substance containing oxygen is introduced into a mixture proper for forming Prussic acid, a greater quantity of that acid will be produced. The same chemist remarked, that an alkaline Prussiat, how dry soever, by decomposition in well-closed vessels, always afforded carbonat of ammoniac. Curaudeau has shewn, that, by heating caustic potash with common charcoal dust in a crucible of platina, a liquor is obtained by lixiviation, which precipitates iron of a true Prussian blue

The Prussic acid combines with different bases. With potash and the pure acid, a slight heat produces a salt which crystallizes in square plates, the edges bevelled, formed in octahedrons with the two opposite pyramids truncated: to obtain these crystals, evaporate the liquor to dryness, re-dissolve, filtrate, and then concentrate, with a gentle heat. In this state, the Prussiat no longer affords a blue colour with acids. This salt may also be prepared by saturating caustic potash with the colouring matter,

matter, and digesting it over white lead, to separate the hepatic gas it may contain; mix it with acetic acid; expose it to the sun to precipitate the iron; and then add two parts of alcohol. The Prussiat of potash will be precipitated in lamellated shining flocks; wash it with fresh alcohol, dry it, and dissolve it in distilled water. If sulphuric acid be mixed with a solution of Prussiat of ordinary potash, a blue precipitate is obtained, by exposing it to the solar rays, or to a brisk heat; which proves that it is a triple salt, containg oxyd of iron.

Berthollet found no sensible difference between the Prussiats of potash and of soda, except that the last crystallizes differently. Mineral acids disengage the Prussic acid, which is partly fixed in the Prussian blue which precipitates. The Prussiats of ammoniac, lime, barytes, &c. are prepared in the same manner. The solution of iron by the Prussic acid, forms Prussiat of iron. According to Proust, there are two kinds of Prussiat of iron. One kind is produced by mixing a solution of green sulphat or muriat of iron, with a saturated solution of prussiat of potash. When the mixture is made, stop the bottle, and a white deposit is obtained, which soon takes a slight tint of green, occasioned either by the small quantity of air contained in the vessel, or by the red oxyd which is always present, more or less, in alkaline Prussiats. Proust regards the whiteness as the natural colour of this prussiat of iron: it is therefore *white Prussiat of iron*.

The author recommends to pour an excess of alkaline Prussiat over the metallic sulphat, in order to decompose it entirely. After standing some hours, this white Prussiat will be covered with a yellow liquid, which is a mixture of Prussiat and sulphat with an alkaline base, holding in solution a little of the white oxyd of iron. On opening the bottle, this last absorbs oxygen from the atmosphere, takes a blue colour, becomes insoluble, and spreads on the white Prussiat, which, feeling likewise the influence of the atmospherical air, becomes blue, by degrees, from the surface to the very bottom of the vessel; at last the whole is converted into *blue Prussiat*. The same effect will arise by putting the white precipitate on a filter. The blue Prussiat may be again converted to white, by keeping it in a bottle with plates of iron and tin. In this case the addition of the metal disoxydates the iron, and converts it into a green oxyd. A solution of sulphurated hydrogen gas, kept with blue Prussiat in a close bottle, decomposes it, and turns it white. This Prussiat has the same properties as that formed immediately from the green sulphat. The white Prussiat, treated in the same manner, undergoes no change. The sulphuric and muriatic acids have no effect upon the white Prussiat. The nitric acids, and the oxygenated muriatic acid, turn it blue: this last loses its smell at the same time.

Sulphat of iron decomposes nitre very readily: Take equal parts of nitrat of potash, and sulphat of iron, slightly calcined red; put the mixture in a stone retort, which place in a reverberating furnace; adapt to the neck of the retort a long-necked balloon, and to the lower extremity of that fix a tube, which is to be plunged into a jar half filled with water. A quantity of nitric acid, very red and fuming, is obtained; the residue, by lixiviation, affords sulphat of potash, fixed alkali, and a red oxyd of iron remains on the filter; but, if strongly calcined sulphat be made use of, together with nitre which has suffered fusion, the product obtained is very inconsiderable. This product consists of two liquors; the one, of a dark and almost black colour, floats on the surface of the other, which is red and ponderous; for which reason Baumé considered this liquor as a kind of oil. There afterwards passes into the neck of the retort a white saline mass, which attracts the humidity of the air, and is soluble with heat and great rapidity in water, emitting a strong smell of spirit of nitre, and very red thick vapours: this solution, saturated with potash, affords sulphat of potash; the white mass therefore is merely sulphuric acid, rendered concrete by a portion of nitrous gas.

Solution of sulphat of iron charged with nitrous gas.—If one gallon of nitrous gas be put into a solution, containing an ounce and a half of sulphat of iron, more than six pints of the gas will be absorbed. For this operation, take a doubly-tubulated bottle, as shewn in the preceding engravings, and therein put the iron-filings; to one of the necks adapt a recurved tube, which is to go into another bottle containing a solution of potash; from this second bottle goes another tube, which is plunged into a third, containing a solution of sulphat of iron. When the apparatus is well luted, pour in at the neck of the first bottle, some nitric acid at 30°. An effervescence takes place, and nitrous gas is disengaged; this gas passes through the solution of potash before it reaches the sulphat of iron, a ready way to be assured of the purity of the nitrous gas. The nitrous gas loses entirely its elastic form, and there remains but a very small proportion of it in the mixture. Azotic gas also is disengaged; and the green colour of the solution of sulphat of iron changes to dark brown, without losing its transparency, or giving any deposit. Its sweet ferruginous taste becomes styptic, and very astringent. Mixed with a ley of caustic potash, it precipitates a dark green oxyd of iron, and exhales a very evident vapour of ammoniac. Mixed with concentrated sulphuric acid, it throws off white vapours, well known to be nitric acid. It tinges tincture of turnsole with a deep red. Hence it appears, that, in this experiment, ammoniac and nitric acid are produced. See further the section upon nitrous gas, page 215.

Sulphureous acid attacks iron; the colour of the solution is green, the taste astringent. By evaporation and cooling, a salt is obtained, crystallized in rhomboids. If a stronger acid than the sulphureous be added to the solution, a brisk effervescence takes place, and the sulphur is precipitated. When iron is dissolved in the sulphureous acid, there is neither a disengagement of gas, nor any precipitation. It appears that part of the sulphureous acid is decomposed, and the sulphur thence proceeding remains in solution in the salt thereby formed, which is called *sulphurated sulphit of iron*.

Iron with weak nitric acid.—If weak nitric acid be poured over iron in thin plates or chips, there is a slight effervescence; the solution is greenish, sometimes brown. By evaporation, a red oxyd of iron is precipitated, but it furnishes no crystals; the liquor takes the form of a reddish jelly, which is only in part soluble in water, the other part precipitating. The concentrated nitric acid attacks iron with violence; the oxyd of iron hereby formed is precipitated red by little and little, and but a small part of it remains in solution in the nitric acid. Ammoniac is formed by the separation of the hydrogen from the water, which is decomposed over the azot of the nitric acid. This solution gives a magma similar to that obtained by the weak acid.

If the nitrat of iron be kept heated, red vapours, in large quantities, are disengaged, the magma becomes dry, and affords an oxyd of a brick-dust red colour; this magma, by distillation in a retort, affords a small quantity of fuming nitrous acid, much nitrous gas, and azotic gas. Vital air cannot be obtained, because the iron retains all the oxygen of the acid; the oxyd which remains after the distillation of nitrat of iron, is of a lively red, and may afford a good colour for painters. The nitric solution of iron, however concentrated, does not appear to afford a precipitate by the addition of distilled water. Alkalis decompose it with different phenomena, according to their nature. Caustic potash precipitates it of a light brown colour; the mixture passes very quickly to a blackish brown, and much deeper than the colour of the first solution. This phenomenon arises from the portion of the precipitate dissolved by the alkali, though the quantity be very small. Carbonat of potash separates a yellowish oxyd, which quickly becomes of a beautiful orange red; if the mixture be agitated, an effervescence takes place, the precipitate is re-dissolved in much

much greater abundance than that produced by the caustic potash. Monnet took notice of this phenomenon, and has with justice attributed it to the gas which is disengaged. The solution of iron, by fixed alkali, is called the *martial alkaline tincture of Stahl*, and of a very beautiful red. This martial alkaline tincture loses its colour at the end of a certain time, and deposits the oxyd of iron it contains; it may be decomposed by the addition of an acid. The nitric acid separates from the *tincture* an oxyd of a brick-dust colour, which is soluble in acids, and is called *Stahl's aperitive saffron of Mars*.

The muriatic acid, diluted with water, dissolves iron with rapidity, and disengages a large quantity of hydrogen gas, produced by the decomposition of the water, as happens when this metal is dissolved in sulphuric acid. The solution of iron by the muriatic acid is attended with much heat, which continues with the same force till the acid is saturated; a proportion of the iron is precipitated in a true *Æthiops*, as happens in all other solutions. After filtration, this solution is of a green colour, inclining to yellow; when preserved in a well-stopped phial, it does not deposit oxyd of iron; but if, on the contrary, it be exposed to the air, almost all the iron it contains is precipitated in a few weeks, and this precipitate is of a lighter colour, in proportion as the access of air is the easier. It is now proved that this precipitation, which takes place equally in all the other solutions of iron, is produced by the oxygen of the atmosphere, absorbed by the metal, which becomes oxydated more and more. This salt is of a green colour, with an astringent taste. The solution of iron by the muriatic acid does does not crystallize regularly by evaporation. Monnet has observed, that if it be suffered to cool when it has acquired the consistence of syrup, it forms a kind of magma, in which may be seen needle-form flat crystals, which are very deliquescent. This magma melts by a very gentle heat; a greater heat decomposes it, though less readily than the nitrat of iron, and it assumes the colour of rust when it is dry; the muriatic acid is disengaged from it, and may be obtained by distillation; it carries up with it a small quantity of oxyd of iron, according to the observation of Brandt. The duke d'Ayen, in one of the four excellent memoirs he communicated to the Royal Academy respecting the combination of acids with metals, has very minutely examined what passes in this decomposition of the muriat of iron. The operation afforded very singular products: a mild heat disengaged a phlegm slightly acid; the muriatic acid then became concentrated, and its gas, which is much more volatile than water, was partly fixed by the iron: a much stronger heat raised a portion of this acid with a small quantity of iron, and crystals were formed in the receiver, which were not deliquescent; very transparent crystals in the form of blades of razors, which decomposed the light in the manner of the best prisms, and exhibited very beautiful tinges of red, yellow, green, and blue, were at the same time sublimed to the upper part of the retort; at the bottom there remained a styptic and deliquescent salt, of a brilliant colour, and foliated texture, which perfectly resembled that kind of talc, in large plates, which is improperly called Muscovy glass. This last salt, exposed to a violent heat in a stone-ware retort, was decomposed, and afforded a sublimation still more astonishing than the former products; it was an opake matter truly metallic, which, when examined by the microscope, exhibited regular crystals, or sections of hexagonal prisms, which the duke d'Ayen compares to the pieces inlaid in floors: these crystals were as brilliant as the most highly polished steel, and were strongly attracted by the loadstone. They consisted therefore of iron reduced in part and sublimed. Art appears here to imitate nature, which sublimes the black oxyd of iron by volcanic fires, in the form of brilliant and well-polished laminæ, resembling steel; such at least appears to be the origin of the specular iron ore, and of that of Volvic, which, according to the valuable observations of de l'Arbre, is always found in the clefts of lavas. From these details we may perceive how rich the science of chemistry is in curious phenomena, and what a fund of discovery is held forth to such as perform experiments with all the accuracy the importance of the subject requires. We must not forget to observe, that this reduction of iron favours the doctrine of gases, and that we may perhaps obtain similar results from many other metallic solutions treated in the same way.

The muriatic solution of iron, like all other martial solutions, is decomposed by lime and alkalis; but the precipitates are less altered, and may be easily reduced, especially such as are produced by the addition of caustic alkalis. Alkaline sulphures, sulphurated hydrogen gas, and astringents, decompose it like the others. Prussian alkalis, or the alkaline Prussiats, precipitate a beautiful blue powder.

Vauquelin, who analyzed pieces of iron continually wetted with urine, found these to be a true phosphat of iron. This iron is of a yellow brown without, dark brown within, and may be broken by the hand. In its internal fracture, its grain is lamellated, shining, and, as it were, spathose; its external cavities are filled with a quantity of small brilliant crystals. Heated in a forge-furnace in a crucible, lined with charcoal in powder, it melts readily, and gives a very homogeneous button, fragile, of a very close brittle grain, of a bright metallic grey colour, exhibiting with the blow-pipe and with acids, all the properties of phosphure of iron. Its surface is covered with a kind of rough enamel, of a greenish grey colour, which Vauquelin discovered to be phosphat of lime. Iron altered and rusted by urine, is therefore true phosphat of iron mingled with phosphat of lime, and with some other saline principles from the urine. In this experiment, the charcoal, at a high temperature, converts the oxyd of iron into metal, and the phosphoric acid into phosphorus.

Liquid phosphoric acid dissolves iron in the heat with violence. During the solution an inflammable gas is disengaged, which burns, like phosphorus, with a blue flame. If the acid be not fully saturated with iron, the solution shoots into crystals, which remain unchanged, in the air, but which melt in the fire into a garnet-coloured glass. When the acid is fully saturated with iron, a white precipitate is instantly formed, which is extremely insoluble even in boiling water: this is the syderit of Bergman and other chemists. The neutral phosphat of iron is insoluble, but it may be dissolved when it contains an excess of its own acid. This phosphat is decomposed by caustic alkalis, by muriatic acid, but not by sulphuric acid.

Water charged with carbonic acid easily dissolves iron: to form this combination, nothing more need be done than to add iron filings to the acid, and leave the mixture in liquid digestion for some time; this fluid, when filtered, has a penetrating and rather styptic taste. Bergman, who calls this combination *aerated iron*, affirms, that when exposed to the air, it becomes covered with a pellicle of rainbow colours; that it is decomposed by the pure alkalis, but that these salts, when saturated with the acid, do not produce the same effect. This solution converts the syrup of violets to green, and affords very brilliant Prussian blue with the calcareous Prussiats; it precipitates the brown oxyd of iron when left exposed to the air, or when heated: this combination is now named *carbonat of iron*. Iron has a strong tendency to unite with the carbonic acid, and nature very frequently presents it in this state. The muddy iron ores and spathose iron appear to be in a great measure formed by this combination; ferruginous mineral waters often contain this metal in the state of carbonat of iron. This salt, separated from the water and dried, is scarcely soluble in that fluid, but it dissolves in a large proportion in the liquid carbonic acid, from which it is precipitated in proportion as the acid is volatilized.

Fluoric acid attacks the metal as well as the oxyd of iron,

iron. During its combination with the former hydrogen gas is evolved. It appears from Rinman's experiments to be difficult to saturate the fluoric acid with iron. By boiling the solution, a copious precipitation of the oxyd of iron is produced. Fluat of iron does not crystallize. It is decomposed in the fire, and by alkalis and earths. It is decomposed also by the sulphuric, nitric, and muriatic, acids. The boracic acid, diluted with water, dissolves both the metal and the oxyd of iron by the assistance of heat. The solution, which has the colour of amber, deposites, by standing, a yellow ochry precipitate, and, by evaporation, fasciculated yellowish crystals. If a solution of borax be mixed with a solution of sulphat of iron, a borat of iron is formed, which is very difficultly soluble in water. This salt is decomposed by alkalis, and by all the acids except the carbonic. Oxalat of iron, with an excess of acid, is easily soluble in water. If the oxalic acid be saturated with the oxyd of iron, a whitish insoluble precipitate is formed. This acid has the strongest affinity of all the acids for iron. The citric acid dissolves iron readily with the evolution of hydrogen gas. The saturated solution is of a dark colour. With time it becomes muddy, black, and thick. This salt is but little known. The malic acid dissolves iron, according to Scheele, and forms with it a deliquescent salt. The benzoic acid acts weakly on the metal, but more powerfully on the oxyd of iron. The solution affords crystals, which have a sweetish taste, and effloresce in the air. Benzoat of iron is soluble in alcohol. Succinic acid affords a slightly coloured solution by digestion with iron, and an ochry precipitate, the nature of which has not been investigated. During the solution of iron in liquid arsenic acid, hydrogen gas is disengaged. Scheele remarks that this solution often forms into a jelly in open, but never in close, vessels. Alkalis precipitate the arseniat of iron of a greenish white colour, which becomes reddish by exposure to a glow heat. If one part of iron filings be distilled with four of arsenic acid, a spontaneous inflammation is produced, by which the acid is converted into the oxyd and metal of arsenic. Arsenic acid precipitates the acetat of iron of a dark green. The neutral arsenical salts decompose all the acid solutions of iron. Arseniat of iron is easily decomposed by calcining it with charcoal. The arsenic acid has very little action on the oxyd of iron.

Iron considerably increases the fusibility of earths, especially the oxyds of iron; for, in its metallic state, it does not unite with them. Common glass owes its colour to the iron which is accidentally mixed with the materials it is composed of. Fixed alkalis and ammoniac have no action upon iron, unless combined with water. When digested in this manner for a few days, the liquor becomes thick, and precipitates a small quantity of black oxyd of iron. Hydrogen gas is disengaged, which proves the necessity of water, since that is decomposed. Mix sulphat of potash with half the quantity of filings of iron; heat them in a crucible: when cool, the sulphat will be found in the state of a sulphure. This sulphure, by lixiviation, furnishes a liquor of a very dark green colour; a few drops of nitric acid will make this colour disappear. The greatest part of the iron oxydated by the oxygen of the sulphuric acid, remains undissolved in the water of lixiviation; and acids disengage from this oxyd a large quantity of sulphurated hydrogen gas.

A salt is prepared for medical uses, with ammoniacal muriat and iron, which is called *martial flowers of sal-ammoniac*, or *ens martis*. One pound of ammoniacal muriat in powder, and one ounce of iron filings, are mixed together. The mixture is exposed in an earthen vessel, covered with a vessel of the same kind, to a heat capable of igniting the lower part of the apparatus: in five or six hours a yellow matter is sublimed in the upper vessel. In this experiment the muriat is not decomposed; for the product is sublimed muriat of ammoniac coloured by a portion of oxyd of iron. To make a complete decomposition, two parts of the filings must be used with one of the muriat; distil in a retort with the pneumatic apparatus, and liquid ammoniac is obtained, charged with a little iron when that ammoniac is received in water. The residue is muriat of iron. The oxyd of iron is much better for the above operations. Iron, or the sulphure of iron, martial pyrites, burns rapidly, but without noise, when triturated in a metal mortar with super-oxygenated muriat of potash; this mixture in a heap struck with steel, detonates strongly, and gives out a red flame.

Gold unites easily with iron, and by this union becomes harder and less malleable. In the proportion of six parts of gold to one of steel, the metallic mixture may be beat out into plates without cracking. Iron is only partially separated by combustion in a glow heat. It has a stronger attraction than gold for the oxygenated muriatic and nitro-muriatic acids, and precipitates gold from these acids in its metallic state. Silver combines readily with iron. A mixture of fourteen parts of silver, and two one-half of iron, is more elastic than silver, attracts the magnet, and is not decomposed in a strong fire. A small portion of iron does not seem to injure the colour or malleability of the silver. Iron precipitates silver from all its solutions in acids; but this happens in the nitric only, when the acid is not completely saturated, or when nitrous gas is added. Muriat of silver is decomposed in the dry way by distillation with iron filings. Iron precipitates mercury in its metallic state from its solution in acids. Distilled with oxygenated muriat of mercury the muriat is decomposed, and fluid mercury produced. Sulphat of iron precipitates mercury from its solution in nitric acid in its metallic state. Lead is precipitated from its solutions in acids by iron. It also precipitates bismuth from its acid solutions, and in the dry way takes from it the sulphur which it contains. Nickel has the strongest affinity of all the metals for iron, and is separated from it with the greatest difficulty. The admixture of nickel does not injure the malleability of the iron, but rather seems to increase it. It renders the iron less fusible. Nickel is precipitated only in a very imperfect manner by iron from its solutions in acids. Iron unites in close vessels with arsenic. This combination renders the iron more brittle, and diminishes its attraction for the magnet. It is separated from the iron with difficulty.

The uses of iron are so great and extensive, and besides so well known, that it would be useless to attempt to enumerate them: it is only necessary to observe, that no art can be carried on without it, and that it is the soul of all the arts. The different modifications it is susceptible of, render it very proper for the multiplicity of purposes to which it is applied. Cast-iron serves to form utensils of various degrees of solidity as may be required. The hardness and tenacity of the several kinds of forged iron are no less applicable to other uses. The same observation is applicable to steel: the fineness of the grain, and excellence of the temper, constitute a great number of species, peculiarly adapted to an almost infinite number of arts. The oxyds of iron serve to give a red or brown colour to porcelain, enamel, pottery, &c. they are likewise used in the preparation of artificial precious stones, and combined with oil for painters. Iron is the basis of an important medicine, which is frequently applied with the greatest success. It is the only metal which is not noxious, and whose effects are not to be feared; it has such an analogy with organic matters, that it seems to form part of them, and often owes its production to the processes of life or vegetation. The effects of iron on the animal economy are numerous; it stimulates the membranes of the viscera, and appears to act more especially on those of the muscles, which it braces; it fortifies the nerves, and gives a remarkable degree of force and vigour to the animal system; it excites many secretions, especially the urinary and menstrual evacuations; it increases the contractions of the heart, and consequently renders the pulse stronger and quicker. Its action

tion is not less effectual on the fluids; it passes quickly through the first passages, and combines with the blood, to which it gives density, consistence, and colour, rendering it more concrescible, communicating at the same time such a degree of activity as enables it to pass easily into the smallest vessels, which it stimulates at the same time, and communicates force and life through every part. The capital experiments of Menghini, published in the Memoirs of the Institution of Boulogne, have proved, that the blood of persons, who take martial medicines, is highly coloured, and contains a larger quantity of iron than it would naturally contain. Lorry, who exercises the art of medicine with that accuracy of observation which characterizes the true philosopher and physician, observed, the urine of a patient to whom he had given iron, in a very divided state, became manifestly coloured with nut-gall. This metal is therefore tonic, fortifying, stomachic, diuretic, alterative, incisive, and unites in its action the properties of a great number of other medicines. Like astringents it increases the motion of the parts, and has the advantage of being more constant and durable in its effects than many other remedies which possess the same virtue, because it combines with the organs themselves, by means of the fluids which serve for their nutrition. It seems, therefore, that in every case wherein the fibres of the viscera, of the muscles, or even of the nerves, have only a very feeble action, in languors of the stomach, and sluggishness of the intestines, and in weaknesses produced by these causes; in fine, in all the cases wherein the fluids are not sufficiently consistent, or too much diluted, as in palsies and propensities to the dropsy, &c. iron may be administered with success. It is used under many different forms, such as the levigated filings, martial Æthiops, astringent and aperitive saffron of Mars, martial alkaline tincture of Stahl, the martial flowers of sal-ammoniac, &c. The sulphat of iron is externally used in hemorrhages. &c. Iron, which possesses the magnetic property, or the artificial magnet, has been reckoned among those bodies which produce very singular effects upon the animal economy. When applied to the skin, according to several modern authors, it mitigates pain, diminishes convulsions, excites redness, sweat, and often a small eruption: it is likewise capable of rendering epileptic attacks less frequent. It has even been affirmed, that, when left in water for twelve hours, it communicates a purgative property to that fluid. All these assertions, which are said to be founded on facts, sufficiently announce to enlightened philosophers the great difficulty which attends physical researches into the animal system.

OF COPPER.

Copper is a metal of a red brilliant colour, to which chemists have given the name of *Venus*, on account of the facility with which it unites to, and becomes changed by, a great number of bodies. It has a disagreeable smell, which is more sensible when it is rubbed or heated; its taste is styptic and nauseous, though less perceptible than that of iron; it is hard, very elastic, sonorous, ductile, and capable of being reduced into exceedingly thin leaves, or fine wire; by immersion in water it loses between one-eighth and one-ninth of its weight; its tenacity is such, that a copper wire of the tenth of an inch in diameter, can sustain a weight of 299 pounds one quarter before it breaks; its fracture appears composed of small grains; it is susceptible of a regular form; the abbé Mongez describes its crystals as quadrangular pyramids, sometimes solid, and sometimes composed of other similar small pyramids, laterally adhering.

Copper, when heated, becomes coloured on its surface, nearly in the same manner as steel; the colours are blue, yellow, and, lastly, violet: when completely fused these colours pass off, and it appears covered with a green flame, boils, and is volatilized, as may be observed, in the chimneys of founderies. If this metal be projected through flame, in small filings, it produces a blue and green colour, and from that property it is used in fire-works. If the melted metal be suffered to cool slowly, and, after the surface is become congealed, the fluid portion be poured off, the remaining solid part is found to be crystallized in pyramids; which are more regular and large, in proportion as the fusion has been more complete, and the cooling more gradual; its pyramids are quadrangular, and appear to be formed of a great number of octahedrons, inserted one in the other.

Copper heated with access of air, burns at its surface, and is converted into an oxyd of a dark red, in proportion as it absorbs the base of vital air: this oxyd may be easily obtained by heating a ball of copper to redness, which causes the oxyd to scale off. The same effect takes place when red-hot copper is quenched in cold water; the sudden contraction of the parts of the metal, facilitating the separation of the portion of oxyd which covers the surface: this oxyd falls to the bottom of the water, and is called *scales of copper*. As it is not perfectly oxydated, it may be burned afresh in the muffel of the cupelling furnace; after which last process it is found to be of a deep brown colour.

The air attacks copper with greater or less facility, accordingly as the fluid is more or less loaded with moisture, and converts it into a rust, or green oxyd, called *verdegris*, which appears to have saline qualities, viz. taste, and solubility in water. From this circumstance the ancient chemists admitted the existence of salt of copper. It is remarkable, that this rust never attacks copper, except at the surface, and seems even to contribute to the preservation of the internal parts and masses of this metal, as may be seen in antique medals and statues, which are preserved very well beneath a covering of rust. The antiquarians call this crust *patina*, and set a high value on it, because it shews the antiquity of the pieces, which are covered with it. Many artists, and in particular the Italians, know how to imitate this coating, and to counterfeit the antique bronzes. The oxydation of copper by humid air, appears to be produced by water in the state of extreme division; this fluid, however, does not appear to attack copper, nor decompose it like iron, at a high temperature. This metal seems to be more oxydifiable by cold water; it being a well-known fact, that more danger attends the suffering of fluids to cool in copper vessels, than in making them boil; because, as long as the fluid is boiling, and the vessel hot, the aqueous vapour does not adhere to its surface; but when the vessel is cold, the drops of water which adhere to its sides seem to reduce it into green oxyd. It is to the air and the carbonic acid distributed therein we must attribute this oxydation; for, by distilling this rust of copper in the pneumatic apparatus, Fourcroy obtained carbonic acid.

Chaptal has a memoir on a new mode of manufacturing verdegris. This process, practised at Montpellier for some years past, consists in causing the residue of grapes to ferment, and of putting it in layers between plates of copper, to develop the metallic oxyd, called *verdegris*. This method is superior to the old one, as it is much easier, and attended with less expence, because it requires no wine. Experiments of the same chemist prove also that white lead may be made in the same manner.

To reduce the oxyd of copper: mix scales, or any other oxyd of copper, with soft or black soap; make it into a stiff paste, and a little muriat of soda may be added. Put the mixture into a crucible, and place it in a melting furnace; heat it gently at first, till the soap burns no longer; then increase the fire rapidly, to give a white heat. Let the crucible cool, break it, and the button of copper will be found.

To produce phosphorated copper: mix equal parts of thin pieces of copper and phosphoric glass; add one-eighth part of powder of charcoal; melt the whole in a Hessian crucible. The result is a metallic button, whitish to the eye, but sometimes exhibiting rainbow colours.

This phosphure of copper detonates with nitre, and produces, besides the oxyd of copper, a phosphat of potash. Exposed to the air, it loses its brightness, and becomes black.

Copper unites very readily with sulphur; the combination may be made in the humid way, that is to say, by mixing flowers of sulphur and copper filings together, with a small quantity of water; but it succeeds much better in the dry way. A mixture of equal parts of sulphur in powder and copper filings, are put into a crucible, which is heated by degrees till it becomes red-hot; the result is a mass of a blackish grey, a sort of mat of copper, which is brittle and more fusible than the copper itself. This compound is prepared for dying and painting on callicoes, by placing strata of plates of copper and sulphur in powder in a crucible, and heating it gradually. The kind of mat which is produced, is pulverized, and called *æs veneris*, which must not be confounded with another preparation bearing the same name, and formed of copper and muriat of ammoniac.

Copper forms alloys with many metals. Melt in a crucible six parts of copper with four of arsenic and four of potash: it forms a metallic button white and brittle. If the experiment be made with arseniat of potash, in the proportion of eight parts of the salt to six of the copper, the copper loses its colour entirely; it is called *white tombac*. It may be carried to such a degree of whiteness as to vie with silver, if three or four parts of this copper already whitened, be mixed with one part of arseniat of potash.

Cronstedt succeeded in uniting copper with nickel in different proportions; but the presence of the copper was always visible, because it always coloured the glass of borax of a green and of a brown red. By melting together six parts of red copper and nine of bismuth, it forms, according to Gellert, an alloy of a reddish white, with cubic facets. It unites very readily with antimony, and affords a cupreous regulus, which is distinguished by a beautiful violet colour; it likewise decomposes sulphure of antimony, and unites with the sulphur which it takes from the antimony.

Copper unites difficultly with mercury; though a sort of amalgam may be produced, by triturating copper in very thin leaves with mercury. A plate of this metal plunged in a solution of mercury by an acid, becomes coated over with a beautiful colour of silver, owing to the mercury which has been reduced and precipitated by the copper, and which has a greater affinity with oxygen than mercury has. It also combines readily with zink. This combination may be made in two ways. First by fusion; a metal is produced whose colour resembles that of gold, and which is much less susceptible of rust than copper, though less ductile than that metal: the nearer its colour approaches to that of gold, the more brittle it is; and it varies greatly according to the proportion of the mixture, and the precautions used in melting it; its varieties are, similor, pinchbeck, princes-metal, yellow tombac, and Manheim gold. Secondly, by cementing plates of copper with native oxyd of zink, or lapis calaminaris reduced to powder, and mixed with charcoal; in a red heat, the copper unites with the zink, and forms *brass*: this is less susceptible of rust than copper, and is likewise more fusible, and less malleable. But a strong heat, continued for a short time, deprives it of the zink with which it was united, and converts it into copper again. The following is Vauquelin's analysis of brass: Dissolve a known quantity of brass in the necessary proportion of nitric acid, put the solution into a bottle, and pour in a solution of caustic potash, till the excess is manifest to the taste; shake it up immediately; then filter the whole; the zink dissolved in the potash passes through the paper, and the oxyd of copper remains. Wash the metal till the last portions of water have no taste; dry the oxyd of copper with a gentle heat; then weigh it; and, subtracting 0·35 from the amount of the oxyd, you have the weight of the metal, for one hundred parts of oxyd of copper contain in that state thirty-five parts of oxygen.

Melt in a crucible twelve parts of red copper and three parts of zink; cover the mixture with charcoal-dust, to prevent the oxydation of the zink: this will produce a tombac of a fine gold colour. Melt one part of yellow copper and two parts of red copper; and you have a very ductile metal of a beautiful gold colour. By adding oxyd of arsenic, you have a metal almost white, brittle, of a very fine close grain: the proportions are, six parts of red copper, four of zink, five of oxyd of arsenic, and the same quantity of potash.

Tin combined with copper renders it stiffer, harder, more brittle, and specifically heavier, than the two metals employed. This alloy is whiter, more brittle, and more sonorous, in proportion as the quantity of tin is greater. When it is very white, it is called *bell-metal*; when it contains a large proportion of copper, it is yellow, and is called *bronze*. This last is used in casting statues and forming pieces of artillery, which require to be sufficiently solid not to burst, and not so ductile as to have their form destroyed by the stroke of bullets. The alloy or mixture is made in different proportions, adding, according to the uses for which the metal is destined, either zink, or antimony, or both. Eight parts of copper and one of tin, form a yellowish white metal with not much ductility. Sixteen parts of red copper to one of tin, produce a metal more ductile than the foregoing, with a colour approaching nearer to red copper. Eight parts of red copper and two of tin, form a metal very brittle and fragile, with a close fine grain, the colour of the copper being considerably changed.

There are several processes for analyzing bell-metal in the works of Fourcroy, Pelletier, and La Grange. 1. By nitric acid, which separates the copper. 2. By adding oxyd of manganese to oxydate the tin. 3. By calcining a portion of the metal. 4. By throwing fifteen parts of oxyd of copper into one hundred of bell-metal in fusion: the tin separates the oxygen, and rises oxydated to the surface; take this away; then the oxydated copper becomes reduced, and mixed with the other.

Tinning of copper consists in applying a plate or layer of tin to the surface of the metal, and making it adhere. There are several ways of preparing the copper to receive the tin. Some scrape the copper, to render the surface clean and brilliant; others rub it with wine-lees, a little very weak nitric acid, and sand. Then there are two modes of applying the tin: 1. Melt the tin, covering the surface with powdered resin, and plunge in the pieces intended to be tinned; but the copper, that it may take the tin better, is generally dipped previously in a solution of muriat of ammoniac, but it must be dried before it is plunged into the melted tin. This mode is when pieces of copper are to be tinned on both sides. 2. For tinning copper vessels on the inside only, heat the vessel over charcoal; put in the inside a quantity of tin, let it melt; put in a little muriat of ammoniac in powder, and rub it in with a handful of tow; spread about the melted tin in the same manner in all the places impregnated with the salt. The intent of the muriat of ammoniac is to cleanse the surface of the copper, and to prevent the oxydation of the tin. It is with justice complained, that the tinning of copper vessels is not sufficient to defend them from the action of air, moisture, and saline substances, because these vessels are frequently observed to be covered with verdegris. It might be possible to remedy this inconvenience by a thick covering of tin, if there were not reason to fear, that a degree of heat superior to that of boiling water, to which these vessels are often exposed, would melt the tin, and leave the surface of the copper uncovered. To prevent this last accident, the tin may be alloyed with iron, silver, or platina, to diminish its fusibility, and render it capable of being applied in thicker strata on the copper. Alloys of

of this kind are already used in several manufactures. The very small quantity of tin required to cover the surface of copper, is surprising; Bayen and Charlard having determined, that a vessel of nine inches in diameter, and three inches three lines in depth, did not gain more than twenty-one grains by tinning. This small quantity is, nevertheless, sufficient to prevent the dangers which might arise from the use of copper vessels, provided care be taken that substances capable of dissolving the tin be not suffered to remain too long a time in the vessels; and more especially that the tin be frequently renewed: as the friction, heat, and action of spoons, with which the included substances are stirred, destroy it very quickly. There is likewise another cause of apprehension respecting the tin used by braziers in tinning, &c. It is often alloyed with one-fourth of its weight of lead; and in this case the bad effects of the latter metal are much to be feared, as it is known to be very soluble in acids and fat substances. La Folie, of Rouen, well known by his chemical labours respecting the arts, and the useful discoveries with which he has enriched the art of dying, of pottery, and a great number of manufactures, proposes, in order to avoid the inconvenience and danger of tinning copper, that saucepans of forged iron covered with zink might be used, which, as we have already seen, is not productive of any dangerous effects. Many persons have already used these vessels, and have been sensible of their advantages. It is much to be desired that the use of these vessels may become more general.

Copper and lead unite very easily by fusion, as the formation of the leaves of eliquation prove. But this composition is not permanent; for the lead melts with a gentle heat, and abandons the copper. The respective affinities of lead and copper for acids have not yet been accurately determined.

Copper and iron are capable of uniting either by fusion, or in the way of soldering; yet this combination does not easily succeed. When a mixture of the two metals is melted in a crucible, the iron is found in pieces in the copper, without being perfectly united. Copper decomposes, according to Monnet, the mother water of sulphat of iron, though iron has a stronger affinity with acids than copper.

The sulphuric acid does not act on copper but when concentrated and boiling; much sulphureous acid gas is disengaged during the solution. A brown matter, of the consistence of a thick fluid, containing oxyd of copper, and a portion of the oxyd combined with the sulphuric acid, are found at the bottom; from which, by the addition of water and filtration, a blue solution is obtained: if this be evaporated to a certain point, and suffered to cool, rhomboidal long crystals are afforded, of a beautiful blue colour, called sulphat of copper, or blue vitriol. If the solution, instead of being evaporated, be left exposed a long time to the air, it affords crystals; but a green oxyd is precipitated. All the oxyds of copper when formed or dried in the air, are of this colour.

Sulphat of copper has a very strong styptic taste, approaching even to causticity; it is a strong poison. When exposed to heat, it very soon melts, loses its water of crystallization, and becomes of a bluish white; a strong heat is required to separate the sulphuric acid, which adheres much more strongly to the oxyd of copper than to that of iron, though the iron indeed decomposes the solutions of copper by a different attraction, that of the iron for oxygen. Sulphat of copper is decomposed by magnesia and by lime; the precipitate formed by either of these substances is of a bluish white, but becomes green if dried by exposure to the air. A similar precipitate is obtained with alkalis. If the precipitate obtained by potash be heated with caustic potash, the precipitate loses its colour, and becomes brown: in this operation, the copper loses a portion of its oxygen, for the brown precipitate contains less oxygen than the blue; but it is not known whether this last oxygen combines with the alkali. The proportions of the constituent principles of sulphat of copper, are known by decomposing it with alkalis. Soda and ammoniac produce the same effect as potash; but, if the latter be in excess, the ammoniac has the property of re-dissolving the precipitate, and giving it a blue colour. The hydro-sulphures decompose this salt, and the Prussiats also. Several metals have the same property: if a plate of iron, zink, or tin, be plunged into a solution of this salt, the copper will be precipitated.

Scheele's green is produced by the decomposition of sulphat of copper with arsenit of potash. Melt potash in water by the assistance of heat; add white oxyd of arsenic, or arsenious acid, to the point of saturation. Or, Take a hot solution of sulphat of copper, pour it into arsenit of potash; pour it by little and little, and stir it with a glass tube. Then let it settle, and a precipitate is thrown down; decant the liquor, and on the residue pour a little hot water, and stir it well; then pour off the liquor afresh; wash twice with warm water in the same manner; put the whole to filter, and then let it dry; a beautiful green colour is produced, not affected by air, and therefore very convenient for painters. *Arsenit of copper* is formed in this experiment. But if, instead of arsenit of potash, the arseniat be used, the precipitate is still of a very beautiful colour, and *arseniat of copper* is formed.

The nitric acid dissolves copper with great rapidity in the cold; a large quantity of very red nitrous gas being at the same time disengaged. This is the method used by Dr. Priestley to obtain a very strong nitrous gas. A portion of the metal reduced to the state of oxyd is precipitated in the form of a brown powder, and is separated by the filter. The filtrated solution is of a much deeper blue than the sulphuric solution, which shows that the copper is more perfectly oxydated; by previous and careful evaporation, crystals may be obtained in cooling, resembling bundles of divergent needles. Nitrat of copper is of a very bright blue, and is so caustic, that it may be employed in corroding the excrescences which arise on the skin; it melts, according to Sage, at the temperature of twenty degrees of the thermometer of Reaumur, and detonates on burning coals, though this phenomenon is scarcely sensible, on account of the large quantity of water it contains. When melted in a crucible, it emits large quantities of nitrous vapour, which may be collected by distillation; when dried, its colour is green; an increase of the heat converts it to a brown, in which state it is a pure oxyd of copper. Fourcroy distilled this salt with the pneumatic apparatus, and obtained much nitrous gas, a small quantity of carbonic acid, and a small quantity of vital air; it was converted into a brown oxyd by this operation. Nitrat of copper attracts the moisture of the air, but it may be preserved a long time in close vessels; in a dry and hot air it becomes covered with a green efflorescence. It is very soluble in water, and rather more so in hot than in cold water. The solution exposed to the air in shallow vessels, or quickly evaporated in hot and dry weather, leaves an oxyd of the same green colour as the crystals of the salt have in similar circumstances. But, not to lose the nitrat of copper which is obtained in coining, by precipitating the silver of the nitrat by means of copper, there is formed of it in England, what is called *blue earth*, or *blue ashes*, used for painting or staining paper. To a solution of copper in nitric acid, they add powdered chalk; stir the mixture to facilitate the decomposition of the nitrat of copper; there should be a small excess of the nitrat of copper, that all the lime may be absorbed; and, that the precipitate, which takes place the moment the mixture is made, may be a precipitate of copper only, let this precipitate settle; then pour off the liquor, which is nitrat of lime, and wash several times; then put the whole into a cloth, that it may strain at leisure. With this precipitate, which is of a faint green colour, commonly called *mountain green*, blue ashes are prepared: for which purpose,

purpose, put a certain quantity on a stone or in a large mortar, and add a little quicklime in powder; the mixture, by trituration, assumes immediately a bright blue colour: the quantity of lime should be seven or ten parts to 100 of the precipitate. If the precipitate be too dry, add a very little water, to give the mixture a proper consistence for trituration. Then dry the whole. This is totally soluble in acids with effervescence, and carbonic acid gas is disengaged, which proves that a great quantity is absorbed in its formation. Pelletier, to whom we are indebted for this process, regards *blue ashes* as a combination of carbonat of lime and carbonat of copper.

The nitrat of copper exhibits the same phenomena as the sulphat, when combined with alkalis; but in general the precipitates are of a finer blue. Ammoniac re-dissolves the precipitate, and produces a triple salt, nitro-ammoniaco of copper. The hydro-sulphures and Prussiats produce the same effects as with the sulphat of copper. The sulphuric acid likewise dissolves nitrat of copper, and blue crystals of sulphat of copper are obtained, if the acid be used in a very concentrated state. Iron has a stronger affinity with most acids than copper. When a plate of iron is plunged in a solution of copper by acids, and in particular by the nitric acid, the copper is precipitated in the metallic form, and covers the surface of the iron; this precipitation depends on the stronger affinity of the iron than of the copper to oxygen. The sulphat of copper exhibits the same phenomenon, and this process has been used by impostors to make the credulous believe they were able to convert iron into copper.

The muriatic acid does not dissolve copper, unless it be concentrated and boiling. Only a small quantity of hydrogen gas is disengaged during this solution. The combination forms a magma very soluble in water; if it be lixiviated, the water becomes of a beautiful green colour, which distinguishes this solution from the two foregoing; when slowly and cautiously evaporated, and suffered to cool, it deposits prismatic crystals of a regular form; on the contrary, if the evaporation has been too rapid, and the cooling too sudden, it presents only very small sharp needles. The muriat of copper is of a very agreeable grass green colour, its taste is caustic, and very astringent, and it melts by a gentle heat, congealing again into a mass when suffered to cool. It strongly attracts the moisture of the air, and is decomposable by the same intermediums as the preceding salts of copper. The sulphuric and nitric acids do not decompose this muriat. The nitric solutions of mercury and silver decompose it by double affinity, a white precipitate being formed by the transposition of the muriatic acid to the oxyd of mercury or of the silver, and by the union of the oxyd of copper to the nitric acid. Evaporated to dryness, it assumes a brown colour; and, if the experiment is made in close vessels, oxygenated muriatic acid may be obtained; which proves that the copper in this state contains less oxygen.

Arsenical acid has some action with the oxyd of copper, but none on the metal itself. Fluoric acid dissolves copper, and still more readily its oxyd. The blue gelatinous solution which it forms affords crystals of a blue colour, and cubical shape. Boracic acid has little action directly on copper in the moist way; but, if a solution of borax be added to a solution of sulphat of copper, a pale green coloured salt is precipitated, which is difficultly soluble in water, but which, in the fire, melts into a greenish glass. Phosphoric acid dissolves only a small portion of copper, but it acts more powerfully on the oxyd. The solution affords, by evaporation, a green transparent gum-like mass, which melts into a dark opake glass in the fire. The affinity of these acids for copper is still very undetermined. Copper will not combine with carbonic acid but in the oxyd state: this combination is called carbonat of copper, or *malachite*. This carbonat may be decomposed by heat in the pneumatic apparatus; carbonic acid gas passes over, and a brown oxyd of copper remains in the retort, if the heat has been strong enough towards the end. Most of these salts are soluble in alcohol, especially the nitrat and muriat of copper. The alcohol then burns with a green flame.

Copper decomposes muriat of ammoniac very readily. Bucquet who examined this decomposition with great care, obtained by the pneumatic apparatus over mercury, from two drachms of copper filings, and one drachm of ammoniacal muriat, fifty-eight inches of elastic fluid, of which twenty-six inches consisted of very pure ammoniac gas, twenty-six of detonating inflammable gas, and six of mephitical gas, which extinguishes candles without being absorbed with water, and without precipitating lime water. A small quantity of liquid ammoniac is disengaged, which swims over the mercury. When this decomposition was repeated in the dose of four ounces of copper with two ounces of ammoniacal muriat, in the common apparatus, Bucquet obtained two drachms eighteen grains of blue liquid ammoniac, which effervesced a little with acids, and contained about one cubic inch of carbonic acid in the drachm. Fourcroy repeated this experiment, with ammoniacal muriat purified by sublimation, and obtained a very caustic ammoniac, which did not at all effervesce with acids. The oxyd of copper likewise decomposes ammoniacal muriat, and affords a portion of carbonac acid, together with the ammoniac it disengages, which renders the latter effervescent. This alkali is always blue, because it carries up with it a small portion of the oxyd of copper, to which its colour is owing. Acids do not however precipitate this metal. Two medicines are prepared in pharmacy with ammoniacal muriat and copper, of which the first has received the name of *cupreous ammoniacal flowers*, or *ens veneris*, and is nothing more than ammoniacal muriat coloured by a small portion of oxyd of copper. A mixture of eight ounces of this salt, with one drachm of the oxyd of copper, is sublimed in two earthen vessels, the one placed on the other: all the ammoniacal muriat is volatilized without being decomposed, and carries up a small quantity of oxyd of copper, which gives it a bluish colour. The second, which is called *aqua celestis*, is prepared by suffering a pound of lime-water, and an ounce of ammoniacal muriat, to remain in a copper vessel without heat for ten or twelve hours; the lime disengages the ammoniac, which dissolves a small quantity of copper of the bason, and produces the blue colour. The celestial water may be made in a glass or earthen vessel, if a small quantity of filings, or oxyd of copper, be added to the lime-water and ammoniacal muriat. In either case, the liquor is to be filtered; and it may be observed, that in this experiment calcareous muriat and ammoniacal cupreat are formed. From the cupreat may be obtained crystals by evaporation. It does not fulminate, like the orat of ammoniac; but it is as soluble. By distillation, water, azotic gas, and oxyd of copper, are obtained.

Copper appears to decompose sulphat of alumine; for if a solution of this salt be boiled in a copper vessel, a small quantity of alumine is deposited; and, when the alumine is precipitated by ammoniac, its earth assumes a slight blue colour, denoting the presence of copper. This effect may likewise be attributed to the small excess of acid which sulphat of alumine always contains.

The uses of copper are numerous, and well known. The alloy of copper and zink is most commonly preferred, on account of its great ductility and its beauty. As copper is a very violent poison, it ought never to be administered in medicine. The properest remedies in case of poisoning by copper reduced into oxyd or verdegris, are emetics, abundance of water, alkaline sulphures, alkalis, &c.

OF SILVER.

Silver called *Luna* or *Diana* by the alchemists, is of a white colour, and of the most lively brilliancy; it has neither taste nor smell; its specific gravity is such, that it loses

loses about the eleventh part of its weight by immersion in water, and a cubic foot of this metal weighs 720 pounds. Silver is so ductile, that it may be beat into exceedingly thin leaves, and drawn into wire much finer than a hair. A grain of leaf silver measures somewhat more than fifty-one square inches, and the silver wire, used by astronomers, about the 750th part of an inch in diameter. This is about half the diameter of a fine human hair. A grain of silver may be extended so as to form a vessel capable of containing an ounce of water. Its tenacity is so considerable, that a silver wire of the tenth of an inch in diameter, may sustain a weight of 270 pounds without breaking. Its hardness and elasticity are not equal to those of copper. It is the most sonorous of metals after those we have mentioned. It hardens under the hammer, but very readily loses that hardness by heating. Tillet and Mongez have crystallized this metal, and obtained quadrangular pyramids, sometimes insulated like those which are found on the edges of the crucibles in which this metal has been melted, or grouped and laterally placed one on the other.

The only way of obtaining pure silver, much finer than that obtained by cupellation, is to extract it from muriat of silver. Silver sustains almost a white heat previous to fusion; and, in a very violent fire, it will volatilize. It oxydates with the greatest difficulty, by the combined action of heat and air; but the electric spark hastens the oxydation. Air seems to have no action upon this metal; yet the surface will be tarnished by long exposure.

To produce phosphorated silver, take one part of phosphoric glass, one half part of filings of silver, and of charcoal in powder one half of the weight of the silver. Put these together in a crucible, and expose them to the heat of a melting-furnace for half an hour. When the fusion is complete, the silver is seen at the bottom of the crucible, and little bubbles of phosphorus are disengaged: take off the crucible immediately, and set it in the air, that it may cool quickly. The silver soon becomes solid, and some sprigs of phosphorus may be taken out of the metallic button. The weight of the silver is increased, its ductility diminished; it appears grained and crystallized, and breaks under the hammer. Exposed on a cupel in a hot muffle, the phosphorus is dissipated, and the silver remains pure.

Sulphur combines readily with silver; this combination is usually made by stratifying plates of the metal with flowers of sulphur in a covered crucible, and quickly fusing the mixture: a deep violet coloured mass is produced, much more fusible than silver, brittle, and disposed in needles; in a word, a true artificial ore of silver, or sulphurated silver, is produced. The Germans call it *blanchmal*, on account of its resembling certain ores of silver which they call by that name. Some silver ores may be imitated by adding a little arsenic; this produces a reddish mass, somewhat like the native red ore of silver. The artificial sulphure of silver is easily decomposed by the action of fire, because of the volatility of the sulphur and the fixity of silver; the sulphur is consumed and dissipated, and the silver remains pure. Alkaline sulphure dissolves this metal in the dry way. When one part of silver is melted with three parts of sulphure of potash, the metal disappears, and becomes soluble in water, together with the sulphure. If an acid be poured into this solution, a black sulphurated precipitate of silver is obtained. Silver left in a solution of sulphure of potash, quickly assumes a black colour, and the sulphur appears to quit the alkali to unite with and mineralize the metal, as we have likewise observed it does with mercury.

Silver unites with arsenic, which renders it brittle; but the properties of this mixture are not yet known. It does not combine with cobalt without difficulty. It unites perfectly well with bismuth, and forms a brittle mixed metal, whose specific gravity is greater than that of the two metals separately taken. According to Cronstedt, silver does not unite with nickel; but when these metals are melted together, they remain beside each other, as if their specific gravity were precisely the same. It mixes by fusion with antimony, and affords a very brittle alloy. It seems capable of decomposing sulphure of antimony, and of uniting with the sulphur of that mineral, with which it has a stronger affinity than the antimony.

Silver combines readily with zink by fusion; an alloy is produced by this combination, granulated at its surface, and very brittle. It dissolves completely, and even without heat, in mercury. To produce this solution, silver leaf may be triturated with seven times its weight of the metallic fluid; an amalgam is produced, whose consistence varies according to the relative quantities of the two substances. Or, fine filings of silver may be used, in which case it should be powdered in a warm mortar with the mercury. This amalgam is capable of assuming a regular form; by fusion and slow cooling, it affords tetrahedral prismatic crystals, terminated by pyramids of the same form. The mercury assumes a degree of fixity in this combination; for a much stronger heat is necessary to separate it from the silver, than would be required to volatilize it alone. Silver is capable of decomposing corrosive mercurial muriat, either by the dry or the humid way. It unites perfectly with tin, but loses its ductility by the smallest addition of this metal. It readily becomes alloyed with lead, which renders it very fusible, and deprives it of its elasticity and sonorous quality. It unites with iron, and forms an alloy, which has been but little examined into, but may probably become of the greatest utility in the arts. It melts and combines in all proportions with copper; and may be even combined in equal quantities with silver, without sensibly changing the colour of that metal. Copper gives body, stiffness, and elasticity, to silver; but considerably diminishes its ductility. Copper is the alloy mixed with silver in making plate and money: without this, the silver would not be hard enough to resist its wear and use.

Almost all combustible matters have a certain action on silver; no metal is more quickly tarnished and coloured by inflammable matters; sulphurated hydrogen gas, from whatever substance it may be disengaged, communicates to it immediately upon contact, a blue or violet colour, inclining to black, and greatly diminishes its ductility. It is well known that fetid animal vapours, such as those of necessary houses, putrified urine, and hot eggs, produce the same effect on this metal.

The assay of silver ores varies according to their nature; such as contain native silver ore, require nothing more than separating and washing. Trituration with running mercury may be used for the accurate separating of this metal from the marine substances, which change it; the fluid metal dissolves the silver, and may be afterwards driven off by fire. Sulphureous silver ores require to be roasted, and afterwards melted with a greater or less quantity of flux; in this fusion, silver is obtained commonly alloyed with lead, copper, iron, &c. For the separation and accurate ascertaining of the quantity of pure metal contained in this alloy, a process entirely chemical is used, which depends on the properties of the other metals. Lead being capable of vitrifying, and of carrying with it in its vitrification the iron and copper, without acting on silver, this property is used to separate the silver from those with which it is alloyed; the silver is melted with a quantity of lead, which must be so much the more considerable, in proportion as the quantity of base metal is supposed to be greater. This alloy is then put in flat and porous vessels, made of calcined bones and water; this kind of crucible, which is called a *cuppel*, is well adapted to absorb the glass of lead, usually formed in cuppellation. After this process, the silver remains pure. In order to determine what quantity of base metal it contains, or its degree of fineness, the mass of silver is supposed to be divided into twelve parts, called *pennyweights*, and each of these pennyweights into twenty-four grains: if the mass of silver has lost a twelfth of its weight,

weight, it is called silver of eleven pennyweights fine; if it has lost only a twenty-fourth, it is called silver of eleven pennyweights twelve grains fine, and so forth. The cuppel, after this operation, is found to be much heavier, and contains the oxyd of vitreous lead, and that of the other metals, which were united with the silver, and have been separated by the lead. As the lead itself almost always contains a small quantity of silver, it is necessary first to cuppel it by itself, in order to determine the quantity of the silver it contains, and a deduction must be made from the button of fine silver obtained of the small portion known to be contained in the lead made use of, which is called the *witness*. Cuppellation is attended with a phenomenon, by which the artist is advertised of the state of the process as it goes forward. In proportion as the silver becomes pure by the vitrification and separation of the lead, it appears much more brilliant than the portion which is not yet fine; the brilliant part increases by degrees, and when all the surface of the metal become pure and luminous, the instant in which it passes to this state exhibits a flash or *fulguration*, which denotes that the operation is finished. Cupelled silver is very pure with respect to the baser metals it may have contained, but it may contain gold; and, as it always contains a certain quantity, another operation must be made to separate these two perfect metals. As gold is much less changeable than silver by most solvents, the silver is dissolved by the addition of the nitric or muriatic acids, or by sulphur; and the gold, on which these solvents have little or no action remains pure. This method of separating silver from gold is called *parting*.

The large works where silver is extracted from its ores and purified, are similar to those we have described for the assay of the ores of this metal. There are in general three methods of treating silver in the large way; the first consists in triturating virgin silver with mercury; this amalgam is washed to separate all the earth; it is then passed through the pores of bags of leather, and distilled in iron retorts; after which the silver is melted and cast into ingots. This process cannot be used with silver ores that contain sulphur: these are roasted and mixed with lead, to refine the silver by cuppellation. Rich silver ores are treated in this manner, but the poorer ores are melted without previous roasting, with a small quantity of pyrites. This fusion, which is called the *crude fusion*, affords a mat of copper in combination with silver, which is treated with lead in the way of elliquation; the latter, which carries down the silver during the fusion, is afterwards scorified on the cupel, and the silver remains pure. Cuppellation in the large way differs from that which is made in the small way, in this circumstance, that in the first, the scorified lead is driven off by the action of a bellows, whereas, in the latter, the oxyd of vitreous lead is absorbed by the cuppel.

The silver obtained by the processes here described is, in general, much less liable to alteration than all the metals hitherto described. The contact of light does not at all change this metal, however long it be exposed to it; heat melts it, causes it to boil, and to become volatilized, but without alteration. It does not melt in less than a white heat, but is more fusible than copper. When it has been held in fusion for a certain time, it boils and emits vapours, which consist of silver volatilized. This fact is proved by the existence of the metal in the funnels of chimneys, under which large quantities are continually melted. It is likewise confirmed by the capital experiment of the Academicians of Paris, who exposed very pure silver to the focus of Trudaine's lens. These philosophers observed, that the melted metal emitted a thick fume, which completely silvered a piece of gold held over it.

The following additional remarks on the subject of cuppellation, are extracted from the new work of Vauquelin. With regard to the proportion of lead to be used, if the silver contains a twentieth part, or 0·05, of copper, then four times and a half as much lead as of silver will be required; but, if it contains 0·20, at least eleven times as much will be necessary. If the silver is so alloyed with copper as to require fifteen or sixteen parts of lead to separate it, not more than eight grains can be assayed at a time, unless you have a cuppel twice or thrice as large as for silver containing but one twentieth of copper; for, the cuppels can hardly absorb more than their own weight of the oxyd of lead; then the remainder would lie at the surface of the water, which would be inconvenient. It is proper to have the heat greatest at the beginning of the operation; but a very great heat is improper towards the end, as part of the silver might be volatilized, and the metallic button become too hard, which are two great inconveniences, where perfect exactness is required as to the fineness of the lump; therefore, when the operation is about two-thirds over, draw the crucible towards the front of the furnace, that it may have precisely the quantity of heat necessary to bring on the fulguration or corruscation spoken of before: for at the moment the last portions of lead evaporate, the surface is covered with streaks exhibiting all the colours of the rainbow. It will be known that the assay has been well made, when the remaining button is round, of a bright white colour, crystallized above and below, and lastly, if it is easily loosened from the cuppel when cold. It is very difficult, however, without much practice, to adjust a proper degree of heat to silver of different fineness; but, in general, silver much alloyed requires a stronger heat, especially towards the beginning, than fine silver; and that fine silver will require but one part and half of lead, and less fire, particularly towards the conclusion of the operation.

Mr. Keir has described, in the Philosophical Transactions for 1790, a method of separating these metals from each other, which appears to be particularly useful in the arts. It consists in putting the mixture of silver and copper, or copper plated with silver into an earthen glazed pan, and pouring on them a mixture of sulphuric acid and nitrat of potash, in the proportion of from eight to ten parts of the acid to one part of the nitrat. The mixture is to be stirred so that the surface of the pieces of metal may be frequently exposed to fresh portions of the liquor. The solution is to be assisted by a gentle heat of from 100 to 200 of Fahrenheit's scale. When the liquor is nearly saturated, the silver is to be precipitated from it by the addition of muriat of soda. A muriat of silver is formed, easily reducible in a crucible by melting it with a sufficient quantity of potash; and lastly, by refining the melted silver, if necessary, with a little nitrat of potash thrown on it. In this manner the silver will be got sufficiently pure, while the copper remains unchanged.

Silver is dissolved by the sulphuric acid when very concentrated or boiling, and the metal is greatly divided. Much sulphureous acid gas is disengaged during this solution; the silver is converted into a white matter, on which sulphuric acid must be poured, in order to hold it in solution: very small needles of sulphat of silver are obtained by evaporating this liquor; Fourcroy obtained this salt in plates, formed by the union of these needles length-wise. This salt melts in the fire, and is decomposed: the acid is driven off by heat, then the oxygen, and the silver is left in its metallic state. It is decomposable by alkalis, iron, copper, zink, mercury, &c. All the precipitates obtained by alkalis, are reducible without addition, and become converted into fine silver, in closed vessels. The hydro-sulphures precipitate the silver from its sulphuric solution, of a fine black colour; the muriatic acid, and all the muriats, decompose this salt.

Nitric acid dissolves silver; but the proportion is not easy to be known, as it depends on the degree of concentration of the acid: sometimes it requires one part and a half, at other times two parts, to one of silver. For a very clear and pure nitric solution of silver, it will be necessary to use the cuppelled silver, without which the nitric

nitric acid will take a blue or red tinge, shewing that it contains copper. It is necessary also to examine the purity of the nitric acid; for, if it contains sulphuric or muriatic acid, a white precipitate, more or less abundant, will be formed. A large matrass should be used, for the action of the nitric acid upon the silver is very strong and rapid; and a large quantity of nitrous gas is disengaged, even without the assistance of heat. This solution is exceedingly caustic, tinges the epidermis of a black colour, and entirely corrodes it. When highly charged with the metal, it deposits slender brilliant crystals, resembling those of boracic acid; when half evaporated, it affords, by cooling, flat crystals, which are either hexagonal, or triangular, or square, and appear to be formed of a great number of small needles, placed one beside the other. These are called the *nitrat of silver*, or *lunar crystals*. The salt is quickly altered by the contact of light, and blackened by combustible vapours. It detonates on heated charcoal, and leaves a white powder, which is pure silver. It is very fusible: if it be exposed to heat in a crucible, it first swells up and loses the water of crystallization, after which it remains in fusion; and, if suffered to cool in this state, it appears to be a grey mass, and forms a preparation known in pharmacy and surgery by the name of *lapis infernalis*. It is not necessary in making this preparation to use the crystallized nitrat of silver, which is difficult and expensive to obtain; as it is sufficient to evaporate a solution of silver in the nitric acid to dryness, and to put this residue in a crucible or silver ladle, as Baumé advises, and to heat it slowly till it is in an undisturbed fusion, in which state it must be poured into a mould, to give it the form of small cylinders. If the cylinders of lapis infernalis be broken, they are found to be of a needle-formed texture, radiating from the axis of each cylinder. Nitrat of silver must not be too long heated to make the lapis infernalis, as by that means a part of the salt would be decomposed, and a button of silver would be found at the bottom of the crucible. To ascertain what passes in this operation, Fourcroy distilled this salt in the pneumatic apparatus; they afforded nitrous gas, and vital air, mixed with a small quantity of azotic gas; the silver was recovered in the matrass, entirely reduced. The glass was opake like enamel, and of a beautiful marron brown colour. Nitrat of silver, exposed to the air, does not attract moisture; it is very soluble in water, and may be dissolved by twice its weight of cold water, but boiling water will dissolve almost its own weight.

Take silver of twelve carats fine, dissolve it in very pure nitric acid, and then precipitate it by lime in the oxyd state; strain, and dry the precipitate with a gentle heat, or in the sun. Pour ammoniac over this dried oxyd of silver, and by spontaneous evaporation you have *fulminating silver*, or *ammoniacal oxyd of silver*. Great care must be taken in the preparation of this oxyd, for it detonates with extreme facility, owing to the decomposition of the ammoniac and the oxyd; for the hydrogen of the ammoniac combines with the oxygen of the oxyd, and the azot is disengaged. We are indebted to Berthollet for this experiment.

Put a solution of silver in nitric acid into a glass; drop in some sulphuric acid, and a white pulverulent precipitate is produced immediately; this is sulphat of silver. The same decomposition takes place with any other sulphat. In this case there are two decompositions, and two fresh combinations: the nitric acid, separated from the silver, unites with the base of the sulphuric salts. The muriatic acid, and its combinations, present the same phenomena. If a hydro-sulphure be poured into a solution of nitrat of silver, the silver is precipitated black.

Most metallic matters are capable of decomposing the nitric solution of silver, because they have a stronger affinity than that metal with oxygen. The arseniat of potash, dissolved in water, produces a reddish precipitate in the nitric solution, which consists of silver united with arsenic acid; this precipitate resembles the red ore of silver; but, if the solution of silver is not perfectly saturated, the precipitation does not take place. Silver may be precipitated in its metallic state by most metals; but we shall more particularly attend to the separation of this metal by mercury or by copper, because of the phenomena the first presents, and the utility of the latter.

Silver separated from the nitric acid by mercury is in its metallic state, and the slowness of its precipitation produces a peculiar symmetrical arrangement, known by the name of *Arbor Dianæ*, or the *philosophical tree*. There are many processes for obtaining this crystallization. Lemery directs one ounce of fine silver to be dissolved in nitric acid of moderate strength: this solution is to be diluted with about twenty ounces of distilled water, and two ounces of mercury are to be added: in forty days a very beautiful vegetation is formed. Homberg has prescribed a much shorter process: according to this chemist, an amalgam of four drachms of leaf silver, with two drachms of mercury, must be made in the cold, this amalgam is to be dissolved in a sufficient quantity of nitric acid, and a pound and a half of distilled water must be added to the solution. A little ball of the soft amalgam of silver must be put into an ounce of this liquid, and the precipitation takes place almost instantly. The precipitated silver, united to a portion of the mercury, disposes itself in fibres of a prismatic appearance on the surface of the amalgam: other fibres appear and insert themselves in the foregoing, so as to exhibit a vegetation in the form of a bush. Lastly, Baumé has described a method of obtaining the arbor Dianæ, which differs in some respects from that of Homberg, and succeeds with greater certainty; he directs six drachms of the solution of silver, and four of the solution of mercury, in the nitric acid, both well saturated, to be mixed, and five ounces of distilled water to be added to this liquor. The mixture must be poured into an earthen vessel, upon six drachms of an amalgam of silver, made with seven parts of mercury and one part of silver. These two methods succeed much more quickly than that of Lemery, by the reciprocal action and affinity between the metallic substances. In fact, the mercury contained in the solution attracts that of the amalgam; the silver contained in the latter acts likewise on that which is held in solution, and from these attractions a quicker precipitation of the silver takes place. The mercury, which composes a part of the amalgam, being more abundant than is necessary to precipitate the silver from the solution, produces likewise a third effect of considerable importance; it attracts the silver by the affinity and tendency it has to combine with that metal, and it effectually combines with it; since the vegetations of the arbor Dianæ are a true brittle amalgam of a crystallized form. This crystallization succeeds much better in conical vessels, or glasses, than in round or open vessels, such as the cucurbit recommended by Baumé. It may likewise be observed, that it is necessary to place the vessel in which the experiment is made, in a situation where it may not be shaken, or agitated, as such circumstances would effectually prevent the symetrical arrangement of the crystallization.

Copper plunged in the solution of silver, precipitates this metal likewise in a brilliant and metallic form. This process is usually employed to separate the silver from its solvent, after the process of parting. Plates of copper are immersed in the solution, or the solution itself is poured into a vessel of copper; the silver immediately becomes separated in whitish grey flocks. When the liquor becomes blue, and is deprived of all its silver, it is decanted off; the silver, after being washed several times in water, is melted in a crucible and cuppelled, in order to separate it from the portion of copper with which it united during the separation. The silver afforded by this operation is the purest of all; it is twelve pennyweights fine. From these two precipitations of silver by mercury and copper, we see, that metals separated from their

their solvents by other metallic matters, are precipitated with all their properties.

The muriatic acid does not immediately dissolve silver, but it perfectly dissolves its oxyd. Muriat of silver is obtained by decomposing the nitrat with muriatic acid, or muriat of soda: the very abundant precipitate which is instantly formed, is muriat of silver. If the oxygenated muriatic acid be poured on leaves of silver, the silver will become oxydated by separating oxygen from the oxygenated muriatic acid: the oxyd thus formed then dissolves in muriatic acid.

The muriat of silver possesses many properties which deserve to be known; it is so fusible, that it melts when exposed in an apothecary's phial to a mild heat; even in that of hot ashes. By this fusion it is converted into a grey and semi-transparent substance, resembling horn, and for that reason has been called *luna cornea*. If it be poured on a stone, it becomes fixed in the form of a friable matter, crystallized as it were in fine silvery needles. When heated for a long time with contact of air, it is decomposed; it passes easily through the crucibles: part is volatilized, and part is reduced into metal, affording globules of silver, interspersed among the portions of the muriat of silver which is not yet decomposed. This salt, exposed to light, loses its white colour, and becomes brown in a short time. It dissolves in water in but a very small quantity; a pound of distilled boiling water taking up only three or four grains, according to the experiment of Monnet. Alkalis are capable of decomposing muriat of silver, dissolved in water, or in the dry way by heat; this method affords the purest and finest silver known. A mixture of three parts of soda, with one part of muriat of silver, is melted in a crucible: when it is in strong fusion it is taken from the fire, suffered to cool, and broken; the silver is found beneath the muriat of soda, formed in the operation, and the superabundant portion of alkali employed. Baumé, the inventor of this process, affirms, that the quantity of alkali he directs prevents the muriat of silver from passing through the crucible, by acting on all its parts, which it decomposes at once. Margraaf has given another process for reducing this salt, and obtaining perfectly pure silver: Five drachms sixteen grains of muriat of silver are triturated in a mortar, with one ounce and a half of ammoniacal carbonat, a sufficient quantity of distilled water being added to form a paste; this mixture is agitated till the swelling and effervescence, which are excited, have subsided. Three ounces of purified mercury are then added, and triturated, till a perfect amalgam of silver is obtained: this is washed with a large quantity of water, the trituration still being continued, and the washing renewed, till the water passes off very clear, and the amalgam is very bright. The amalgam being then dried and distilled in a retort, till the vessel has acquired a white heat, the mercury passes into the receiver, and the silver is found pure at the bottom of the retort. In this way the metal is obtained in the most perfect state of purity, and without any sensible loss. This is the silver which ought to be used in the nicer chemical experiments. The water employed in washing the mixture carries off two substances; a certain quantity of ammoniacal muriat, which it holds in solution, and a white insoluble powder. When the latter is sublimed, a small quantity of silver is found at the bottom of the sublimatory vessel. This experiment shews, that muriat of silver is not completely decomposed unless by the double affinity. In fact, in the process of Margraaf, the ammoniac does not unite with the muriatic acid, but because the silver combines on its part with the mercury, which attracts and tends to separate it from the acid, which the alkali alone could not do. It is easily seen, that this long and expensive operation can only be used in the small works of a chemical laboratory. If muriat of silver in large quantities be required to be reduced, either fixed alkalis, or some metallic substance, must be used, which have a stronger affinity than silver with the muriatic acid; such among others, are antimony, lead, tin, iron, &c. If one part of muriat of silver be melted in a crucible with three parts of one of these metals, the silver will be found reduced at the bottom of the crucible, and the metal united to the muriatic acid. Silver precipitated in this manner is very impure, and always contains a portion of the metal used for the reduction; and as lead is most commonly employed, according to the advice of Kunckel, the silver obtained requires to be cupelled; it cannot consequently be brought to the same state of purity with the silver reduced directly by alkalis, or by the process of Margraaf.

The nitro-muriatic acid acts strongly on silver, and precipitates it in proportion as it is dissolved: this effect may easily be understood; the nitric acid first dissolves the metal, and the muriatic acid seizes it, forming muriat of silver, which falls down on account of its small degree of solubility. This process may be used to separate silver contained in gold.

This metal does not appear to be altered by neutral salts; it is certain that it does not detonate with nitre, nor decompose ammoniacal muriat. This unchangeableness of silver with nitre, affords a good method of separating it by detonation from the metals with which it may be united, such as copper, lead, &c. The alloyed metal must be melted with the addition of nitre; the salt detonates and burns the portion of foreign metal, and the silver remains at the bottom of the crucible, in a state of much greater purity than before.

The oxyd of silver precipitated by caustic alkali, from its solution in nitric acid, is soluble in ammoniac. Berthollet discovered that this combination possesses the property of fulminating in a degree superior to that of oxyd of gold. He remarks, that this substance fulminates with violence while still humid, if it be pressed with a hard body. In this experiment the silver was found constantly reduced. In the dry state, the slightest touch, or friction of any kind, is sufficient to make it fulminate. If a small retort be filled with a solution of the oxyd of silver in ammoniac, and exposed to a boiling heat, bubbles of azotic gas are disengaged, and small crystals are formed, which are opake, and have a metallic appearance. These crystals detonate by the slightest touch, even when covered by the liquor, and, in large quantities, produce dangerous explosions. The detonation of the oxyd obtained by lime was much more powerful than that by the fixed alkalis.

Silver is a metal highly useful, on account of its ductility, and its indestructibity by fire and by air. Its brilliancy renders it capable of serving the purposes of ornament. It is applied on the surface of different bodies, and even on copper; and likewise enters into the texture of rich silks; but its most considerable use is that of affording a matter, proper, by its hardness and ductility, to form vessels of all sorts. Silver plate is usually alloyed with one twenty-fourth of copper, which gives it a greater degree of hardness and coherence, and does not render it at all noxious, because the twenty-three parts of silver cover the copper, and entirely prevent its noxious effects. It is universally employed as a medium of exchange, in the form of money; in this case it is alloyed with one twelfth part of copper, and is consequently eleven penny-weights fine.

Of GOLD.

This metal, called *Sol* by the alchemists, is the most perfect and the least changeable metal known; it is of a yellow brilliant colour; no other substance in nature is so heavy, platina excepted, for it loses only between one nineteenth and one twentieth of its weight in water. Neither its hardness nor its elasticity are very considerable. Its astonishing ductility, which are well ascertained by the smallness of gold wire, and the thinness of gold leaf, is such, that an ounce of this metal is sufficient

sufficient to gild a silver wire of 444 leagues in length, and it is reduced into plates sufficiently thin to be blown away by the least breath of wind. A grain of gold, according to the calculation of Lewis, is capable of covering the surface of more than 1400 square inches. It is the most tenacious of all the metals; a gold wire of one tenth of an inch in diameter, being capable of sustaining a weight of 500 pounds without breaking. Gold soon becomes hard under the hammer, but immediately recovers its ductility by ignition. The colour of gold is susceptible of considerable variety; it is more or less yellow, and some specimens are almost white; these differences however seem to depend on some alloy. Gold has neither smell nor taste; it is capable of crystallizing by cooling, in short quadrangular pyramids, as Tillet and Mongez have observed.

Gold is almost always found in a native or virgin state: it is sometimes met with in small insulated masses, disposed on a matrix of quartz; sometimes it is in small spangles, intermixed with sand at the bottom of waters; and lastly, it is obtained from many ores into the composition of which it enters, such as galena, blend, red silver ore, and virgin silver. It is almost always united with a certain quantity of silver and other metals, forming natural alloys.

Gold exposed to the fire becomes red before it melts. In a strong heat it appears of a brilliant sea-green colour; but it does not melt completely till heated to whiteness, and crystallizes by slow cooling. The strongest heat of a furnace continued for an indefinite time does not produce any change in this metal; Kunckel and Boyle made this experiment, by exposing gold for several months to the fire of a glass-house. This inalterability, however, is merely relative to the fires we are able to make with combustible substances; for it appears certain that a stronger heat, such as that of the sun concentrated by glass lenses, is capable of depriving it of its metallic properties. Homberg observed that this metal, when exposed to the focus of the lens of Tschirnhausen, fumed, was volatilized, and even vitrified. Macquer found, that gold exposed to the focus of the lens of Trudaine, melted and exhaled a fume which gilded silver, and was therefore gold in a volatile state; that the globule of melted gold was agitated with a rapid circular motion, and became covered with a dull, and, as it were, earthy, pellicle; and, lastly, that a violet vitrification was formed on the middle of the globule. This vitrification gradually extended, and produced a kind of button, flatter, or of a larger curvature, than that of the globule of gold, which stuck on the globule itself, as the transparent cornea appears on the sclerotica of the eye. This glass increased in size, while the gold itself continually diminished; the support always appeared tinged with a purple colour, apparently produced by the absorption of part of the glass. Time did not permit Macquer to vitrify entirely a certain quantity of gold. This celebrated chemist observes, that it is a necessary condition, that the violet glass should be reduced with combustible matters, in order to justify the assertion, that it is the oxyd of that perfect metal, which would evidently appear to be the case, if it became revived into gold. However this may be, we think it may be considered as a true vitrified oxyd of gold, with so much the greater probability, as, in many operations with this metal, the purple colour is constantly produced, and many preparations of gold are employed to give that colour to enamel and porcelain. Gold is therefore oxydifiable like the other metals, and only requires, as likewise does silver, a stronger heat, and a longer time, to unite with the base of air, than other metallic substances. These circumstances, no doubt, bear relation to its density, and its small tendency to unite with oxygen. Gold may be converted into the state of purple oxyd by the action of a strong electric spark. Gold is not changed by exposure to air; its surface becomes tarnished merely by the deposition of foreign bodies which continually float in the atmosphere. Water does not at all change it, though, according to the experiments of Lagaraye, it seems capable of dividing it.

To prepare phosphorated gold, mix one half part of parted gold in powder, with one part of phosphoric glass, and about one-eighth of charcoal: put the whole into a crucible, covering the mixture with a little powdered charcoal: then urge a violent heat, strong enough to melt the gold: much phosphoric vapour flies off during the operation, but a little of the phosphorus remains combined with the gold. The gold is collected at the bottom of the crucible, but not in its natural state; it is whiter, breaks under the hammer, and has a crystalline form. Care must be taken not to continue the fire too long, as in that case the gold will be found unchanged at the bottom of the crucible; for Pelletier says, the combination may be decomposed, by roasting it in an open fire.

Sulphur and gold, when both very pure, will not combine; but an addition of iron makes them unite: this explains the presence of gold in pyrites. Sulphur is advantageously used to separate metals, with which gold may be alloyed, more especially silver: this alloy is melted in a crucible, and flowers of sulphur, or sulphur in powder, is thrown on its surface: the latter substance, melting and combining with the silver, floats above the gold in the form of a blackish scoria. It must be observed, that this operation, called *dry parting*, never separates the two metals accurately from each other, and that it is not used, except when the mass of silver does not contain a sufficient quantity of gold to repay the expence of the operation of parting by aquafortis.

Alkaline sulphures completely dissolve gold. Stahl even thinks that this process was used by Moses, to render the calf of gold adored by the Israelites soluble in water: to form this combination, a mixture of equal parts of sulphur and potash must be quickly fused with one-eighth part of the whole weight of leaf gold; this matter being poured out, and levigated on a stone, forms, with hot distilled water, a yellowish green solution, containing an auriferous sulphure of potash; the metal may be precipitated by means of acids, and separated from the sulphur, which falls down at the same time, by heating it in an open vessel.

Gold combines with most metallic substances, and exhibits many important phenomena in its combinations. It unites with arsenic, and forms a brittle pale compound; the last portions of arsenic are very difficultly separated from this alloy by the action of heat; the gold seems to communicate fixity to it. The alloy of cobalt and manganese with gold has not been sufficiently examined. It unites with bismuth, which renders it white and brittle, as do likewise nickel and antimony; as these metals are very oxydifiable, and, for the most part, fusible, they are easily separated from gold by the combined action of fire and air.

Sulphure of antimony has been greatly extolled by the alchemists for the purification of gold; when this substance is melted with half its weight of gold, alloyed with other metallic substances, as copper, iron, or silver, the sulphur of the antimony unites to the alloy, and separates them from the gold, which is found at the bottom of the vessel; this gold is contaminated with antimony, and must be purified by a white heat; the antimony by this treatment is volatilized, but the last portions require a very strong heat to drive them off. It is likewise observed, that this metal carries up certain portions of gold in its volatilization. This process, so celebrated by the alchemists, has not, therefore, any advantage over that in which sulphur is employed alone.

Gold readily unites with zink; the product is a mixed metal, more brittle and white in proportion as the quantity of metal is greater. This alloy, made with equal parts of each metal, is of a very fine grain, and takes to beau-

beautiful a polish, that it has been recommended by Hellot to make mirrors of telescopes, not being subject to tarnish. When the zink is separated from the gold by calcination, the oxyd which this metal affords is reddish, and carries up a small quantity of gold with it. Or the mixed metal may be put into nitric acid, which dissolves the zink without affecting the gold.

Gold has a stronger affinity with mercury than with other metallic substances, and is capable of decomposing their amalgams; it unites with mercury in every proportion; but La Grange recommends to form amalgam of one part of leaf-gold with seven parts and a half of mercury; put these into a marble mortar, and triturate with a glass pestle till the amalgam is properly formed. The gold may be separated again from the mercury by heat, which occasions the mercury to volatilize. This amalgam is employed in water-gilding.

Though gold is not capable of oxydation by the action of the fire of our furnaces with access of air, it nevertheless becomes so when heated together with mercury: if mercury, with one forty-eighth of its weight of gold, be heated in a flat-bottomed matrass, whose neck is drawn out into a capillary tube, the two metallic substances become oxydated at the same time, and are converted into a deep red powder. This compound oxyd, according to Baumé, is obtained in much less time than that of mercury alone. We here see a metal, which, though very difficult to oxydate alone, assists and facilitates the oxydation of another metallic matter, which is likewise very difficultly oxydated.

Gold is easily alloyed with tin and lead; these two metals deprive it of all its ductility, rendering it brittle and fragile. Gold unites with iron by fusion: equal parts of gold and iron or steel form a grey mixture; but three or four parts of iron to one of gold produce a metal almost as white as silver. This alloy with iron is very hard, and may be used to form cutting instruments, much superior to those made with pure steel. Lewis proposes gold as a very proper and firm solder for small pieces of steel. Gold also combines with copper, which gives it a red colour, and greater firmness, at the same time that it renders it more fusible: this alloy is mixed in different proportions for money, plate, and toys; it is called red alloy, and is used as a solder for gold.

Gold and silver unite in all proportions. The metals, when mixed, seem to lose very little of their ductility; but they acquire firmness and elasticity. A twentieth part of silver renders gold considerably paler; but silver may be mixed with a fourth, or even a third, part of gold, without any apparent change of colour. This alloy is not, however, made without a certain degree of difficulty, on account of the different specific gravities of these two metals, as Homberg observes, who saw them separate during their fusion. The alloy of gold with silver forms the green gold of the jewellers and gold-beaters.

As gold is of the most extensive use, and, by the convention of mankind, is become, together with silver, the price of all the other productions of nature and of art, it is of importance to ascertain the degree of purity of this precious metal, in order to prevent the deceptions which covetousness might produce, and to cause the value of all the masses or pieces of gold dispersed in commerce to be the same, equal weights being supposed. Severe laws, founded in justice, have therefore been made, establishing the quantity of alloy necessary to be used, in order to give the due degree of hardness and rigidity to gold intended to form utensils in which these properties are necessary. Chemistry affords methods of ascertaining the quantity of imperfect metals mixed with gold: the operation by which this knowledge is obtained, is called the *assay of gold*. Twenty-four grains of the gold intended to be assayed is cupelled with forty-eight grains of silver and four drachms of pure lead; the latter, in its vitrification, carries along with it the baser metals, such as copper, &c. and the gold remains combined with the silver after the cupellation is finished. These two metals are separated by an operation called *parting*; the parting of gold and silver consists in the separating of the two metals by a solvent, which acts on silver without affecting gold: aqua-fortis is commonly used. Silver is added to the gold, because experience has shown that it is necessary the gold should be mixed with at least double its weight of silver, in order that the nitric acid may perfectly dissolve the latter metal. As three parts of silver are usually added to one of gold, this process is called *quartation*, the gold being one-fourth of the weight of the alloy. This proportion, however, as Vauquelin remarks in his late accurate experiments, is proper only when the gold is very fine, as 997, 998, or 999, parts fine in 1000; for, should it contain 200, 250, or 300, parts of copper, two parts of fine silver will suffice; but, as it is necessary for the quantity of silver to diminish in an inverse ratio to the purity of the gold, the lead, on the contrary, must increase in a direct proportion. It is easy to conceive, indeed, that, when the gold is fine, or almost fine, the lead is more necessary for favouring the fusion of the silver and the gold, than for refining the gold; but, when the gold contains much copper, the case is otherwise; if, for example, the gold is only 0·75 fine, then twenty-four times its weight of lead would be requisite for its purification, and so in proportion. The same remarks relative to the quantity to be assayed at a time, will hold good here, that were made on the cupelling of silver. A greater heat is necessary for assaying gold than for silver; but there is no danger of its fulminating like that metal, nor are the precautions there directed necessary here.

When the assay is complete, and the matter has cooled, the metallic button is to be hammered flat, and then roasted again, either by placing it on a piece of charcoal heated from underneath, or upon burning coals, or by putting it into the muffle of a cupelling furnace, taking care it does not melt. Then it is to be passed through an instrument, to form it into a plate, not more than one fourth of a line thick; this metallic plate is to be roasted again, and then rolled up spirally. The *plating*, and the *re-roasting*, are two operations necessary to the success of the process, and which require some precautions. 1. The plate must be neither too thick nor too thin; if too thin, it might break during the agitation caused by the boiling in aqua-fortis, which it is to undergo; if too thick, the aqua-fortis would not perhaps penetrate to its centre, so as to separate the very last particles of silver. 2. The re-roasting of the plate, while it gives it more pliability, and promotes its folding up, without breaking or cracking, opens the pores of it, which the pressure of the instrument had closed, and favours the action of the aqua-fortis.

Now put the rolled plate into a pear-shaped matrass, that is, one whose neck diminishes from the belly to the top; pour in pure aqua-fortis of 22° till the matrass, which usually holds about three ounces, be half or three parts full. Then place it on burning coals, covered with a slight layer of ashes, lest the vessel should break by the sudden heat; from the instant the liquor boils, till the end of the operation, should be about fifteen or twenty minutes. This is called *humid parting*: at this time a red vapour is disengaged, proceeding from the solution of the silver by the nitric acid: the rolled plate changes colour; it becomes brownish, loses its solidity and consistence, as is easy to conceive. When the aqua-fortis has thus boiled for twenty minutes upon the gold, the solution is to be carefully decanted off, taking care the gold does not fall; then pour on the same quantity as at first of aqua-fortis at 32°, to separate the last portions of silver that might adhere to the gold. This second operation is called the *repetition*. Let it boil this time for about seven or eight minutes; decant this aqua-fortis like the first, and then fill the matrass with distilled water, or very pure river-water. Invert a small crucible upon the aperture of the matrass; turn the matrass very carefully bottom upwards; the spiral gold sinks in the crucible through the

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the water, which supports part of its weight, and hinders it from breaking; then turn up the matrass quickly and dextrously, that the water may not escape in sufficient quantity to fill the crucible and run over the brim. Pour the water out of the crucible; and roast the spiral piece of gold once more in the crucible, covered, amidst burning coals, or under the muffle of a cupelling furnace.

The gold, which, on coming out of the aqua-fortis, was of the brown hue of oxyd of copper, extremely fragile, and diminished in volume, becomes ductile, and recovers its colour and metallic brilliancy by this operation. By the weight of the gold, the quantity of alloy it originally contained is known. To ascertain with precision the quantity of baser metal which the gold may contain, a given mass of gold is supposed to contain twenty-four parts, called *carats*; and, for great exactness, each carat is divided into thirty-two parts, called thirty-seconds of a carat: if the gold after the assay has lost one grain out of twenty-four, it is gold of twenty-three carats; if it has lost one grain and a half, it is gold of twenty carats sixteen thirty-seconds, and so forth. The weight used in the assay of gold is called the *assay weight*, and usually consists of twenty-four grains; it is divided into twenty-four carats, which are likewise subdivided into thirty-two parts: an assay weight, which weighs twelve grains, is likewise used, but divided into twenty-four carats, and the carat into thirty-two thirty-seconds.

Hitherto we have principally confined ourselves to the alloy of copper with gold and silver; but there are other mixtures which require some consideration. It sometimes happens that a large quantity of silver contains but a small quantity of gold: this is called *gilding*, and the assay is called an *assay of gilding*. And sometimes it happens, also, that a large quantity of gold contains a small quantity of silver. If these two metals alone were mixed, the process would be very simple: it would only be necessary to dissolve the first in pure aqua-fortis; and to add silver to the second, and then cupel it with lead. But there is almost always a certain quantity of copper in both mixtures, which must be separated by cupellation. If it be *gilding*, which is to be assayed, it will not be necessary to add silver, since the greater part of the mass is silver already; but, having determined the quantity of lead necessary to be added, by the usual methods, proceed to cupellation, as directed in the assay of silver, but not with such a heat as directed in the assay of gold. The first part of the assay being finished, weigh the button, which will shew the quantity of alloy it contained. Then flatten it under the hammer, and re-roast and boil with aqua-fortis, as directed before in the assay of gold, taking care to let the liquor settle after each boiling, otherwise the gold, being in small quantity, will be precipitated in a powder; and, the last time, give the crucible two or three slight knocks, to forward the precipitation, and detach any small particles that might adhere in the inequalities of the vessel. Then pour off the water very gently and carefully; and roast the gold again as before directed. The weight of gold makes known that of the silver, since you have only to subtract that from the weight of the original mass. In the second case, of a large quantity of gold containing a small quantity of silver, first try the mass by the touchstone, and add as much silver as is necessary to complete the inquartation; then cupel with the proper quantity of lead, according to the foregoing calculations: weigh the metallic button, and proceed in the usual way of assaying gold, having regard, in weighing the results, always to deduct the quantity of silver added at the beginning of the operation.

Gold is not altered by the most concentrated sulphuric acid, even though heated. The nitric acid appears capable of dissolving a small portion of this metal; several chemists think that this solution is produced rather mechanically, than by a true combination. Deyeux, member of the College of Pharmacy in Paris, has observed, that the nitric acid dissolves gold only when it is smoking, and charged with nitrous gas; he thinks that the acid in this state is not pure, and affirms that it is loaded with gas, and by that means converted into a kind of aqua regia. The muriatic acid alone, and in a state of purity, does not sensibly act on gold. Scheele and Bergman have discovered, that this acid, when oxygenated, dissolves gold absolutely in the same manner as aqua regia, and forms with this metal the same salt which is usually obtained with the mixed acid employed to dissolve it. The solution appears to take place in consequence of the excess of oxygen united to the muriatic acid; it is made without sensible effervescence, a circumstance common to all metallic solutions in the oxygenated muriatic acid. If gold leaf be shut up in close vessels with oxygenated muriatic acid gas, the gold soon disappears, and is converted into a yellow fluid. On opening the vessel, it will be found that the gas has been absorbed. Scherer observed, that concentrated oxygenated muriatic acid occasioned an immediate inflammation, on coming into contact with gold leaf.

Aqua regia, or nitro-muriatic acid, has been considered as the true solvent of gold; it does not, however, dissolve it better than the oxygenated muriatic acid. As soon as the nitro-muriatic acid comes in contact with the metal, it attacks it with an effervescence which is so much the stronger, as the acid is more concentrated, the temperature higher, and the gold more minutely divided. The operation may be hastened by a gentle heat, or at least its commencement may be forwarded; the bubbles succeed each other without intermission till a portion of the metal is dissolved, after which this appearance gradually ceases, and cannot be renewed but by agitation or heat; nitrous gas is disengaged during this solution. The nitro-muriatic acid, when saturated with as much gold as it is capable of taking up, is of a yellow colour, more or less deep, considerably caustic, corrodes animal matters, and tinges them of a deep purple colour. By cautious evaporation it affords crystals of a beautiful gold colour, resembling topazes, and appearing to consist of truncated octahedrons, and sometimes tetrahedral prisms. This crystallization is not easily effected. Bergman considers this salt as a true muriat of gold: if the crystals be heated, they melt and assume a red colour. This salt strongly attracts the moisture of the air. When a solution of gold is distilled, a beautiful red liquor is obtained, which is found to consist of the muriatic acid, charged with a small portion of gold. The alchemists, whose labours with gold were immensely great, gave the name of the *red lion* to this liquor. Some crystals of gold, of a reddish yellow colour, are likewise sublimed in this process; but the greatest part of the metal remains at the bottom of the retort, and requires only to be fused, in order to regain all its properties. According to Vauquelin, the chromo-muriatic acid has the property of dissolving gold.

The solution of gold is decomposed by a great number of intermediums. Lime and magnesia precipitate gold in the form of a yellowish powder, which becomes darker by exposure to the air. Alkalis decompose the muriat of gold, forming triple salts. Fixed alkalis exhibit the same phenomenon; but it must be observed, that the precipitate is afforded very slowly, and that the solution assumes a reddish colour, if more alkali be added than is necessary; because the excess of this salt re-dissolves the precipitated gold. The precipitate of gold may be reduced by heat alone, in closed vessels, this oxyd readily suffering the oxygen to become disengaged in the form of vital air. It is, nevertheless, capable of being fused with vitreous matters, and communicating a purple colour to them; for the precipitate of gold, formed by the mixture of a solution of gold and the liquor of flints, is used in enamels and porcelain. Gold precipitated by fixed alkalis has likewise a property very different from that of gold in its metallic state; it is soluble in the pure sulphuric, nitric, and muriatic, acids; all these acids, heated on the yellowish precipitate of gold, readily dissolve it,

it, but do not become sufficiently saturated to afford crystals.

Ammoniac precipitates the solution of gold in much greater abundance. This precipitate, which is of a brown yellow, and sometimes of an orange colour, has the property of detonating with a considerable noise when gently heated: it is called *fulminating gold*. The ammoniac is absolutely necessary in the production of fulminating gold; this preparation may be formed either by precipitating a solution of gold in nitro-muriatic acid, made with ammoniacal muriat, by the addition of fixed alkali, or by precipitating with ammoniac a solution of gold, made in aqua regia, composed of pure nitric and muriatic acids. The fulminating gold always weighs one-fourth more than the gold dissolved in aqua regia. The terrible effects of fulminating gold render it necessary, to act with great caution in the management of this subject; it must be carefully dried in the open air, without being brought near the fire, as a strong heat is not necessary to produce the fulmination, and friction alone is sufficient for this purpose: the vessels which contain it ought not to be closed with glass stoppers, but with cork; the most dreadful accidents have shewn, that glass stoppers, by the friction they produce in the necks of the vessels, expose the operator to great danger, from the fulmination of such particles of gold as may remain between the stopper and the neck. If a very small quantity of this fulminating gold be put on the blade of a knife, and gently heated, it catches fire, and gives a violent explosion. The oxygen of the oxyd of gold seizes on the hydrogen, and forms water, which, driven up suddenly in vapour, occasions the explosion; the azot is disengaged, and the gold remains pure; it is found incrusted on the blade of the knife. Berthollet has proved, that, by distilling this salt in metal tubes, azot is produced, and the gold was reduced to its metallic state. To deprive it of its fulminating property, Darcet put some to soak in oil, and then heated it in a crucible. It is soluble in an excess of alkali.

Gold is precipitated from its solutions by all bodies which have more affinities with oxygen than gold has. With sulphureous acid, sulphuric acid is formed, and the gold is precipitated. We must here observe, that gold, precipitated from its solution by any intermedium whatsoever, is perfectly pure, even more so than gold purified by the process of parting; because it is separated from the silver it may contain in this last process, which may fall down in the form of a muriat, and takes place even during the solution of gold, as we have before remarked.

A plate of tin, plunged in a solution of gold, separates the gold in the form of a deep violet powder, called *purple precipitate of Cassius*. This precipitate, which is used in painting in enamel and on porcelain, is prepared by diluting a solution of tin in nitro-muriatic acid, with a large quantity of distilled water, and pouring in a few drops of the solution of gold; when the solutions are well saturated, a red or crimson precipitate is immediately formed, which at the end of a few days becomes purple: this precipitate is light, and, as it were, mucilaginous; it is separated from the liquor by filtration, washed, and afterwards dried. The experiments of Pelletier have proved why the precipitation of gold does not take place with the oxygenated muriat of tin.

Lead, iron, copper, and silver, have likewise the property of separating gold from its solvent; lead and silver precipitate it of a deep and dirty purple; copper and iron separate it with its metallic brilliancy. Alcohol, acetit of copper, and green sulphat of iron, precipitate the solution of gold, because those substances are susceptible of uniting to a greater quantity of oxygen, and they seize on that which was united to the gold, and by means of which it was held in solution. But the super-oxygenated oxyd of iron causes no precipitate, the reason of which must be apparent from what has been said above.

Sulphuric ether is another means of recovering gold from its nitro-muriatic solution; thus general Lamotte prepared his *drops*. A solution of gold applied to bones, ivory, feathers, and vegetable matters, as linen, &c. leaves a purple-red spot not to be effaced; on the skin it will leave purple spots, which last several days; they turn, by degrees, brown, and almost black.

The name of gold in rags, is given to the following preparation: Very fine clean rags are steeped in a solution of gold, and afterwards dried and burnt in a crucible: the ashes, which are of a dark purple colour, are used to gild small pieces of copper and silver; it is generally rubbed on with a bit of cork, and the gold, being so minutely divided, easily adheres.

Gold is applied to a great number of uses; its scarcity and price in a great measure prevent its being made into utensils or vessels; but, as its brilliancy and colour are very agreeable, methods have been found of applying it to the surface of a great number of bodies, which it at the same time defends from the impressions of the air. This art, in general called gilding, is performed in a variety of methods. Leaves of gold are often applied on wood by means of some glutinous substance. A powder of gold is prepared by triturating the clippings of gold leaf with honey, washing the paste with water, and drying the particles of gold which precipitate. Shell-gold is an oxyd of gold, mixed with a mucilaginous water, or solution of gum. Water gilding is done by previously cleaning a piece of copper, intended to be gilt, with sand and weak aqua-fortis, called *aqua secunda*, after which the piece is plunged in a diluted solution of mercury; the mercury which precipitates causes the amalgam of gold to adhere, which is spread on the piece, after having washed it with water to carry off the acid; when the amalgam is uniformly spread, the piece is heated on charcoal, to volatilize the mercury, and the work is finished by covering it with gilder's wax, composed of red-bole, verdegris, alum, or martial vitriol, incorporated with yellow wax, and heated once more to burn off the wax. The other uses of gold, for toys, laces, &c. are sufficiently known without enumeration. As to the medicinal virtues attributed to gold, it is admitted, by all physicians of reputation, that they are imaginary, and that the effects of the different kinds of potable gold proposed by the alchemists, arise from the substances in which the metal has been mixed or dissolved.

Of PLATINA.

Platina, which has not been known as a peculiar metal above half a century, has been hitherto found only in the gold mines of America, more especially in those of Santa Fé near Carthagena, and in the bailiwick of Choco in Peru. The Spaniards give it this name from the word *plata*, which signifies silver in their language, by way of comparison to that metal, whose colour it imitates. The name of *white gold*, however, appears to agree better with its properties than that of *little silver*, because it in fact resembles gold much more than silver in most of its properties. Some toys made of platina were in existence before the time we have cited; but, as this metal cannot be melted and wrought alone, it is probable that the snuff-boxes, heads of canes, and other utensils of this kind, which were sold under the name of platina, were alloys of this metal, with certain metallic substances, which might give it fusibility. The platina, in mineralogical collections, has the form of small grains, its plates of a bluish black, whose colour is intermediate between those of silver and iron. These grains are mixed with many foreign substances; they contain small particles of gold, blackish ferruginous sandy grains, which by the magnifier appear scorified, and certain particles of mercury. If the grains of platina be examined under the magnifier, some appear angular, others round and flat, like a kind of button. When beat on the anvil, most of them are flattened, and appear ductile; some break into several

several pieces; the latter, examined more narrowly, appear to be hollow, and particles of iron and a white powder has been found within them. The property of being attracted by the magnet, which these grains possess, though accurately separated from the ferruginous sand they contain, must doubtless be attributed to a portion of iron contained within them. The hardness of this metal nearly approaches to that of iron; the specific gravity of platina, mixed with all the foreign matters we have spoken of, nearly approaches to that of gold; it loses in water between one-sixteenth and one-eighth of its weight. Buffon and Tillet compared together an equal volume of platina, and of gold reduced into particles similar to those of the platina, and found that the specific gravity of the former was about one-twelfth less than the gold. Late experiments have shewn, that platina exceeds gold in weight, when it has been purified by a long fusion.

It is not probable that platina exists in its ores in the same form as is comes to us, but that its granular or plated figure is produced by the motion of the waters by which it is carried from the mountains to the plains: that found in the largest grains, or lumps, is most valuable. It has been sometimes found in masses of considerable magnitude; the society of Biscay possess one of the size of a pigeon's egg. As it is found in the neighbourhood of gold mines, it is always mixed with a quantity of this metal. The mercury it contains is part of that used in extracting the gold. The first person who paid any particular attention to platina, was a Spanish mathematician, Don Antonio Ulloa, who accompanied the French academicians in the celebrated expedition to Peru, for determining the figure of the earth. This philosopher gives a cursory account of it in the relation of his voyage, published at Madrid in 1748. Charles Wood, an English metallurgist, brought a quantity of this metal from Jamaica in 1741, which he afterwards examined, and gave an account of his experiments in the Philosophical Transactions for 1749 and 1750: at this era, the greatest chemists in Europe appeared emulous in their inquiries respecting this new metal, which promised, by its singular properties, such considerable advantages. Scheffer, a Swedish chemist, published his experiments on platina in the Memoirs of the Academy of Stockholm, in 1752. Dr. Lewis made a connected and almost complete series of experiments on this metal, which may be found in the Philosophical Transactions for 1754. Margraaf has inserted in the Memoirs of the Academy of Berlin for 1757, an account of his experiments on this new metal. Most of these memoirs were collected by Morin, in a work entitled *La Platina, l'or blanc, ou le huitième Métal, Paris,* 1758. At the same time Macquer and Beaumé made, in conjunction, a great number of important experiments on platina, which were published in the Memoirs of the Academy for 1758. The scarcity of platina, and the difficulties attending the experiments made on it, stopped for a time the progress of inquiries, but within the last few years they have been resumed with new spirit. Bergman, Achard, and Morveau, have exerted themselves in the examination of the properties of this metal. Guyton has lately published remarks on the gangue of this metal; he found some grains adhering to feld-spar, which makes it to be presumed, that the platina had been loosened by a flood, and washed down as an auriferous sand.

Platina may be obtained in plates and in wire, and may be worked like gold and silver. There are several ways of purifying this metal: 1. By the magnet, which separates the iron. 2. By washing, which carries off the sand. 3. By acids. The methods most usually employed to make it pure and malleable, are as follow: 1. Take equal parts of crude platina, oxyd of arsenic, and acidulated tartrit of potash, or potash only. Put the mixture into a well-luted crucible, and expose it for an hour to a violent heat; the platina melts; but it is brittle, fragile, and whiter than ordinary; expose it to a strong heat under the muffle, by which means all the arsenic is driven off, and the platina remains pure. 2. Take three parts of platina, six of oxyd of arsenic, and two of pure potash; throw the mixture into a crucible in several parcels, or by degrees, to promote the oxydation of the iron. Then melt in crucibles with very flat bottoms, that the button may be very thin: thus you have the arsenical alloy. Put the button under the cupel, and heat for thirty hours, to volatilize the arsenic. The operation must be performed with great care and address; if the fire be too strong, it is often necessary to begin afresh: the degree of heat should be just sufficient to volatilize the arsenic without melting the metals; a beginning of fusion makes the arsenic adhere, so that it cannot be driven off. The result of this operation is platina in the spongeous form. To render it malleable, give it a red heat, put it on an anvil, and give it one good stroke with a hammer; one steady stroke will be sufficient, as a second might make it fly. Then give it a white heat, after which about fourscore strokes with a heavy hammer will make it malleable. Vessels are advantageously formed of platina, by pouring a mixture of arsenic and platina into moulds of clay, and exposing the moulds to a heat sufficient to dissipate the arsenic.

Guyton substituted the arseniat of potash to the oxyd of arsenic. The same chemist likewise succeeded in melting platina in the wind-furnace described by Macquer, by means of his own reducing flux, composed of eight parts of pounded glass, one part of calcined borax, and half a part of charcoal in powder. Small portions alone, and without addition, are now very easily melted, by heating them on a lighted charcoal, with a stream of vital air; but these small ductile globules cannot be applied to any use, on account of their inconsiderable size. The platina, when pure, is nearly of the colour of silver. It resists a very strong heat, but is oxydified by the electric spark.

Phosphorus combines easily with platina: Mix equal parts of platina and phosphoric glass with one-eighth of charcoal; put them into a crucible, and sprinkle over a little charcoal-dust; give a heat nearly sufficient to melt gold, and continue it for an hour; break the crucible, and underneath a blackish glass will be found a little white silvery button, the lower surface of which presents cubic crystals. The platina thus alloyed with phosphorus is very brittle, and pretty, striking fire with flint, and has no magnetic property; when exposed to a fire strong enough to hold it in fusion, the phosphorus quits it, and burns at the surface. The simple acids have no action upon this phosphure; but the nitro-muriatic acid decomposes it, forming a phosphat of platina. A mixture of phosphorated platina, and super-oxygenated muriat of potash, thrown into a red-hot crucible, produce a strong detonation; the platina remains in the crucible. The same effect takes place when phosphorated platina is thrown upon melted nitre. Another way of obtaining phosphure of platina, is by giving it a strong red heat; then throwing in a piece of phosphorus, and stirring it with an iron rod, the combination takes place. Sulphur combines also with platina. This metal is soluble in the alkaline sulphures, though only in small quantities.

Platina does not unite with all metallic substances. This metal unites very well with bismuth, which renders it so much the more fusible, as the quantity of the latter is greater; the alloy is brittle, and becomes yellow, purple, and blackish in the air. This mixed metal cannot be cupelled without the greatest difficulty, and never forms a mass of any considerable ductility. It fuses readily with twenty parts of antimony, and produces a brittle metal of a plated texture, from which the antimony may be separated by the action of fire, though not so completely, but that the platina always retains a sufficient quantity to render it defective in weight and ductility. Zink renders platina very fusible, and combines readily with it, assisted by a little borax; this alloy is brittle,

brittle, and difficult to file; its colour is bluish. When the platina is most abundant, these two metallic substances are separated by the action of fire, which volatilizes the zink, though the platina always retains a small portion.

Platina does not unite with mercury, though triturated for several hours with that metallic fluid. It is likewise known, that platina resists the mercury used in America to separate the gold. Many intermediums, such as water, used by Lewis and Beaumé, and nitro-muriatic acid by Scheffer, have not been found to facilitate the union of these two metals. In this respect platina appears to resemble iron, to whose colour and hardness it likewise in some respects approaches.

Platina mixes very easily with tin, and forms a very fusible and fluid alloy. It is brittle, so as even to break by a fall, when the two metals are united in equal portions. When the tin is in the proportion of twelve or more to one of platina, the mixture is considerably ductile, but its grain is coarse, and it becomes yellow in the air. Platina remarkably diminishes the ductility of tin, and the alloy does not promise to be of any use; yet, when it is well polished, it may remain long exposed to the air without alteration. It seems that Lewis, to whom we are indebted for most of the knowledge we possess respecting the alloys of platina, succeeded in oxydating this metal, and dissolving it in the muriatic acid by means of tin.

Lead and platina unite very well by fusion, but they require a stronger heat than the last-mentioned alloy. Platina deprives lead of its ductility; the combination of these two metals is of a purplish colour, and brittle, according to the proportion of platina, striated and granulated in its fracture, and quickly changes by exposure to air. Cupellation with lead was one of the first and most important experiments attempted to be made with platina, because this operation was expected to deprive it of the foreign metallic substances it might contain. Lewis, and several other chemists, have in vain attempted to cupel platina in the ordinary cupelling furnaces, though they applied a most violent heat. The vitrification and absorption of the lead takes place as usual at the commencement of the process, on account of the excess of that metal; but the platina soon becomes fixed, and the operation is at an end. The metal remains united with a portion of the lead, and is not at all ductile. Macquer and Baumé succeeded in the perfect cupellation of platina, by exposing an ounce of the metal, and two ounces of lead, in the hottest part of the porcelain furnace at Seves. The wood-fire lasts for fifty hours successively; at the end of this time the platina was found flattened on the cupel; its upper surface was dull and rough, and easily separated; its under surface was brilliant, and, what is the most valuable, it was easily extended under the hammer. These chemists were convinced, by every possible method, that the platina did not contain lead, but was very pure. Morveau likewise succeeded in cupelling a mixture of one drachm of platina, and two drachms of lead, in the wind-furnace of Macquer: this operation, made at four successive times, lasted eleven or twelve hours. Morveau obtained a button of platina, not adhering to the cupel, uniform, of a colour resembling tin, but rather rough, which weighed exactly one drachm, and was found to be not at all acted on by the magnet. This process appears to be excellently adapted for obtaining platina in plates or laminæ, which may be forged, and consequently may be employed in making various utensils of great value, with respect to hardness and unchangeableness. Baumé has likewise observed another very useful property, viz. that of welding and forging together, like iron, without the assistance of any other metal. After having heated two pieces of platina to whiteness, which had been cupelled in the furnace of Seves, he placed them one on the other, and striking them briskly with the hammer, they welded together as quickly and firmly as two pieces of iron would have done. The great importance of this experiment, with respect to the arts, need not to be insisted on.

Macquer could not obtain an alloy with forged iron and platina: this mixed metal would possess the great advantage of uniting the hardness of steel with a considerable ductility, or at least it would not be brittle like steel. Dr. Lewis melted a mixture of cast iron and platina; the alloy was so hard as not to be touched by the file; it had a slight degree of ductility, but broke short when ignited.

Platina communicates hardness to copper, with which it melts with considerable facility: this alloy is ductile, when the dose of copper is three or four times greater than that of platina; it is capable of taking the most beautiful polish, and was not tarnished in the air during the space of ten years. Platina partly destroys the ductility of silver, augments its hardness, and impairs its colour. This mixture is very difficult to fuse; by fusion and rest the two metals are separated. Lewis observed, that silver melted with platina was thrown up against the sides of a crucible with a kind of explosion; a property which appears to belong to silver alone; for Darcet has observed that this metal breaks balls of porcelain, in which it is enclosed, and is thrown out by the action of the fire.

Platina does not readily combine with gold, but by the help of a very strong fire. It greatly alters the colour of platina, unless its quantity be very small; thus, for example, a forty-seventh part of platina, and all the proportions below that, do not greatly change the colour of gold. Platina does not much impair the ductility of gold, which is less affected than any other metal by the admixture. The specific gravity of platina being superior to that of gold, might give rise to frauds; and for this reason the Spanish ministry have prohibited its exportation: however, since chemistry has discovered methods for distinguishing the alloy of gold with platina, and even of platina alloyed with gold, these fears ought no longer to be attended to; and it is much to be desired that platina may no longer be prohibited, but that this new metal, which promises such considerable advantages to society, may become an article of commerce. The solution of ammoniacal muriat, as we have observed, has the property of precipitating platina; if, therefore, gold be suspected to be alloyed with platina, its solution in aqua regia may be assayed with a solution of ammoniacal muriat. The small quantity of platina it contains will occasion an orange or reddish precipitate; if no precipitate is thrown down, the gold does not contain platina. If it should happen that the valuable properties of platina should at some future time render it more scarce and valuable than gold, it will not be in the power of avarice to deceive us in alloying it with gold, since a solution of sulphat of iron, which has the property of precipitating the solution of gold without producing any change in that of platina, would immediately expose the deception. A piece of tin, plunged in a solution of platina alloyed with gold, would likewise shew the presence of the latter, by becoming covered with a purple precipitate; whereas platina gives only a dirty brown precipitate, of a reddish colour: this last precipitate likewise does not colour glass, whereas the precipitate of gold gives it a purple colour.

This metal is not altered by water, earthy matters, the salino-terrestrial substances, or by alkalis. The most concentrated sulphuric acid, and the strongest and most fuming nitric and muriatic acids, do not act on platina, even when boiling; neither is distillation, which is known to be so efficacious in promoting the action of acids on metallic substances, of any advantage in the present case. The sulphuric acid simply tarnishes the grains of platina, according to Lewis and Baumé; the nitric acid, on the contrary, renders them brittle. Margraaf affirms, that towards the end of the distillation of this acid from platina, he obtained a small quantity of arsenic, a phenomenon not observed by other chemists. The muriatic acid

acid produced no change whatsoever in grains of platina. Margraaf likewise obtained from this acid, distilled from the metal, a white sublimate, which appeared to him to be arsenic, and a reddish sublimate, whose properties he could not examine on account of its being in so small a quantity. All these appear, however, to be foreign to the platina itself: this metal, therefore, resembles gold by the slight action of the simple acids upon it; but the analogy is still more evident by its solubility in the oxygenated muriatic acid, and in nitro-muriatic acid. The first of these acids dissolves platina with facility, and without the assistance of a strong heat; seventy or eighty degrees of heat in the atmosphere being sufficient to facilitate this solution, which takes place without any sensible effervescence, and in other respects does not differ from the following.

The nitro-muriatic acid, best adapted to dissolve platina, is composed of equal parts of the muriatic and nitric acids. To effect this solution, which in general is less easily performed than that of gold, one ounce of platina must be put into a retort, on which a pound of nitro-muriatic acid, in the proportions here mentioned, must be poured; the retort is then to be placed on a sand-bath, with a receiver applied; as soon as the acid is hot, a few bubbles of nitrous gas are extricated, and the action of the mixed acid proceeds without violence or rapidity. The colour of the fluid becomes at first yellow, afterwards orange, and at last of a very deep brown. When the solution is finished, reddish and black particles of sand are found at the bottom of the retort, from which the saturated liquor is to be separated by decantation: small irregular crystals of a dusky colour are gradually deposited, which consist of a combination of the acid and platina. The solution of platina is of a deeper colour than that of any other metal. Though it appears of a dark brown, yet, if it be diluted with water, it assumes first an orange colour, which soon becomes yellow, and resembles the solution of gold: it tinges animal matters of a blackish brown, not at all inclining to purple. Baumé affirms, that platina fused in the focus of a burning mirror, and dissolved in aqua regia, does not assume a brown colour, like that of platina in grains, but that the solution is of a deep orange-yellow colour. Macquer affirms, that, by evaporating and cooling the solution of platina, much larger and more regular crystals are obtained, than those spontaneously deposited by the saturated fluid. Lewis, having left this solution to evaporate in the open air, obtained crystals of a deep red, of a moderate size, irregularly formed, and resembling the acid of benzoin, though thicker: Bergman describes it as being of an octahedral form. This salt is sharp, but scarcely caustic; it melts in the fire, the acid being dissipated, and a residue is left in the form of an obscure grey oxyd. Concentrated sulphuric acid occasions a precipitate of a deep colour, which, doubtless, is a sulphat of platina; the muriatic acid, in a certain time, produces a yellowish deposition. Alkalis and the salino-terrestrial substances decompose this solution of platina: the carbonat of potash produces an orange-coloured precipitate in the solution of platina, which is not a pure oxyd. Macquer and Baumé have observed that its colour is owing to a certain quantity of acid it contains. It must therefore be considered as a mixture of a portion of the oxyd of platina with muriat of potash, or as a kind of triple salt. The caustic ammoniac precipitates platina of an orange yellow: this precipitate is a triple salt, like the foregoing.

The property of these two alkalis in forming triple salts, is very useful, when the object is to separate gold from platina. Dissolve the whole, pour on some potash, and a triple salt will be formed with the platina, while the gold remains in solution. Or it may be separated by means of a sulphat of iron, which precipitates the gold, and not the platina. Soda, however, forms no triple salt with muriat of platina; but the platina is converted into an oxyd; and precipitated lime and barytes have the same effect. The platina thus converted into an oxyd may then be dissolved on the other, and form salts; but these salts have not been examined.

To obtain a very pure solution of platina, it should first be digested in muriatic acid, which dissolves the iron, if there be any. The presence of iron in a solution of potash, may be ascertained by means of Prussiat of potash; for platina is not precipitated by that salt; but iron is. The gallic acid precipitates the solution of platina in a dark coloured glass, which grows paler by degrees.

Most of the neutral salts have no action on platina. Margraaf heated platina by a strong fire, with sulphat of potash and soda; these salts melted, and the platina remained in grains without alteration: it only communicated a slight reddish colour to the saline substances, doubtless on account of the iron communicated by the metal to them.

Nitre produces a singular alteration in platina, according to the experiments of Lewis and Margraaf. Though no detonation is produced when a mixture of both substances is thrown into a red-hot crucible; yet, by a strong heat long continued, such as Lewis applied for three successive days and nights to a mixture of one part of platina and two of nitre, the metal becomes of a rusty colour. If the mixture be boiled in water, the fluid dissolves the alkali, which takes up the brownish powder, and the platina separated from the liquid is found diminished more than one-third of its weight. The brown powder taken up by the alkali may be separated by filtration. It appears to be a kind of oxyd of platina, mixed with a small quantity of oxyd of iron. Lewis converted this oxyd to a whitish grey colour, by distilling it a great number of times with ammoniacal muriat. Margraaf, who repeated this experiment, adds two important facts; the first is, that platina, combined with the alkali of nitre, and diluted in a certain quantity of water, forms a jelly; and the other, that, by heating the portion of metal separated from the jelly, diluted with water and filtrated, it becomes of a black pitchy colour. This experiment certainly shews a great alteration of the platina, and requires to be continued, in order to decide whether, by virtue of repeated oxydations with nitre, it be possible to reduce the whole of the metal into a brown powder, and especially to determine the state of the platina thus oxydated.

All the properties of platina which we have examined, appear to prove that this substance is a peculiar metal: its want of ductility and fusibility, which have been considered by some writers as strong objections to this opinion, are not capable of overthrowing it, since there is, perhaps, a less difference between the fusibility of platina and forged iron, than between that of forged iron and lead, and since its want of ductility arises from its not having undergone complete fusion. As to the opinion of those philosophers who consider platina as a natural alloy of iron and of gold, however ingenious and satisfactory it may appear, it is impossible to admit it, until the metal has been separated into the two others by an accurate analysis, and until platina can be better imitated by the artificial alloy of gold and of iron. Macquer has made a very strong objection against this last opinion, by observing, that the more platina is deprived of the iron it contains, the greater is the difference between its external appearances and those of gold.

The important uses to which this metal may be applied will be easily conceived, when it is considered that it unites the indestructibility of gold to a degree of hardness almost equal to that of iron; that it resists the action of the most violent fire, and also of the most concentrated acids. It cannot be doubted but that chemistry and the arts would be in the highest degree benefited by its being applied to useful purposes. Crucibles have been made with platina, and spoons or ladles for assays by the blow-pipe. Conté availed

availed himself of its oxyd as an improvement in enamel painting; and leaves of platina are advantageously used for plating China-ware, or porcelain.

Two parts of platina, accurately mixed with one of arsenic and tartar, when exposed to a glow heat in a luted crucible, melt into a brittle substance, still whiter than platina. This substance is easily softened by the fire, or, by a stronger heat, completely melted. In this state, if exposed for a sufficient length of time to the fire, the arsenic is dissipated, and the platina, which again becomes solid, alone remains. Achard has recently taken advantage of this property, to form vessels of all sorts from platina, a substance so infusible by itself; a circumstance which seems to lead to further improvements, of infinite importance to society.

OF VEGETABLE SUBSTANCES.

In our enquiries into vegetable substances, we have to consider, first, the living vegetable, its functions, its products; next, the dead vegetable, and the alterations it undergoes. Next to these, we are to examine the general principles and organization of vegetables, and then pass to the substances that contribute to their developement, their nourishment; and the circumstances that may forward or retard their growth; all of which naturally leads to observations on the manuring and fertilising different soils; the theory of composts, watering, marling, and ploughing land; and improving hence the science of Husbandry.

Nature presents us with three classes or orders of being, very different and distinct from each other; namely, minerals, vegetables, and animals. The grand characteristic of organized substances, is their perpetual change of form, of nature, of place, &c. The distinguishing character of vegetables and minerals, is, that by the aid of heat the first yield carbon, which the latter do not; another distinction is, that the first are homogeneous, the others composed of various substances.

Vegetables are formed of six parts, or organs, destined to perform peculiar functions, the products of which are made known by vegetable analysis. These parts are the root, the stem, the leaf, the flower, the fruit, and the seed. These differ in form, texture, magnitude, number, colour, duration, taste, &c. for particulars of all which see BOTANY, vol. iii. p. 234, and seq.

Vegetable analysis is very different now, from what it was some years ago. The ancient chemists laboured continually in the distillation of vegetable matters, which always gave nearly the same results. But this method is now almost laid aside, to bring forward the analysis by menstrua, or solvents. Bouduc, Geoffrey, and others, worked largely in this way, and hence distinguished the mucus of resine, and threw considerable light on this part of chemistry. But the discovery of elastic fluids, about the years 1770 and 1772, raised vegetable enquiry to a much higher degree of perfection. We are indebted to Fourcroy for a clear methodical work upon this subject. He describes eight species of analysis, very distinct from each other. 1. Natural analysis; as when the vessels are choaked up, and burst; and there is a flowing out of sap, gum, sugar, or resin. The sap runs commonly in the spring; and, besides these substances, vegetables also furnish eroma, and water. 2. Artificial immediate analysis: In this we assist nature; as, when a plant seems ready to let some matter escape, the scissars are applied to make it run freely: this is done to obtain resins, manna, saccharine liquors, &c. 3. Immediate artificial analysis upon dead vegetables; as by expression, to procure linseed oil, fixed oils, &c. 4. By fire: Vegetable matters sometimes require a gentle heat; vegetables transported from the north to the south dry up, and change their colour, and even their specific weight: this is called *desiccation*; it is however a beginning of decomposition. Vegetables may be exposed to a heat of 45°; in that case, the desiccation is quicker, and the decomposition is already apparent; with a stronger heat the vegetable matters are entirely decomposed: then they give out phlegm, black oils of different weights, carbonic acid, carbonated hydrogen, pyromucous acid, and often a pyromucite of ammoniac and carbon remain in the retort. This manner of analysing gives all that was contained in the vegetable, but the constituent matters are combined in a different order, and in general the products are more simple: thus, by analysing a quaternary combination, we often have ternary and binary ones; and the products are generally mineral matters, as water, carbonic acid, hydrogen gas, and carbon. 5. By water: If by cold water, it is *maceration*; if warm water, *infusion*; if boiling water, *decoction*; but water at different degrees of heat gives very different results. There is a fourth way of using water; which is to leave the vegetable a long time in soak, as when wood is carbonated by water: this is called *analysis by the slow and long-continued action of water*. 6. Analysis by acids, and by salts in general. It is not to be wondered at that analysis should be now better understood, since we know so well the composition of the solvents we use. There are acids which will only dissolve vegetable matters, as vinegar; while others are decomposed over them, and reduce them entirely to water and to carbonic acid. The action of acids upon vegetables is such, that the chemist, by varying their proportions, can produce, at his pleasure, either tartarous acid, malic acid, oxalic acid, or acetous acid: this arises from the base of all the vegetable acids being at least binary; carbon and hydrogen, the base, combined with different proportions of oxygen, produce the acids we have mentioned. Neutral salts are principally the preservers of vegetables; but alkalis often destroy them entirely. 7. By fermentation. Thus insipid matters become sweet, then spirituous: such is the art of the brewer, and maker of wine. There are three kinds of fermentation, the *spirituous*, the *acetous*, and the *putrid*. 8. Analysis of vegetables, by the products of vegetables; as in decomposing a vegetable substance by vegetable acids, oils, alcohol, or ether. This last analysis is the most complicated and difficult.

In the analysis of vegetables, the most simple mode here laid down should be first used. Then treat the products obtained from this first analysis by all the other modes; and the analysis is complete. The first and second mode of analysis procure immediately, and without alteration, the sap, juices, &c.

OF THE SAP.

It is now generally understood that the sap is the primary source of the various nutritive juices, which act in the growth of vegetables, and the formation of their parts. Deyeux has a Memoir on this subject in the Journal de Pharmacie. He concludes from his own researches and analysis, 1. That the sap which appears at the begining of the vegetation, and which flows, whether spontaneously or by incision from the yoke-elm and the vine, is a compound liquor, 2. That it contains calcareous earth united with acetous acid. 3. That it holds in solution, by means of the same acid, a vegeto-animal substance or matter. Vauquelin has also lately examined different kinds of sap, as, of the common elm, the beech, the birch, and the yoke-elm. In all these, he constantly found acetit of potash and acetit of lime; in the elm, the acetit of potash was almost pure, forming very near ·9 of the residue by evaporation; he found carbonat of lime also. The sap of the birch contains, besides the acetits of potash and lime, an excess of acetous acid, and such a plenty of saccharine matter, as to be susceptible of the vinous fermentation, and to afford alcohol. In the sap of the beach Vauquelin found a pretty large

quantity

quantity of tannin, of gallic acid, and a coloured extract of a fine maroon red, which gives a red tinge to wool, cotton, and thread.

Of the JUICES of VEGETABLES.

The succulent vegetables give out their juice by simple expression; such as have it viscous, or in small quantity, require water to increase and dilute it. Juices differ in taste, smell, colour, and consistence. In general, the juice of young plants is very watery, with little taste, and hardly any smell. Evaporated to dryness, it yields but little extract, and very little saline matter. As the plant advances in age, the sap has a sensible smell and taste; the colour is also more evident; and the quantity of its products is in every respect more considerable.

To extract the juices of plants: First clean and wash the plant well; then beat it in a stone or marble mortar, and afterwards put the pulp in a hair-cloth, and squeese it in a press as much as may be necessary. This fluid is found to contain a green colouring matter, and a portion of the solids of the vegetables beaten small by the pestle, and consequently requires *depuration*; which may be effected either, 1st, By subsidence, or filtration, when they are very fluid, as is the case with the juice of purslain, houseleek, &c. 2d, By white of egg, which collects the fecula, by coagulation, as is requisite with the juice of borage, nettle, &c. 3d, By simple heat, which coagulates and precipitates the parenchyma, as Baumé advises with respect to juices that contain volatile principles, such as those of cochlearia, cresses, &c. The phial which contains the juice, being covered with a perforated paper, must be plunged in boiling water, and taken out as soon as the juice is clarified. Immersion in cold water brings it to a proper temperature for filtration. 4th, By spirit of wine, which coagulates the fecula. 5th, By vegetable acids, as the London Pharmacopœia prescribes for the juices of cruciform plants. 6. By filtration cold, which is the method preferred by La Grange on every account; the process, he says, is indeed long, but this inconvenience is more than counterbalanced by the advantage of preserving the juices in their natural state, and consequently without altering any of their properties. Yet there are some juices so thick and viscous, that it would be impossible to depurate them by cold filtration; such, e. g. as those of dogs tooth, nettles, borage, bugloss, &c. but this may be remedied, says the same author, by mixing them with other more aqueous juices, or adding some fluid, which, by lessening the viscosity, enables them to pass through the filtre, without the necessity of recurring to heat, or the whites of eggs.

Some kind of juices require a different treatment. These are called *acid juices*. We shall speak only of the acid juices of the gooseberry and the lemon, as the same process will serve for all others of the same kind. Most of the juices are furnished by the fruit. To extract the juice of lemon, first take off the outer skin, then the white skin very carefully, so as to leave the fruit entirely bare, and take out the seeds; afterwards cut the lemon into thin slices, and squeese them with the hand. Leave the fruit in this state for some days in a temperature of 15 or 16°. A slight fermentation takes place, sufficient to separate the mucous and parenchymetous matters, which made the juice viscous. By degrees it floats on the surface, and sometimes is so clear as not to require filtration. This first juice being drawn off, the remaining matter is put into the press, by which means more juice is obtained, not so clear indeed as the first, but which easily depurates itself, if it be immediately put into bottles, and left to ferment a few days. Lastly, draw it off, either by decantation, or with a syphon, or by filtration; and it will soon receive all the transparency of which it is susceptible.

Gooseberries, strawberries, &c. will not afford a transparent juice but by fermentation; yet it is to be observed, that these fruits have a principle not found in the lemon, namely, the mucous saccharine principle; so that their juice undergoes the spirituous fermentation, and might be converted into wine, not very strong indeed, but from which alcohol might be extracted by distillation. The period at which the acid fermentation succeeds to the vinous, is the time wherein the depuration of the juice is performed quickest; then it may be separated with much facility, and obtained very clear, by means of filtration.

Of EXTRACTS.

That which is obtained from the juices of plants by thickening, or rather by separation from the aqueous vehicle, is called an extract. All clarified juices are either red or yellow, never green. We may distinguish two kinds of extract, the soft, and the dry. The extract never has a pleasant taste, but a taste more or less disagreeable, which may be called medicamentous. In general, it has three kinds of taste: agreeable, or nutritive, disagreeable, or medicamentous; and bitter, or poisonous.

An extract is a matter of a reddish-brown colour, which slightly attracts the humidity of the air, gives out ammoniac by distillation, and is sometimes transparent. All extracts, when exposed to the air, precipitate an insoluble matter, which is only matter already dissolved, and which has imbibed a quantity of oxygen which renders it insoluble: this evidently proves the continual change which vegetables undergo. Vauquelin, by evaporating the juice of the elm in a copper vessel, covered with verdigris, observed, that in the midst of the ebullition, the juice was of a beautiful red colour, which changed to brown, like the brown oxyd of copper, as soon as the liquor had acquired the consistence of an extract; which proves the great affinity of the extract for oxygen, since it takes it even from copper.

Extracts are prepared, either from the juice of the plant, in which case it is clarified with white of egg, and brought to the required consistence with a gentle heat; or from dry and ligneous plants, in which case maceration, infusion, or decoction, are employed, according to the nature and state of the matter to be wrought upon: maceration is often sufficient. Odoriferous plants should be only infused; decoction exhausts them too much, by separating the resinous parts; it forms a very thick overcharged fluid, which grows turbid in cooling. By means of water, extracts of different natures are produced, as, of juniper, bark, senna, rhubarb, &c.

We shall borrow from Vauquelin, some general observations on the extractive principles of vegetables; and here we may remark, that all extracts have an acid taste. If into the solution of an extract, prepared from the juice of plants, some drops of ammoniac be poured, a brown precipitate is formed, consisting of lime and a portion of the extract now become insoluble. If sulphuric acid, even a little concentrated, be poured over any extract, a very penetrating acid vapour is presently disengaged: this is acetous acid. If quicklime be mixed with an extract, ammoniac will be disengaged. If into a solution of any extract, be poured a solution of sulphat of alumine, saturated with an excess of acid, by boiling, there will be formed a precipitate in flocks, composed of alumine and vegetable matter, not soluble in water. Most metallic solutions, mixed with solutions of extracts, produce the same effect: thus, with muriat of tin, we have a brown precipitate perfectly insoluble, composed of a portion of oxyd of tin, and some vegetable matter. By pouring oxygenated muriatic acid into a solution of an extract, there is immediately a plentiful yellow precipitate; and the liquor retains oftentimes only a faint lemon-colour commonly holding muriatic acid in solution. If wool, cotton, or thread, first steeped in alum-water, be boiled in an extractive solution, these substances will imbibe a great quantity of the extractive matter; they are dyed of a fawn-colour, and the solution loses much of its colour. Nearly the same effect will be produced, if

if the matters to be dyed are soaked in a solution of muriat of tin, instead of alum-water. But the best precaution for fixing the extractive colour upon stuffs, is to let them soak for some time in oxygenated muriatic acid, and then to plunge them into a solution of extract. Extracts distilled with a naked fire give an acid product; but it contains much more ammoniac than when they are distilled in the humid way, with lime or an alkali. Extracts dissolved in water, and left to themselves with an access of air, waste away entirely: nothing is found remaining in the water but carbonats of potash, of ammoniac, of lime, and some other mineral salts, which existed in the extract before, and cannot be destroyed by putrid fermentation. Several extracts are prepared in commerce by means of water, as liquorice, caoutchouk, &c. Extracts are used in medicine as aperitive, solvent, diuretic, stomachic, remedies, and are daily administered with great success.

Of GUMS and MUCILAGES.

The mucilaginous parts of the juice of plants, when dried, are called gums. There are three kinds. 1. Gum Arabic, which flows from the acacia-tree in Egypt and Arabia. 2. The gum of our own country, which flows from the apricot, pear, and plum, trees, &c. 3. Gum tragacanth, which flows from the adragant of Crete, *astragalus tragacantha*.

Gum is soluble in water, to which it gives a viscous consistence. This solution is called *mucilage*; and by evaporation becomes dry, transparent, and friable. The roots of mallows, the greater comfrey, the bark of elm, linseed, the seed of quinces, &c. afford viscous fluids, by maceration in water, which, by evaporation, leave true gums. The decoction of these plants is substituted, in medicine, instead of gums. The mucilages are insipid, soluble in water, but not in alcohol; coagulate with the addition of weak acids; are carbonated by fire without yielding any sensible flame; exhale a considerable quantity of carbonic acid by combustion; and take the acid fermentation when weakened with water.

Gum, by distillation, affords much water and pyromucous acid, a small quantity of thick and brown oil, and carbonic acid gas, mixed with hydrogen gas. Its coal is very bulky, and contains a small quantity of the carbonat of potash. Treated with the nitric acid, the product is mucous or saccho-lactic acid, acetous acid, and lastly oxalic acid. Take any one of the gums mentioned before: reduce it to powder, which put into a glass retort; pour over it six times its weight of acid at 35°, adapt a receiver, and distil with a gentle heat. It is easy to distinguish the different acids which are obtained. The acetous acid is known by its smell; but care must be taken to observe the moment of its formation; the mucous acid is precipitated in powder; and the oxalic acid always crystallizes in cooling.

Of SUGAR.

Sugar has some resemblance to gum. The saccharine quality is abundant in many vegetables, and generally accompanies gums. We cannot here enter into detail upon the extracting and refining of sugar. Sugar is distinguished into raw sugar, muscovado, brown sugar, white sugar, &c. That part of the sugar which is incapable of becoming concrete, is called either coarse syrup, fine syrup, or molasses.

Sugar is a substance holding in some respects an intermediate place between essential salts and mucilages. It possesses the property of crystallizing. It crystallizes in hexahedral truncated prisms, and in this state is called *sugar-candy*. By distillation it affords water, pyro-mucous acid, and some drops of empyreumatic oil; at the same time that a great quantity of carbonic acid gas, and hydrogen gas, holding charcoal in solution, are disengaged. The residue is a spongy light coal, which contains a small quantity of carbonat of potash. Sugar is inflammable. On hot coals it melts, and swells up very much, emits a penetrating vapour, and becomes converted into a brown yellow matter, called *caramel*. It slightly attracts the moisture of the air, and is very soluble in water, to which it gives much consistence, and constitutes a kind of saccharine mucilage, called *syrup*. Syrup, diluted with water, is capable of fermentation, and affords ardent spirit.

Sugar is very extensively useful. It is a food which, taken in too large a quantity, is capable of heating the animal system. It is very much used in pharmacy, where it is the base of syrups, conserves, and other preparations. It is very useful, as a medium to favour the solution or suspension of resins, oils, &c. in water. It preserves the juices of fruits, after they are reduced into a jelly. It may even be considered as a medicine, since it is incisive, aperient, slightly tonic, and stimulant; and there are, accordingly, instances of disorders, arising from obstructions, which have been cured by the habitual use of sugar.

Of VEGETABLE ACIDS.

The fourth immediate principle of vegetables, is what the first chemists called, in general, essential salts of vegetables; but we now give that name only to such as are susceptible of crystallization. Chemists formerly pretended that all essential salts were the same, being nothing but tartar or vinegar. Such was the state of the science, when Scheele discovered that the citric, malic, and gallic, acids, were very different from the tartarous and acetous acids. It has been already remarked, that the juices of some vegetables afforded the principles of mineral salts: the salts most commonly present are, the sulphat and nitrat of potash, the muriat of soda, &c.

The ancient chemists held, that nitre was formed in the vegetables during their vegetation; the moderns, on the contrary, believe that it is formed in the earth, and communicated to the plant through the medium of its vessels. However this may be, the salts are formed during the process of vegetation; for, by planting sun-flowers in earth well lixiviated, by analysis of their juices nitrat of potash will be found.

Vegetable acids are all composed of radicals, which are themselves combined and united with oxygen: these radical substances are carbon, hydrogen, and oxygen. One grand mark of distinction between vegetable acids and mineral acids, is, that the first are all reduced, by complete analysis. All vegetable acids are convertible one into the other, which arises from the different proportions of the constituent principles; but it must be remarked, that neither nature nor the chemists can work retrograde; for, having produced oxalic acid, the citric or malic acids cannot be formed from this.

There are five kinds of vegetable acids: 1. Vegetable acids, formed in the same vegetables, and pure. 2. Acids partly saturated with a base in vegetables. 3. Those obtained by fire. 4. By fermentation. 5. By mineral acids. Of the acids completely formed in vegetables, and which are extracted in a state of purity by very simple processes, we may distinguish four species, the citric, gallic, benzoic, and malic; to which Fourcroy thinks we may add the succinic, as that acid, he says, possesses all the properties of the rest.

SUCCINIC ACID.

To obtain this acid, reduce amber to gross powder; put it into a retort with a receiver adapted; place the apparatus in a sand-bath, and proceed to distillation with a gentle gradual fire. A little water is first obtained, which soon acquires acidity; and a concrete substance adheres to the neck of the retort; this is the succinic acid: lastly a thick brown oil passes over.

The acid obtained by this first distillation is never pure, but always contains some oil. The following is a very

very simple and successful mode of purifying it. Mix up the impure acid with white sand; put the whole into a cucurbit with a head adapted to it, and place it on a sand-bath; by the help of a gentle heat, the succinic acid volatilizes and sticks to the sides of the vessel; in this state the acid is very pure and very white. To obtain it in crystals, it must be dissolved in water; evaporate about two-thirds of the liquor in a gentle heat, and by cooling, it produces crystals. Guyton distilled this acid with nitric acid; and thus obtained very pure and beautiful crystals. The succinic acid is bitter; it reddens tincture of turnsole; is soluble in twenty-four parts of cold, and two of boiling, water. It crystallizes in triangular prisms with truncated angles. Its combinations with different bases form *succinats*.

CITRIC ACID.

Scheele first succeeded in obtaining this pure acid crystallized, and separated from the mucilage which accompanies it in the juice of lemons. According to this chemist, the lemons are to be squeezed, and the juice is to be left at rest for four-and twenty hours, to promote the separation of the mucilage; filter the juice through paper, then saturate it with carbonat of lime. The calcareous citrat which arises from this combination, being insoluble, falls to the bottom of the liquor; when this has well settled, draw off the supernatant water; wash the precipitate till it becomes tasteless and very white; decompose this salt with half its weight of sulphuric acid, in six parts of water, with a gentle heat; the sulphuric acid separates the lime from the citric acid, the sulphat of lime which is formed is for the most part precipitated, and the citric acid remains free in the water. By suffering it to evaporate to the consistence of a syrup, by cooling, the acid is obtained in a crystalline form.

Dizé, who made several experiments upon this subject, found that an excess of sulphuric acid was necessary to destroy the portion of mucilage, which the acid obstinately retains in its combination with lime, and which prevents the citric acid from crystallizing, or at least retards it. He observed also, that, to obtain the citric acid quite pure, the dissolution and crystallization should be several times repeated. The crystals he obtained were rhomboidal prisms, with inclined planes of 60 or 120°, and terminating with four-faced summits, intercepting the solid angles. One part of distilled water, at the temperature of 10°, will dissolve, according to this author, 1·25 of crystallized citric acid, producing 13° degrees of cold during the solution. Water, at its boiling point, dissolves double of its weight of this acid. 100 parts of citric acid, dissolved in a sufficient quantity of boiling water, dissolves 50 parts of calcareous citrat.

The citric acid thus prepared is very pure and concentrated; its taste is strongly acid, and it reddens all the blue vegetable colours which are capable of that change. Fire decomposes and converts it into an acidulous phlegm, gaseous carbonic acid, and carbonated hydrogenous gas; a small portion of charcoal remains in the retort: its crystals effloresce in the air; it is very soluble in water, and its solution is decomposed by a true putrefaction, which is very slow.

The uses of the citric acid are sufficiently numerous. With water and sugar it forms a very agreeable drink, known under the name of *lemonade*. It is employed in medicine as refreshing, cooling, antiseptic, antiscorbutic, diuretic; more particularly it corrects acrid bile. It is sometimes used as a slight escharotic in scorbutic ulcers, dartrous eruptions, and spots on the skin.

OF CITRATS.—Vauquelin has lately examined the combinations of this acid. The following is his account of the salts hereby formed: 1. Alkaline citrats are decomposed by a solution of barytes, and the precipitate is soluble in a large quantity of water. 2. They decompose the calcareous salts, forming a precipitate which is soluble in 500 parts of water. 3. They are decomposed by mineral acids; but make no precipitates as in the tartrits and oxalats, because they do not make acidulous citrats like these salts. 4. They are decomposed by the oxalic and tartarous acids, which form crystallized or pulverulent precipitates insoluble in water. 5. These salts, especially the metallic citrats, give marks of acetous acid by distillation. 6. Thrown upon burning coals, the citrats melt, boil up, exhale an empyreumatic smell of acetous acid, and leave behind a small portion of charcoal. The affinities of the citric acid for alkaline and earthy bases, according to different authors, are as follows.

Bergman.	*Bressy.*	*La Grange.*
Lime,	Barytes,	Barytes,
Barytes,	Lime,	Lime,
Magnesia,	Magnesia,	Potash,
Potash,	Potash,	Soda,
Soda,	Soda,	Magnesia,
Ammoniac.	Ammoniac.	Ammoniac,
		Alumine.

GALLIC ACID.

We give the name of gallic acid to that extracted from the nut-gall, which grows on the oak by the puncture of an insect. This acid exists in general in greater or less quantities, in all austere vegetable, or astringent substances: such are the woods of the oak, the ash, the willow, the barks of the same trees, the quinquina, simarouba, pomegranate, sumach, tormentilla; the nuts of cypress; the husks of nuts; the stem and leaves of the marsh iris, the strawberry plant, the nenuphar, &c. Chemists were formerly acquainted in this substance, which they distinguished by the name of *astringent principle*, with no other property than that of precipitating the solutions of iron in acids of a black colour, or of forming ink, which, indeed, is an exclusive and very characteristic property. Macquer, Monnet, Lewis, Cartheuser, and Gioanetti, made experimental inquiries into the mode of action of this principle upon iron. Monnet had more particularly remarked, that the nut gall, and astringent vegetable juices, acted immediately on iron, and gave it a black colour. Gioanetti had observed, that the precipitate, or atramentary fecula, was not attracted by the magnet, and that the iron was not in the metallic state, as had been supposed before his time. These observations ought to have led to the notion that the astringent principle of the nut-gall was an acid; or at least that it acted as an acid in chemical operations. Sequin first discovered, in the infusions and decoctions of astringent barks, the new principle, which, from the effects it produces on animal matters, is called *tannin*.

Scheele has not only shewn, that all austere and astringent plants exhibit signs of acidity, but he has likewise discovered and described a process to obtain this vegetable, pure and crystallized. Six pounds of distilled water are poured upon one pound of nut-galls in powder; this is left to macerate during fifteen days, at the temperature of between 16 and 20 degrees of Reaumur; it is then filtrated, and the fluid is left in a tureen of stone ware, or a large glass capsule. It is suffered to evaporate slowly by exposure to the air. A mouldiness and thick pellicle is formed, which appears as if glutinous; very abundant mucilaginous flocks fall down; the solution then no longer possesses a very astringent taste, but is strongly acid; and after two or three months exposure to the air, a brown crust is observed adhering to the sides of the vessels, and covered with granulated, brilliant, yellowish, grey crystals; the same crystals likewise exist in large quantities beneath the thick pellicle which covers the liquor: the fluid is then decanted, and alcohol is poured on the deposit of pellicle and of crystalline crust, and heated. This solvent takes up the whole of the crystallized salt, but does not touch the mucilage.

By

By evaporation of this spiritous solution, the pure gallic acid is obtained in small granulated crystals, of a brilliant appearance, and slightly yellowish grey colour.

Deyeux has pointed out, in the Journal de Phisique for June 1793, the two following modes of procuring this acid. 1. Distil extract of nut-galls in a glass: it liquefies with the first degree of heat, then tumefies; by increasing the fire, a great quantity of carbonic acid is disengaged; at the same time a salt is sublimed, which sticks to the neck of the retort, sometimes in the form of very small thin needles, sometimes in small scales. If the fire be continued, the salt is soon dissolved by a fluid which condenses and falls down in the receiver The fluid contained in the receiver is extremely acid, as is the salt which is sublimed in the neck of the retort. 2. Put the nut-galls into a retort to which a receiver is adapted; for obtaining the gaseous fluid, the pneumatic apparatus must be used. Place the retort on a sand-bath, or on a naked fire, and increase the heat by little and little, till the temperature exceeds boiling water. A transparent liquor comes over, colourless, acid, and affording by spontaneous evaporation needled crystals crossing each other in every direction. This is pure gallic acid. For a second product, there is a concrete salt sublimed in the neck of the retort in the form of small needles, extremely white; and towards the end of the operation, a pretty large quantity of oil.

The acid obtained by this process is always coloured, and clogged with oil, especially that which is formed near the conclusion of the experiment. Deyeux employed sublimation to purify it. For this purpose, two capsules of glass are inverted one over the other, in such a manner, that only the lower capsule containing the matter to be purified can receive the heat. When the apparatus is well luted, heat the lower capsule; and by degrees the upper one will be filled with the sublimed acid crystallized in white silvery needles. When the operation is finished, there will be found at the bottom of the lower capsule a black magma, as it were carbonated. If the heat employed should be too great, the sublimate, after it is formed, will liquefy, and assume a brown colour in cooling.

This acid reddens the blue vegetable tinctures. Placed on burning charcoal, it inflames and emits an aromatic smell. Placed on a hot metallic plate, it melts, boils, becomes black, and is converted into charcoal. Distilled in a retort, it gives out a yellow acid liquor, some of the salt sublimes into the neck of the retort, and a carbonaceous matter is left behind. During the distillation, an aeriform fluid escapes, which appears to be purer than atmospheric air. The gallic salt is completely decomposed by repeated distillations, but this may be effected more easily by distilling the solution of this salt in water. Heated with the contact of air, it swells up, and takes fire, emitting a somewhat agreeable smell, and leaves a charcoal of difficult incineration. When distilled by a gentle heat, part rises, dissolved in the water of crystallization; another part rises in small silky crystals, without decomposition; a strong fire separates some drops of oil, carbonic acid gas, and carbonated hydrogen. The nut-gall, distilled in substance, affords a small quantity of concrete salt, analogous to the sublimed gallic acid. The gallic acid requires twenty-four parts of cold water, but no more than three of boiling water, to dissolve it; repeated solutions and crystallizations do not render it sensibly whiter. Alcohol dissolves it much more effectually; four parts of this liquid are sufficient when cold, but when boiling it is soluble in an equal weight of that fluid. This acid disengages the carbonic acid from earthy and alkaline bases, when its action is assisted by heat. With barytes, magnesia, and lime, it forms salts, soluble in water, more especially by the assistance of an excess of these bases. Potash, soda, and ammoniac, unite very readily with it, and form gallats, whose properties are no yet known. The nitric acid converts the gallic acid into the oxalic acid.

The gallic acid precipitates gold its solvent in the form of a brown powder, and part of the metal appears at the surface in a brilliant and metallic pellicle. Silver is precipitated of a brown colour, and a film of this metal reduced, soon covers the surface of the liquor. Mercury is precipitated of an orange yellow; copper of a brown colour; iron of a beautiful bright black; and bismuth of a yellow lemon colour. The solutions of platina, zink, tin, cobalt and manganese, are not altered by this acid.

The solution of sulphat of iron is the only one upon which this acid acts in an uniform manner. The precipitate is constantly of a fine shining black; and, according to Deyeux, is a combination of carbonated oxyd of iron and gallat of iron. If a very weak acid, especially the sulphuric acid, be poured into a solution of sulphat of iron precipitated by the gallic acid, the liquor presently becomes transparent; but, by saturating the excess of acid, and then adding gallic acid, the precipitate appears again.

The gallic acid effervesces with earthy and alkaline matters, especially with the assistance of heat. This is the method used in preparing of *gallats*, salts as yet but little known. It is only known, that those with potash and soda are irregular crystals, brown, and of a disagreeable taste; and that they are decomposed in a temperature somewhat beyond boiling water, in which case the alkali remains in the retort. The uses of the nut-gall for dying black are sufficiently known. We shall only add, that, by employing the purified gallic acid for the preparation of ink, this fluid is very beautiful, very black, and may be kept a long time without alteration.

Of TANNIN.

The substance now called tannin, was long confounded with the gallic acid or astringent substances. Seguin gave much attention to this subject, and made some important discoveries in the application of this matter, in simplifying and improving the art of *tanning*. The memoirs of Pelletier, Darcet, Chaussier, Vauquelin, and La Grange, on this substance, are also worthy of attention. Tannin exists not only in the oak, nut-gall, and shumach, but also in the rose-bush, larch-tree, several kinds of pines, of acacias, and lote-trees; and in some species of onion, the roots of bistort, rhubarb, patience, &c.

Water poured upon tar, after several hours infusion, only at the temperature of the atmosphere, becomes coloured, sour, and takes up the most soluble parts of the tan; by pouring on fresh water several times, and by repeated infusions, all the soluble parts of the tan are taken up, the water is void of colour; and there remains nothing but a fibrous mass, acid and spongy insoluble in water, and entirely improper for the purposes of tanning.

This liquor contains two substances very different in their properties: the one gives a black precipitate of iron; this is the acid or gallic principle. The other, which precipitates the animal gelatin, or glue, is designated by the name of tannin, because of its action in the tanning of hides. To preserve in laboratories a solution of this glue, a twentieth part of alcohol should be added: this prevents the putrefaction to which animal substances are so much inclined.

It will appear by experiment, that the liquor of the last lixiviations makes no precipitate with the glue; which seems to indicate, that the gallic acid contained in tan is not so soluble as tannin; that the liquor of the first lixiviation, after having been saturated with glue, or animal gelatin, and having made a plentiful precipitate with it, is entirely deprived of tannin; that, as tannin has always a great affinity with animal gelatin, as it forms an insoluble precipitate therewith, this mode will furnish a very convenient re-agent to detect immediately the presence, and to determine the quantity, of gelatin

gelatin in any liquor; thus the *infusum* of tin, poured into milk, whey, serum of blood, beef-broth, &c. will form a precipitate from these liquids, which will be more or less plentiful, according to the quantity of gelatin they contain. Thus, every substance whose infusum can precipitate animal glue, possesses the tanning principle; every substance which has the tanning-principle precipitates the sulphat of iron black; any substance which precipitates sulphat of iron, but does not precipitate the *solutum* of glue, has not the tanning principle.

The essential point in the art of tanning, is to know, and to regulate invariably, the circumstances which determine the passage of the fibre to the state of gelatin; and to seize the proper time, as well as the proper method, of combining the tannin; for, according to Seguin, the fibre is oxygenated glue, which, in the fibrous state, cannot combine with tannin; but it acquires the property of forming that combination in passing to the state of gelatin, by which it loses part of its oxygen.

MALIC ACID.

This acid exists not only in the *apple*, (whence its name,) but also in strawberry, raspberry, and most of the summer fruits. Commonly, however, to obtain this acid, the juice of sour apples is expressed, and saturated with vegetable alkali: to this liquor a solution of acetit of lead, or sugar of Saturn, is added; a double decomposition takes place, the acetous acid combines with the potash, and the malic acid with the oxyd of lead; the metallic salt, or malat of lead, falls down: this precipitate is washed and treated with the sulphuric acid, diluted with water; sulphat of lead is formed, and the malic acid remains in the liquor. It is necessary to add a sufficient quantity of sulphuric acid to decompose the whole of the malat of lead, which is known by the fresh acid taste of the liquor.

This acid possesses the following properties: It cannot be obtained in the concrete form. With the three alkalis, it forms deliquescent neutral salts. With lime it forms a salt which affords small irregular crystals, soluble in boiling water, in vinegar, and in the malic acid itself. With clay it forms a salt of very difficult solubility. With magnesia, a deliquescent salt. It dissolves iron; and this solution is brown, and does not afford crystals. With zink, which it dissolves well, it affords a salt in very fine crystals. The nitric acid changes it into the oxalic acid. It precipitates the nitrats of mercury, of lead, of silver, and of gold, in the metallic state. The calcareous malat decomposes the ammoniacal citrat, and calcareous citrat is formed, which is insoluble in boiling water and in the vegetable acids. The solution of calcareous malat in water is precipitated by alcohol. Lastly, the malic acid is readily destroyed by fire, which changes it into the carbonic acid: this last partly saturates the bases of the malats, which are decomposed by heat. These are the properties which establish the peculiar characters of this acid.

Scheele found it almost pure, or mixed with a small quantity of citric acid, in the juice of apples, barberries, elderberries, sloes, the fruit of the service-tree, and damsons. He found it in combination with half its weight of citric acid in gooseberries, cherries, strawberries, raspberries, and blackberries. He also obtained it from sugar by the nitric acid; and Morveau remarks, that the malic acid appears before the oxalic acid. To obtain this acid from sugar, and to separate, at the same time, the oxalic from the malic acid, and to obtain the latter in a state of purity, weak nitric acid is to be poured over sugar, and distilled, till the mixture begins to assume a brown colour; precipitate the oxalic acid by means of lime-water; and another acid remains which lime does not affect. To obtain this acid pure, the liquor is to be saturated with chalk; filtre, and add alcohol, which occasions a mucilage; this mucilage, well washed with alcohol, is to be dissolved again in distilled water: decompose the malat of lime with acetit of lead; and then disengage the malic acid by means of the sulphuric acid.

Gum-arabic, manna, sugar of milk, gum-tragacanth, starch, the fecula of potatoes, and many animal substances, such as isinglass, white of egg, yolk of egg, and blood, treated as above, will furnish malic and oxalic acid.

BENZOIC ACID.

This acid exists in benjamin, balsam of Peru and Tolu, liquid styrax, storax, cinnamon, vanilla, the urine of horses, cows, and children; in general urine which does not contain phosphoric acid, furnishes the benzoic, though sometimes mixed with lime. This acid was formerly obtained by distillation and sublimation, and was called *flowers of benjamin*. But, as this method affords it only in small quantity, Scheele, after several less-successful experiments, proposed the following process: Four ounces of quick-lime are extinguished in twelve ounces of water, and eight pounds of water are added when the ebullition has ceased; six ounces of this lime-water are poured over one pound of benzoin in powder, with sufficient agitation to mix these two substances; the whole of the lime-water is added by degrees. This mixture by parts prevents the benzoin from unitng into a mass. The liquor is heated over a gentle fire for half an hour, with continual agitation; it is then taken from the fire, and suffered to settle for several hours; the clear liquor is then decanted, and eight pounds of water thrown on the residue, which, after being boiled for half an hour, is suffered to subside, and, when clear, is added to the preceding fluid. This washing and ebullition is repeated twice more, and the washing is ended by pouring hot water through the residue upon a filtre; all these waters are afterwards reduced to two pounds by evaporation: a small quantity of resin separates; the evaporated liquor being cooled, muriatic acid is added drop by drop, until no more precipitate falls down, and the liquid exhibits a taste sensibly acid; the salt of benzoin is the precipitate in the form of a powder; it is edulcorated on the filtre. If crystals be desired, it may be dissolved in five or six times its weight of boiling water, which being filtered through a cloth, and suffered to cool slowly, the salt is deposited in flat and very long prisms.

In this process, the lime absorbs the benzoic acid, and forms with it calcareous benzoat, which is very soluble: the resin separates from this salt, which has but a small affinity with it; the muriatic acid, whose attraction for lime is stronger than that of the benzoic acid, seizes the earth, and separates the vegetable acid. The liquor reduced to two pounds by evaporation, is not sufficient to hold the acid in solution, and almost the whole is deposited. The calcareous benzoat has not the smell of benzoin; but, as soon as the benzoic acid is separated by the muriatic acid, it resumes the lively smell which is peculiar to that balsamic substance. By this process Scheele obtained twelve or fourteen drams of benzoic acid from one pound of benzoin; whereas sublimation affords no more than nine or ten. He informs us, likewise, that the purification of this salt by hot water and by crystallization, causes the loss of a great quantity, and that this purification is not necessary for pharmaceutic uses. In fact, this salt, well crystallized, is very difficult to reduce to powder, and the purification has no other object than to separate about two grains of resin in the pound of benzoin. Lastly, he remarks that the filtration of this acid dissolved in water cannot be made but through a cloth, as it separates quickly, and, in proportion as the liquor cools, the salt closes the pores of the paper, and the filtration cannot proceed.

Chaptal proposes to distil the benjamin, and to let all the

the products run together into a large receiver; then boil them in water, by which means a large quantity of the acid is obtained.

Deyeux has another process, as follows: Into a vessel of glazed earth, or of stone, put four parts of benjamin in gross powder, and add eight parts of water: boil the mixture gently for a quarter of an hour, stirring it from time to time with a wooden spatula; strain the liquor, boiling as it is, into another earthen vessel placed on a sand-bath. The liquor passes over very clear, and preserves its transparency while hot; but as it cools it grows turbid, and deposits regular crystals white and shining. Draw off the natant liquor, and evaporate with a gentle heat; more crystals are obtained by cooling. The boiling may be repeated several times, so as to exhaust the benjamin entirely of its acid.

Fourcroy advises the benzoic acid, for the use of perfumers, to be drawn from the urine of horses and cows; nothing more is necessary than to pour sulphuric acid over the water pressed from the litter and dung of these animals; since much calcareous benzoat is contained therein, benzoic acid will be thus obtained.

The pure benzoic acid has a slightly sour, penetrating, hot, and acrid, taste; its smell is but slightly aromatic, and it reddens the colour of turnsole very well.

Heat volatilizes it, and at the same time singularly increases its odour. If it be exposed to the action of the blow-pipe in a silver spoon, it liquifies, according to the observation of Lichtenstein, and evaporates without inflaming. If it be suffered to cool, it forms a solid crust, whose surface presents traces of crystallization in divergent rays: it does not burn with flame, unless it be in contact with bodies which are themselves strongly inflamed; the contact of a burning coal only causes it to sublime rapidly. Air does not appear to have any action upon this acid; for, after having been preserved twenty years in a glass vessel, it was very pure, and had lost nothing of its weight: its smell is dissipated, but it recovers it again by heat. The benzoic acid is but sparingly soluble in cold water: from the experiments of Wenzel and Lichtenstein, it appears that 400 grains of cold water dissolve no more than one grain, and that the same quantity of boiling water can dissolve twenty grains, of which nineteen separate by cooling.

The benzoic acid unites to all the earthy and alkaline bases, and forms with them the benzoats of alumine, of barytes, of magnesia, of lime, of potash, of soda, and of ammoniac; the characteristic properties of these several combinations are not known, nor the various attractions of this acid for the bases. Lichtenstein affirms that it prefers the fixed alkalis, and even ammoniac, to the aluminous, magnesian, and calcareous, earths: but more numerous experiments are required to determine exactly the order of these attractions, more especially as Bergman arranges them differently: according to him, lime separates the alkaline bases, and barytes separates lime: it disengages the carbonic acid from all these bases.

The concentrated sulphuric acid readily dissolves it without heat, and without noise, according to the same chemist; nevertheless it passes to the state of sulphureous acid. The benzoic acid may be separated without alteration by water.

The nitric acid dissolves it in the same manner, and water equally disengages this salt unaltered. Morveau augmented the action of these two bodies by heat; the nitrous gas was not disengaged but towards the end: and the benzoic acid was sublimed entire and without alteration. However, Hermstadt affirms, that, by employing the concentrated nitrous acid, the benzoic acid becomes fluid, more fixed, and assumes the characters of the tartareous or oxalic acid; but this result, which is itself very uncertain, requires additional researches. That which appears to be the most certain respecting this acid is, that it differs by its nature and properties from all the other vegetable acids, and that it retains an essential oil, which gives it smell, volatility, combustibility, and solubility in alcohol.

With muriatic acid, the benzoic acid may be separated from the calcareous benzoat. Alcohol dissolves it entirely, and it may be precipitated from that solution by distilled water.

TARTAREOUS ACIDULE, or TARTAR.

Acids of the second genus are likewise found in vegetables in the acid state; but they are partly saturated with potash; and hence they are called *acidules*, or acids combined with a base.

There are two species. The first is the tartareous acidule, or tartar; the second, the oxalic acidule of potash, or acid of sorrel. Tartar is either white or red; both are found on the sides of wine-casks: it is certain that this tartar must have been held in solution by the wine.

Tartar contains many foreign matters, such as the nitrat and sulphat of potash, colouring parts, &c. so that we are not to regard tartar as pure acidulous tartrit, or *cream of tartar*; for this is produced by purification. At Venice they purify it by solution in water, and then clarifying the liquor with ashes and whites of eggs. At Montpellier, they employ for the same purpose a white argillaceous earth dug at Murviel, two leagues off. Few vegetables contain this acidule: grapes contain more of it when ripe than while green; for at that time they contain citric acid; which fully proves the conversion of one acid into another, as daily practised by chemists.

Very pure tartareous acidule is crystallized, though irregularly; it has an acid taste, less vinous than that of crude tartar. On hot coals, it emits much smoke, of a penetrating empyreumatic smell, and itself becomes black and carbonaceous. If this substance be distilled in an earthen retort, with a receiver, connected with an inverted vessel of water, by means of a tube, and the fire be gradually raised, a phlegm, almost colourless, and scarcely acid, first comes over; next a stronger acid, of a deeper colour; and afterwards an oil, which becomes more and more coloured, consistent, and empyreumatic; and last of all, the concrete ammoniacal carbonat, and a large quantity of carbonic acid. A very abundant coal remains in the retort, which, lixiviated without incineration, affords a large quantity of carbonat of potash. The distilled products may be rectified by a gentle heat. In this rectification, the phlegm passes over nearly colourless, the oil becomes very white and volatile, the ammoniac partly combines with the acid, and is not obtained separate and pure, but by distilling the last portions of phlegm with the addition of potash. The potash contained in the coal is not produced in the operation, as many chemists have thought, who were not sufficiently acquainted with the nature of cream of tartar, but is all contained originally in this substance. The re-action of the fixed alkali on the oil produces the ammoniac; and the quantity of this volatile salt may be increased, by distilling the oil obtained from the tartareous acidule a second time with the coal it leaves in the retort. It appears that this formation of ammoniac is owing to the azot of the potash, which unites to the disengaged hydrogen of the oil.

Tartareous acidule is not altered by exposure to air. It dissolves in sixty parts of cold and twenty-eight parts of boiling water, and crystallizes confusedly by cooling, as we have observed. A certain quantity of earth separates from the solution of this salt, which is doubtless that which was used in its purification: the solution reddens tincture of turnsole, and has an acid taste. If it be left exposed to the air, it becomes turbid, and after some time deposites mucilaginous flocks. The acid is decomposed, and the fluid is found to contain nothing but carbonat of potash.

Mr. Demachy first observed this decomposition. Messrs. Spielman and Corvinus have likewise busied themselves on this subject; but Berthollet has made experiments which are still more accurate than those which preceded him. He has observed, that two ounces of the tartareous acidule required eighteen months for their entire decomposition; that it afforded six and a half drachms of carbonat of potash, still oily, and mixed with a small quantity of carbon; that this quantity of alkali answered with sufficient exactness to that which was afforded by the acidule by combustion and calcination. The alkaline residue of the distillation, and this spontaneous decomposition, prove, therefore, that the tartareous acidule contains nearly one fourth of its weight of potash.

None of the combustible bodies have any action upon tartareous acidule. Some metals, in the oxyd state, unite to it with excess of acid, forming triple salts.

The combination of tartareous acidule and antimony, is called *stibiated*, or *emetic*, or *antimoniated, tartar*: it is the tartarit of antimony and of potash. As it is one of the most important remedies afforded by chemistry, it is necessary to examine its properties with the greatest care. Since the time of Adrian de Mynsicht, who first described this composition, in the year 1631, the process for making it has been greatly varied. The Pharmacopœia, and the writings of chemists, all differ in the antimonial substances directed to be employed, as well as in the tartareous acidule and water, either with respect to quantity, or the method of applying them to each other. The sublimated white, the brown vitreous, or orange, oxyds, have been successively prescribed: some direct these substances to be boiled with tartareous acidule, and a greater or less quantity of water, for ten or twelve hours; others direct the ebullition to be continued no longer than half an hour; others again require the filtered lixivium to be evaporated to dryness; and lastly, there are others who direct it to be crystallized, and the crystals only to be used in medicine. Hence it happens, that tartarit of antimony is never the same substance, but possesses various degrees of force, so that its effects cannot be clearly ascertained. Vitreous oxyd of antimony has been chosen in preference to other antimonial substances, because it is one of the most soluble by the acidule of tartar; but this metallic glass may be more or less oxydated, and the different degrees of oxydation must affect its emetic power. However, if very transparent vitreous oxyd of antimony, previously well levigated, be boiled in water, with an equal weight of tartareous acidule, till the latter is saturated, and this solution be filtered and evaporated by a gentle heat, crystals of antimonial tartarit are obtained, by standing, whose emetic power appears to be sufficiently constant. The liquor being decanted and evaporated, affords new crystals for several successive times. The mother water contains sulphur, tartarit of potash, and a certain quantity of antimoniated alkaline sulphure. When the mixture of tartareous acidule, vitreous oxyd of antimony, and water, has been boiled for the preparation of antimoniated tartarit, and passed through the filtre, a yellow or brown gelatinous substance remains behind, which Rouelle has examined. According to Proust, this jelly affords, by distillation, a very inflammable pyrophorus.

Macquer proposes to substitute the white oxyd, precipitated from muriat of antimony by water, in the place of vitreous oxyd of antimony, in the preparation of emetic tartar. This oxyd is itself a violent emetic, which Macquer considered as always the same. Bergman has adopted the opinion of Macquer; and nce that time, a tartarit of antimony has been prepared in the laboratory of the academy of Dijon according to the method of Bergman and De Lassone. This medicine has been used with the greatest success: it operates, in a dose of three grains, without fatiguing the stomach and intestines.

Lartigue, an apothecary at Bourdeaux, has lately proposed another method: Mix twelve parts of the white oxyd of antimony with fifteen of the acidulated tartarit of potash reduced to powder and strained through silk. Throw the mixture by degrees into hot water, and boil it till the acidule is saturated, or till the acid taste of the liquor changes to sweet, which will be in about a quarter of an hour; filtre the liquor, and by rest and cooling it will furnish very white crystals, composed of trihedral pyramids.

The antimoniated tartarit of potash is decomposable by heat, which converts it to a coaly substance. It effloresces in the air, and becomes a white farinaceous powder; it is soluble in sixty parts of cold water, or in a much less quantity of hot water. It crystallizes by cooling; and is decomposed by lime and alkalis. Calcareous earth, bark, and pure water, in a large dose, are capable of decomposing it; whence it follows, that it ought to be administered only in distilled water. Alkaline sulphures, and sulphurated hydrogen gas, precipitate from it a red powder, or kind of sulphurated oxyd of antimony, which may serve as a test for the presence of this salt in all liquors containing it. Iron seizes the acid of tartar, and separates the oxyd of antimony; antimoniated tartar ought not, therefore, to be prepared in vessels of this metal. Durande, physician and professor at Dijon, proposes that this medicine be made publicly, and by one uniform process, established by law, as the theriaca is made; and we are convinced, that the greatest advantages would arise to the practice of physic from such a regulation being adopted.

Tartareous acidule has a sensible action on the oxyds of lead. Rouelle the younger has ascertained, that the tartarit of lead, produced in this operation, does not remain dissolved, but that the liquor, by evaporation, affords pure tartarit of potash, which was ready formed in the tartareous acidule. This is one of the processes he has made use of to prove, that potash exists in tartar. Copper, and its oxyds, are readily attacked by the tartareous acidule: the result is a salt, of a beautiful green, capable of crystallization, but hitherto little examined.

Iron is very strongly acted on by tartareous acidule; and its different combinations form several compositions much used in medicine. The first, called *chalybeated tartar*, is prepared, by boiling four ounces of levigated iron filings with one pound of white tartar, in twelve pounds of water. When the tartar is dissolved, the liquor is filtered, and deposites crystals, more of which may be obtained by subsequent evaporation.

To prepare the *tartarized tincture of Mars*, a paste is made, with six ounces of iron filings, one pound of white tartar in powder, and a sufficient quantity of water. This mixture is left at rest for twenty-four hours; after which twelve pounds of water are added, and the whole boiled for two hours; fresh water being added in proportion as the evaporation goes forward. The liquor is then decanted, filtered, and thickened, by boiling to the consistence of syrup; after which one ounce of spirit of wine is added. Rouelle ascertained, that potash exists at liberty in this tincture, and that by treating it with acids, neutral salts, with base of this alkali, are obtained.

Ludovicus's tincture of Mars, according to Baumé, is a mixture in water of equal parts of sulphat of iron and of acidulous tartarit of potash; the mixture is to stand till a dry pulverulent matter remains; then digest alcohol over it with a gentle heat till it has acquired a yellow colour; draw off the liquor, filtre, and dry the residue; pour on fresh alcohol, and digest as before.

Peres has given another process in the Journal de Pharmacie, p. 154. Take two parts of iron-filings, over which place in digestion, in a gentle heat, one part of pure tartareous acid, dissolved in the least possible quantity of water: when the acid is very red and much loaded with iron, add as much alcohol as may be judged necessary.

There are likewise two other medical preparations, formed

formed by the combination of the tartareous acid and iron. The one is *soluble martial tartar*, consisting of one pound of the tartarized tincture of Mars, and four ounces of tartarit of potash, evaporated to dryness. The other is known by the name of *martial balls*. They are made by mixing, in a glass vessel, one part of steel filings, and two parts of white tartar in powder, with a certain quantity of brandy; when the brandy is evaporated, the mass is pulverized, and more brandy added, which is suffered to evaporate as before. This process is repeated till the mass becomes tenaceous, when it is formed into balls.

Pott and Margraaf treated tartareous acidule with the mineral acids, and the latter obtained neutral salts, similar to those afforded by each of these acids with potash; whence he concluded, that this alkali exists, ready formed, in this acidule. Rouelle the younger made a number of accurate experiments, which afforded the same results. A pound of tartareous acidule, in very fine powder, was added to a pound of concentrated sulphuric acid; the mixture became hot, and the mutual action of the two substances on each other was assisted by the heat of a water-bath, and by frequent stirring with a glass instrument. This heat being continued ten or twelve hours, the mixture became of the thickness of cream, at which time two or three ounces of boiling distilled water were added, which rendered the whole fluid. Two hours after, the mixture was taken from the fire, and three pints of boiling distilled water were added. This solution was coloured, and opake, and contained disengaged sulphuric acid, a portion of tartareous acidule not decomposed, and sulphat of potash. The excess of sulphuric acid was then saturated with chalk; and sulphat of lime, with a small quantity of tartareous acidule, was precipitated. The mixture was then filtered and evaporated, till it became reduced to eighteen or twenty ounces; during which, a small quantity of tartareous acidule and of sulphat of lime fell down. The fluid was decanted off, evaporated a second time, and, by standing, afforded crystals of sulphat of potash; more of which was obtained in the like manner by successive operations. This salt is always mixed with a small quantity of tartareous acidule, and burns on a hot iron. But, if a due quantity of distilled water be added, it will be taken up, and the tartareous acidule will remain undissolved. The foregoing process is described by Berniard, who repeated it with success after Rouelle. The nitric and muriatic acids, treated in the same manner with tartareous acidule, afford nitrat and muriat of potash; which incontrovertibly proves the existence of potash in this substance.

Tartareous acidule acquires solubility, by uniting with borax and boracic acid, affording a preparation called *soluble cream of tartar*. Various receipts are in existence for making this; we shall give two, which seem to answer the purpose best.

1. Tancoigne, of Paris, formerly prepared his soluble cream of tartar with one part of cream of tartar, and the fifth part of its weight of borax in powder; but this process gave a cream of tartar which attracted the moisture of the air. To avoid that inconvenience, he substituted, with advantage, the boracic acid; but, instead of one-fifth of borax, he employed half the weight of acid. Dissolve the whole in a glazed pot, with about three times its weight of water; filtre the liquor cold, and then evaporate to dryness. As the evaporation goes forward, the salt takes a glutinous tenaceous consistence. When the matter is dry and brittle, pulverize it, and shut it close in a vessel.

2. Process of Lartigue, of Bourdeaux. Take one part of crystallized boracic acid in powder; put it in twice its weight of pure water over a gentle fire, in a vessel which will not be injured by vegetable acids. When hot, put in by degrees, and stirring it continually, eight parts of tartareous acidule in fine powder; this will form a very stiff paste. Keep the pot on the fire, and stir it till it becomes dry, breaking the clots, and taking care that the matter does not burn to the sides and bottom of the vessel. Then reduce it to powder, and sift it through a fine sieve.

The combinations of the tartareous acidule with earths, have not been yet sufficiently examined. Lime decomposes it; and it unites very well with the different alkalis. If it be added to a solution of carbonat of potash, a strong effervescence is immediately produced, by the disengagement of the carbonic acid. The acidule must be added to saturation, and the liquor filtered, after having boiled for half an hour; after which, the evaporation being continued till a pellicle is formed, the solution, by slowly cooling, affords long quadrangular prisms, terminated by two facets, placed slantwise. This salt is known by the names of *vegetable salt*, *soluble tartar*, *tartarized tartar*, and ought to be called tartarit of potash. It has a bitter taste; is converted into a coal by a strong heat; and is decomposed by distillation, affording an acid phlegm, oil, a large quantity of carbonic acid, and a small quantity of ammoniacal carbonat. It slightly attracts the humidity of the air, and is completely dissolved in four parts of water, at the heat of 120 degrees of Fahrenheit. This solution is decomposed during the course of some months, and leaves the fixed alkali combined with the carbonic acid. The mineral acids decompose it, and precipitate tartareous acidule; it is also decomposed by most metallic solutions. Lime water decomposes it, forming an insoluble tartarit of lime.

Tartareous acidule, combined with soda, forms *salt of Seignette*, so called from the name of an apothecary of Rochelle, who first composed it. Vauquelin had lately discovered that this is a triple salt, and we now give it the name of *tartarit of potash and soda*. It is prepared by dissolving twenty ounces of acidule of tartar in four pounds of water, and gradually adding very pure crystallized carbonat of soda to saturation, which point is known by an effervescence not being excited by the addition of more alkali. In this combination the tartareous acidule is rendered soluble. The fluid being evaporated till it has nearly the consistence of syrup, affords, by cooling, very beautiful regular crystals, often of a considerable magnitude. They are prisms of six, eight, or ten, unequal faces, truncated at right angles at their extremities. These prisms are most commonly bisected lengthwise; and the large face, or base, on which they rest, is marked by two diagonal lines, intersecting each other, and dividing the base into four triangles.

To be assured that this was a triple salt, Vauquelin made the following experiments. 1. He evaporated the combination of pure tartareous acid and soda; and he obtained a salt much less soluble than the salt of Seignette, which crystallizes in very small needles, or in thin irregular plates, and never like tartarit of soda. 2. He mixed together a very concentrated solution of neutral tartarit of soda, and of vegetable salt equally concentrated, which did not crystallize separately; but, as soon as the liquors were mixed, he obtained eight-sided prisms exactly similar to the salt of Seignette. Here then is an acidule formed by the addition of tartareous acid. From the enquiries of Vauquelin it appears, that 100 parts of the cream of tartar of commerce contain seven parts of tartarit of lime, and that 100 parts of crude tartar contain about 0·16. And it appears, that the same results as above would be produced with the neutral tartarits of lime, antimony, and iron.

This salt has a bitter taste; is decomposed by the fire, like the tartarit of potash; effloresces in the air, because it contains much water of crystallization, and is nearly as soluble as tartarit of potash, and, like that salt, is decomposed by air, mineral acids, and metallic solutions. The mother water of this salt contains the portion of tartarit of potash, which composes part of the tartareous acidule.

Ammoniac

Ammoniac forms with acidule of tartar an ammoniacal tartarit, which cryſtallizes very well by evaporation and cooling. Bucquet affirms that its cryſtals are rhomboidal pyramids. Macquer obſerved ſome in thick priſms of four, five, or ſix, ſides; others thickeſt in the middle, and terminated by very acute points. The academicians of Dijon obtained them in oblique-angled parallelopipedons. Ammoniacal tartarit has a cool taſte, and is decompoſed by heat: in the air it effloreſces: hot water diſſolves it more readily than cold; and it cryſtallizes by cooling. Lime and fixed alkalies diſengage the ammoniac; the contact of air, mineral acids, and metallic ſolutions, decompoſe it.

TARTAREOUS ACID.

M. Retzius publiſhed, in the Memoirs of Stockholm for 1770, a proceſs, invented by Scheele, for the extraction and purification of this acid. Waſhed chalk is thrown into a ſolution of two pounds of cream of tartar in boiling water, until there is no longer any efferveſcence nor acid at liberty; ſomewhat more than 1-4th of the weight of the cream of tartar is required: the precipitate of calcareous ſalt or tartarit of lime, which is formed muſt be then collected on the filtre, and waſhed with warm water; it commonly amounts to thirty-two or thirty-three ounces, on account of the water it retains. The liquor decanted from this precipitate affords, by evaporation, nearly the half of the weight of the tartarit of potaſh, which has not been decompoſed: 9½ ounces of denſe ſulphuric acid, diluted with five pounds five ounces of water, is poured on the calcareous ſalt of tartar; and the mixture is left to digeſt for twelve hours, being agitated from time to time. The liquor is then decanted from the ſulphat of lime; and the water is evaporated, after having aſcertained that it does not contain ſulphuric acid. For this purpoſe, a few drops of the acetit of lead, or ſugar of lead, are added; if the precipitate which is formed be entirely ſoluble in vinegar, the lixivium does not contain ſulphuric acid; if it is not ſoluble in this fermented acid, it contains the ſulphuric acid, of which it may be cleared by digeſting the liquor on a certain quantity of calcareous tartarit. Lime may be uſed inſtead of chalk, to obtain the tartareous acid: but, as this alkaline earth decompoſes the tartarit of potaſh contained in the tartareous acidule, the lixivium contains only alkali inſtead of the tartarit of potaſh, as in the former proceſs. The uſe of quicklime in this decompoſition affords a great quantity of acid, becauſe this earth decompoſes twice its weight of tartareous acidule or cream of tartar.

The pure tartareous acid obtained in the liquid ſtate by either of the above deſcribed proceſſes, muſt be evaporated to dryneſs; afterwards re-diſſolved and cryſtallized, either by gentle evaporation, or by cooling the liquor evaporated to the conſiſtence of a ſyrup, according to Bergman. It is obtained in the form of ſmall needles acutely pointed, or fine priſms, whoſe form is difficult to be determined. Bergman deſcribes them as ſmall diverging leaves; Retzius compares them to hairs entwined together. They are at firſt very white, but thoſe which are obtained towards the end are yellow.

The cryſtallized tartareous acid melts, fumes, blackens, and even takes fire by the contact of ignited bodies. By diſtillation it affords, like the tartareous acidule itſelf, an acid phlegm, a ſmall quantity of oil, and much gaſeous carbonic acid, mixed with carbonated hydrogen gas. The charcoal which remains, contains neither acid nor alkali; which proves that this laſt is not formed by the decompoſition of the tartareous acid by fire. This acid, though purified, is always oily. It is for this reaſon that we diſtinguiſh it, in the new nomenclature, by the name of tartareous acid, and its ſalts by that of tartarits. It is unalterable in the air, is much more ſoluble than tartareous acidule; its taſte is very penetrating; it reddens the tincture of violets, and likewiſe that of turnſole; it perfectly diſſolves alumine, and forms with it an aluminous tartarit, which aſſumes a gummy or mucilaginous appearance by evaporation. In combinations with magneſia, the pure tartareous acid likewiſe forms a kind of gelatinous matter inſtead of cryſtallizing. With lime it forms a ſalt which is ſcarcely ſoluble.

If a ſmall quantity of potaſh be poured into its ſolution, cryſtals of the tartareous acidule, or cream of tartar fall down. This diſcovery of Scheele and Bergman throws the greateſt light on the nature of this vegetable ſalt: there no longer remain, as Morveau obſerved, any inquiries to be made concerning the compoſition of tartareous acidule, it is known to be the tartarit of potaſh with exceſs of acid. If the proportion of potaſh be increaſed, a neutral ſalt is formed, which is perfectly ſaturated and ſoluble; it is the tartarit of potaſh or *vegetable ſalt*.

The tartareous acid has no action upon platina, gold, and ſilver; it diſſolves their oxyds or calces; it acts only inſenſibly upon copper, lead, and tin; it diſſolves their oxyds, and deprives that of lead of its red colour. It diſſolves iron with a very ſlow efferveſcence. It produces no alteration whatever in antimony in the metallic ſtate, but it diſſolves the vitreous oxyds of that metal very well. It takes lime from the nitric, muriatic, acetous, formic, and phoſphoric, acids. It precipitates the nitric ſolutions of mercury, the muriatic ſolutions of lead, &c. Its attractions, pointed out by Bergman, are in the following order: Lime, barytes, magneſia, potaſh, ſoda, ammoniac, alumine, the oxyds of zink, iron, mangancſe, cobalt, nickel, lead, tin, copper, biſmuth, antimony, arſenic, ſilver, mercury, gold, platina, water, and alcohol.

OXALIC ACIDULE.

This is called *ſalt of ſorrel of commerce*.—The acidulous oxalat, or oxalic acidule, exiſts in all kinds of ſorrel, eſpecially in that ſpecies called by Linnæus *oxalis acetoſella*. It is obtained by preſſing the juice from the ſorrel, which is then to be filtered, diluted with water, and evaporated till it becomes of the conſiſtence of cream; then it is to be covered with oil to prevent fermentation, and left in a cellar for ſix months. In this ſtate it is partly ſaturated by potaſh; it is therefore a triple ſalt. It differs from the tartareous acidule, becauſe it gives out a great deal of water, and by diſtillation a little undecompoſed acid; it affords leſs gas, no oil, and its coal is leſs bulky; but it contains potaſh, in the ſame manner as the coal of the tartareous acidule.

The oxalic acidule unites to barytes, magneſia, ſoda, and ammoniac, and forms with them triple ſalts. Lime decompoſes it, by ſeizing its whole acid, as well that which is at liberty, as that which is combined with potaſh: 100 grains of chalk decompoſe 137 grains of the oxalic acidule. The precipitate of calcareous oxalat which is depoſited, weighs 175 grains; the ſupernatant liquor affords thirty-two grains of carbonat of potaſh by evaporation. This proceſs cannot be uſed to prepare the pure oxalic acid in the ſame manner as the tartareous acid is obtained in a ſtate of purity, becauſe the calcareous oxalat cannot be decompoſed by the ſulphuric acid, as the calcareous tartarit is: on the contrary, the attraction of the oxalic acid for lime is ſo ſtrong, that it takes it from all other acids; and a ſure means of aſcertaining the purity of the oxalic acidule, or ſalt of ſorrel of commerce, conſiſts in pouring its ſolution into water, charged with a ſolution of calcareous ſulphat. If this acidule be truly extracted from ſorrel, an abundant precipitate is afforded. Potaſh remains in ſolution.

OXALIC ACID.

To prepare the oxalic acid, and deprive it of the portion of potaſh which renders it acidulous, the following proceſs is recommended by Scheele. The oxalic acidule, or ſalt of ſorrel, is ſaturated with ammoniac. Into the ſolution of this triple oxalat, compoſed of the acid with ammoniac

ammoniac and potash, the nitrat of barytes is poured. A precipitate is formed of oxalat of barytes, and the nitric acid retains the alkalis. The barytic oxalat, when well washed, is decomposed by the addition of sulphuric acid, which combines with the barytes, and remains insoluble at the bottom. The fluid being decanted, is to be assayed by the addition of a small quantity of barytic oxalat, dissolved in boiling water, to separate the portion of sulphuric acid which may be contained in it; and, when no more precipitate is afforded, the liquid, which contains the pure oxalic acid, may be decanted. This being duly evaporated, affords, by cooling, the crystallized salt in quadilateral prisms, whose faces are alternately broad and narrow, and are terminated by dihedral summits. These crystals often have the form of square or rhomboidal plates.

To procure this acid in laboratories, it is extracted from sugar, by combining the oxygen of nitric acid with one of its constituent principles. For this purpose, pour eight parts of nitric acid over one part of sugar; put the whole into a retort, which place on a sand-bath; adapt a receiver, and give a gentle heat to help the action of the acid. Some nitrous gas is disengaged; and, when the decomposition is finished, continue the distillation in a sand-heat till the residue be sufficiently contentrated; then, by cooling, crystals will be formed in the liquor, which are to be separated by decantation; spread them on blotting-paper to dry; after which dissolve them afresh in distilled water, and evaporate for more crystals.

This acid is always concrete; it has a very penetrating sour taste; seven grains give to two pounds of water a sensible degree of acidity; it reddens all blue colours: one grain of the salt gives to 3600 grains of water the property of reddening paper tinged with turnsole. The concrete oxalic acid, exposed to a mild heat, becomes dry, and covered with a white crust; soon afterwards it is reduced to powder, with the loss of three tenths of its weight. By distillation in a retort with a stronger heat, though still moderate, it liquefies, becomes brown, boils up, affords an acidulous phlegm, sublimes in part without alteration, at the same time that a mixed gas, consisting of carbonic acid and hydrogen gas, is disengaged. If a very strong heat be applied, more gas, less of concrete sublimed acid, and more acidulous phlegm which is not crystallizable, are afforded: there remains at the bottom of the retort, a grey or brown mass, forming $\frac{1}{50}$ of the acid employed. If laid upon ignited charcoal in the air, it exhales in a very acrid white fume, which strongly irritates the lungs, and leaves only a white residue without any coaly matter. Such is the result of the decomposition of the oxalic acid by heat, as observed by Bergman.

The concrete oxalic acid, exposed to a moist air, remains deliquescent, but it rather becomes dry in a dry atmosphere: cold water dissolves half its weight. When the crystals of this acid are thrown into cold water, they produce a slight noise, which indicates a sudden breaking of the particles. The specific gravity of this cold solution is 1·0593, according to Morveau. If the water of solution be evaporated, no acid vapour arises, even by ebullition. Boiling water dissolves its own weight of this concrete acid salt. One half is precipitated in crystals by cooling. This acid combines with all the saline bases, forming *oxalats*.

The affinity of this acid for lime is such, that it takes it from every other; and Bergman proposes it as a test to discover the presence and quantity of lime in mineral waters. At any rate, this peculiar property is sufficient to distinguish it from all other acids.

The third genus of the vegetable class, consists of acids by the action of fire. *Pyro*, from the Greek πυρ, fire, is prefixed to the name of each. There are only three at present well known, the pyro-tartarous, pyro-mucous, and pyro-lignous, acids.

PYRO-TARTAROUS ACID.

Fill a glass retort about half way with the pulverised acidule of potash; adapt a tubulated receiver, communicating by a tube with a jar in the pneumatic apparatus. By graduating the fire, an empyreumatic acid liquor, mixed with oil, is obtained; separate the two products by means of a funnel, and the acid liquor is what we call pyro-tartarous acid. This acid is not quite pure; it always contains some oil, which it were to be wished could be separated; but the rectification, or second distillation, of this acid, which has been recommended by a great number of authors, exhibits a very great difficulty, according to the academicians of Dijon, namely, that the rapid elevation of the liquid always burst the vessels, in spite of every care they took to moderate the heat, and leave room for the vapours. They attribute this elevation to the gas produced by the decomposition of the acid, and compressed by the oil, against the pressure of which it prevails at last by its great dilatation. However, this rectification may be dispensed with; and the acid, separated from the oil by means of the funnel, is sufficiently pure to exhibit all its distinctive characters.

The pyro-tartarous acid has an empyreumatic smell and taste; it does not redden violets, but it does turnsole and blue paper; it disengages the carbonic acid from its basis, with a strong effervescence. With earths and alkalis it forms salts, which are very different from those constituted by the tartarous acid. Chemists, before they arrived at the knowledge that hydrogen, carbon, and oxygen, appear to be the true principles of all the vegetable acids, which differ from each other only in the proportions, had adopted opinions very remote from truth, concerning the acid obtained by distillation from tartar. Vennel affirmed, that it was the acid of nitre. Monnet, upon more positive experiments, imagined this acid to be the muriatic acid, disguised by oil and mucilage. But though Scheele found a small portion of muriatic acid in tartar, yet the cubic form of the neutral salt, produced by adding the pyro-tartarous acid to soda, and the precipitation of the nitrat of mercury, are not at present sufficient for chemists to ascertain the identity.

PYRO-MUCOUS ACID.

All saccharine, gummy, and farinaceous, matters, produce this acid by distillation. Put the sugar into a retort, (it should be a very large one, because the matter swells up,) and adapt a receiver large enough to condense the vapours. When the heat first begins to act, a large quantity of carbonic acid and hydrogen gas are disengaged. A brown liquor is found in the receiver, of which the greater part is a weak acid, reddening blue paper, and coloured with a portion of oil, a spongeous coal remaining in the retort. Guyton obtained the acid less coloured by a second distillation.

Schrickel obtained, from sixteen ounces of sugar, six drachms of phlegm, passing in white vapours, and condensed in oily streams, of a penetrating smell of horseraddish, or roasted bitter almonds, of an acid and bitter taste, and of a yellowish-red colour. He rectified it from clay; the acid passed clear with a mild smell and a sourer taste. The acid, thus purified, did not crystallize; but, when exposed to cold, the aqueous part froze, and the portion which remained liquid was much more concentrated. Morveau observed, in preparing the pyro-mucous acid by the distillation of sugar, that the bottom of the retort was corroded. He does not attribute this corrosion to the acid, which exhibits not that property when rectified, or when left a long time in the glass, but to the action and adherence of the carbure of iron, which exists in the residual charcoal left by the sugar, and which he had heated very strongly. This acid cannot be concentrated by the volatilization of the water which is united to it, because it is itself as volatile as that fluid. It is this acid which exists in melasses, and according to Morveau,

veau, renders them deliquescent, and prevents their crystallization.

The pyro-mucous acid, when concentrated by freezing, is very penetrating, and strongly reddens blue vegetable colours. It spots the skin of a reddish yellow colour; and this spot does not disappear but with the epidermis. It rises totally by the fire, and leaves only a brown trace; it is changed, for the most part, into gaseous carbonic acid and hydrogen gas, by cautious distillation in well-closed vessels; it then affords a coaly residue, more abundant than when it is heated in open vessels: part rises without alteration. Combined with barytes, magnesia, lime, potash, soda, and ammoniac, it forms neutral salts, which we call *pyro-mucits*, whose properties have hitherto been little examined, but which differ from all the known salts. It disengages the carbonic acid from all these alkaline bases with a strong effervescence.

Though the property of dissolving gold was formerly attributed to the spirit of honey, it appears certain that the pyromucous acid does not touch this metal, nor platina, nor silver, nor even mercury; but it may, perhaps, dissolve their oxyds. This acid corrodes lead, and becomes opake in consequence of the oxyd of this metal which is formed; the pyro-mucit of lead has the form of long crystals: it likewise attacks copper, and becomes green; it dissolves tin, and attacks iron, with which it forms a crystallizable salt.

Its chemical attractions have been determined by Morveau in the following order: Potash, soda, byrytes, lime, magnesia, ammoniac, alumine, metallic oxyds, water, alcohol.

This empyreumatic acid has not yet been much applied to use. The spirit of honey, of manna, &c. was formerly used in pharmacy, but this usage has long since been abandoned. The acid obtained by the distillation of melasses is used in some manufactories.

Of the Lignous Matter.

This name is given to a substance whose properties agree not with any of the matters hitherto examined. From this definition, it will appear to be the skeleton or last remains of vegetable substances. By distilling wood, we find distinct products, as, a particular acid, an oil, and some carbonated hydrogen gas. The coal which remains in the retort is very considerable; so that it may be said that wood owes its hardness and other properties to the considerable portion of carbon it contains.

If lignous bodies treated with acids, which disunite their principles, they will be changed into vegetable acids which differ from each other only by the proportion of those principles.

Pyro-Lignous Acid.

For obtaining this acid, Guyton directs to distil in an iron retort, in the reverberatory furnace, little bits of very dry beech; to change the receiver when the oil has risen; and to rectify the product by a second distillation. The chemists of Dijon found that fifty-five ounces of this wood in dry chips afforded seventeen ounces of rectified acid, of an amber colour, without mixture of oil, and whose weight, compared with that of distilled water, was in the proportion of forty-nine to forty-eight: 23½ ounces of lime water were required to saturate one ounce of this acid. When gently heated, it rises in vapour. A strong heat decomposes it, as well as all the other vegetable acids. It cannot be obtained in the concrete form, it is always liquid.

It combines with earthy and alkaline bases, and forms peculiar salts, which we call the *pyro-lignits* of alumine, of barytes, of magnesia, of lime, of potash, of soda, and of ammoniac. These salts have not been yet examined with sufficient attention to enable us to give a sketch of their history. Calcareous earths and barytes adhere more strongly to it than the alkalis; lime more strongly than barytes; and magnesia more strongly than ammoniac; so that the order of these attractions alone might serve to distinguish it from most of the other vegetable acids. It acts on several metals, and dissolves most of their oxyds.

It seems as if all woods would afford the same acid by distillation, since box, birch, and beach, have already afforded a similar one. We perceive, however, that a number of experiments remain to be made to complete our knowledge of the properties and distinctive characters of this acid.

The fourth genus of vegetable acids, contains such as are obtained by fermentation, as the acetous acid, &c. which we shall examine in speaking of the products of fermentation.

The fifth, comprehends vegetable acids formed by the nitric acid. There are four species: 1. The oxalic acid, which is obtained from sugar by nitric acid, for the manner of operating, see *Oxalic Acid*, p. 329. 2. Camphoric acid, of which we shall speak under *Camphor*. 3. Suberic acid, which see under the section on *Cork*. 4. Saccholactic acid, which we shall make known when we come to treat of *Milk*.

Of Cork, and the Suberic Acid.

Before Brugnatelli, no accurate experiment had been made upon cork. Several modern chemists supposed that the acid he obtained from it was oxalic acid. But La Grange has set the matter in a new light, by his experiments and observations printed in the twenty-third vol. of the Annales de Chimie, from which this account is abridged.

For obtaining the acid of cork, which he calls suberic acid, from *suber*, cork, six parts of nitric acid at 30° are to be distilled by a gentle fire, with one part of the raspings of cork; nitrous vapours are disengaged, the cork swells and assumes a yellow colour; and, in proportion as the distillation advances, it sinks. When the froth, which is formed, ceases to appear on the surface of the liquor, the acid which had passed over into the receiver is to be returned into the retort, and the distillation repeated till no more red vapours are produced. The retort is then to be taken from the sand-bath, and, while it is still warm, its contents are to be poured into a glass or porcelain cup, which is placed on a sand-bath, and exposed to a very gentle heat. The mixture, which is to be constantly stirred with a glass rod, gradually thickens; and, as soon as white vapours are observed to be disengaged, the mixture is to be removed from the sand-bath, and stirred carefully till it cools. During the distillation of one drachm of cork with six of nitric acid, 113·63 inches of gas were disengaged; of this forty cubic inches were carbonic acid, and the rest nitrous gas. The yellow saline mass is now to be mixed with twice its weight of water, melted with a gentle heat and filtered. The liquor which passes through the filtre, is of a clear amber colour, and has a peculiar smell somewhat similar to that of Prussic acid. It becomes muddy by cooling, is covered with a saline pellicle, and deposits a pulverulent sediment.

The precipitate is to be collected and dried with a gentle heat, (not more than 30° of Reaumur,) and the liquor evaporated till the acid which it contains be all deposited. This acid is obtained by precipitation in a pulverulent form, and by evaporation in thin irregular pellicles. Dissolved in a small quantity of boiling water, it stimulates the throat and excites coughing. The acid obtained by this process is always coloured, but it may be purified, 1. By saturating the suberic acid with potash, bringing the combination to the consistence of a syrup, and then precipitating by an acid. 2. Boiling the acid with charcoal. The part not soluble in water is a substance similar to wax.

The suberic acid is in a solid form, not crystallizable; it is obtained in powder by precipitation, and by evaporation in thin irregular pellicles. Its taste is somewhat bitter, and acid. It reddens blue vegetable colours, and attracts

attracts humidity from the air, particularly when impure. It becomes brown by exposure to light. Heat volatilizes it. By exposing it to the blow-pipe, this acid emits the smell of the sebacic acid. When very pure, an ounce of water dissolves only four grains of suberic acid. Boiling water dissolves nearly half its own weight, which it deposites again by cooling. The other acids have little action on this acid. A kind of ether may be obtained from it by distilling it with alcohol. It decomposes the acetit and nitrat of lead, and gives a green colour to the nitrat of copper. It decomposes also the nitrats of mercury and silver, together with the sulphats of copper, iron, and zink. A few drops of suberic acid poured into a solution of indigo by sulphuric acid, gives a green colour. The suberic acid unites very well with earths and alkalis, and several metallic oxyds. These combinations are called *suberats*.

SUBERAT OF POTASH.—For this preparation it is necessary to use carbonat of potash in crystals; for, with the potash of commerce, or caustic potash, the results would not be the same, because the one is not pure, and the other acts upon the acid, and begets a very dark colour. In the same manner, for the suberats of soda and ammoniac, it will be necessary to use the crystallized carbonats. When at the point of saturation, evaporate the liquor, in a gentle heat, to the consistence of a clear syrup; and by cooling it forms prisms with four unequal sides. It has a bitter saltish taste, and reddens blue vegetable colours a little. It swells with heat, and parts readily with its acid. It is very soluble in water. Suberat of potash is decomposed by barytes, and by the mineral acids. All the metallic solutions are decomposed by this salt. It decomposes also the sulphat of alumine, the muriats of alumine and lime, the nitrats of lime and of alumine, and the phosphat of alumine.

SUBERAT OF SODA is not obtained in a crystallized state: it has a slightly bitter taste, reddens tincture of turnsole, and attracts humidity from the air. It is soluble in alcohol, and is decomposed by the fire, by barytes, and by potash. Mineral acids precipitate the suberic acid. Suberat of soda decomposes calcareous, magnesian, and aluminous salts.

SUBERAT OF AMMONIAC has a saltish taste, which at last becomes bitter. It attracts humidity from the air, and reddens blue vegetable colours. It is volatilized without any remainder by an intense heat; water dissolves it readily. Barytes, the fixed alkalis, and lime, decompose it, as do also the mineral and oxalic acids. It decomposes the aluminous and magnesian salts.

SUBERAT OF BARYTES is not crystallizable. It swells and melts by the action of heat, and is soluble in water, with an excess of acid. It is not decomposed by alkalis, but the mineral and oxalic acids take from it its basis. It decomposes all the salts, except the fluat of lime and barytic salts.

SUBERAT OF LIME does not crystallize. It has a white colour, a slightly saltish taste, and does not redden the tincture of turnsole. It swells on burning charcoal, while its acid is disengaged. Suberat of lime is more soluble in warm than in cold water. Barytes, potash, and soda, precipitate the lime. It is decomposed by the mineral and by the oxalic acids. It decomposes the carbonat of potash and soda, the fluat of magnesia, the phosphat of alumine and soda, together with the borat of potash.

SUBERAT OF MAGNESIA reddens tincture of turnsole, has a bitter taste, is soluble in water, and attracts humidity from the air. It exists in a pulverulent form. It swells and melts by heat. Its acid is decomposed by the blow-pipe. Barytes, alkalis, and lime, decompose this salt, as do also the mineral and oxalic acid. It decomposes the muriat of alumine, the nitrats of lime and alumine, the borat of potash, the fluat of soda, the borat of soda, and the phosphat of alumine.

SUBERAT OF ALUMINE reddens tincture of turnsole. It attracts humidity from the air, and is decomposed by an intense heat. The other earths, the alkalis, and mineral acids, decompose it. It decomposes the sulphat and muriat of iron, the nitrats of silver, mercury, and lead.

The suberic acid has no action on platina, gold, and nickel, but it forms metallic suberats with oxyds of silver, mercury, lead, copper, tin, iron, bismuth, arsenic, cobalt, antimony, manganese, and molybdena. In general, these salts do not crystallize, and have all an excess of acid.

CICERIC ACID.

Proust first mentioned the existence of an acid liquor on the stalks, leaves, and pods, of the pea vetch, or the *cicer arietinum* of Linnæus. When washed and bruised, this plant did not exhibit any mark of acidity. Proust conceived that it was merely an acidifiable base which exuded from the plant, and which was afterwards converted into an acid by combining with the oxygen of the atmosphere. Deyeux, who collected this acid liquor, seems inclined to think that the hairs which cover this plant are the excretory organs, in which this acid is formed. From some experiments which he made with a view to discover the nature of the acid, he concludes it to be the same with the oxalic, and considers this plant as the only instance in which pure uncombined oxalic acid is produced. Dispan, however, who had made a great variety of experiments on this acid, is of opinion, that it differs not only from the oxalic, but from every known acid. He collected the acid liquor by wiping the plant with a clean linen cloth, and by washing the cloth in distilled water, to which it imparts the acid. When the water has acquired a taste sufficiently acidulous, it is to be filtered, and evaporated with a gentle heat to the degree of concentration required. This liquor, according to Dispan, acquires by evaporation a colour which passes gradually from a citron yellow to the colour of Malaga wine. The following are the properties which this chemist ascribes to the ciceric acid. 1. It has a sharp and penetrating taste. 2. It reddens the blue vegetable colours which are sensible to acids. 3. It effervesces with akaline and calcareous carbonats. 4. It does not form any deposite or mouldiness by age. 5. It preserves its colour and transparency, but loses somewhat of its strength and acidity. 6. It gives a beautiful red carmine colour. 7. It is precipitated by the gallic acid, and gives a beautiful green colour. 8. It forms a kind of syrup by evaporation, and does not crystallize. 9. It becomes brown and brittle like a gum by drying.

Ciceric acid forms with potash a salt which crystallizes in bundles of shining needles, turned spirally and parallel to each other. The taste of this salt is cooling, like that of nitrat of potash; but it leaves behind it a saline sharp taste. It dissolves readily in water. It melts on burning charcoal; boils and swells up considerably. The carbonaceous matter which it forms, leaves behind it spongy ashes, of a grey colour. With soda this acid forms a salt which does not crystallize, and which has an austere taste. Its combination with ammoniac affords, by spontaneous evaporation, transparent shining crystals, of which the form has not yet been determined. A gentle heat decomposes this salt by volatilizing the ammoniac. Lime produces with this acid a soluble salt, which by a cautiously conducted evaporation, crystallizes in very large solid polyhedrons that have some analogy with those of sugar. At first this salt seems to have little taste, but at the end of some time it produces a saline taste. It is reduced to a dry and friable mass by the heat of lighted charcoal. Carbonat of potash and the oxalic acid decompose it. Magnesia forms with this acid a salt, which crystallizes in white grains, the figure of which has not been determined. It has a saline taste, burns readily, and leaves behind it a greyish residue.

The ciceric acid dissolves iron filings with effervescence. This combination, which has a styptic taste, does not crystallize.

cryſtallize, but it affords a cruſt by evaporation that is deliqueſcent. Lime and alkalis decompoſe this ſalt, and precipitate the iron of a greeniſh blue colour, which ſoon becomes yellow. From theſe experiments Diſpan concludes that the ciceric acid is of a peculiar nature, different from all other vegetable acids; but it ſeems to be ſtill undetermined whether the acid liquor exuding from the pea vetches contains two different acids, or if the ciceric is a modification of the oxalic acid.

OF FIXED OILS.

Oil was long regarded as a ſimple ſubſtance; but it is now demonſtrated, by the uſeful experiments of Lavoiſier, that it is a ſubſtance eſſentially compoſed of carbon and hydrogen, differing only from the firſt products of vegetation by a greater proportion of hydrogen, and a more intimate combination. Oil in vegetables is an inflammable body, which is ſufficient to diſtinguiſh it from the preceding ſubſtances. It is inſoluble in water, which is a ſecond diſtinction. Oil gives out much water in burning, and ſome carbonic acid; more water is formed than there was originally of oil: this exhibits a third diſtinguiſhing mark. Thus it is manifeſt that oil is compoſed of carbon, hydrogen, and a ſmall quantity of oxygen.

Oils are diſtinguiſhed in general into two claſſes: The firſt are called *fat oils, ſweet oils, expreſſed oils*, and by chemiſts *fixed oils*. The ſecond were formerly called *eſſential oils*, and are now named *volatile oils*. All the fixed oils have a mild inſipid taſte; they ſtick to the ſides of veſſels, which has occaſioned them to be called fat oils. They are not emitted from the ſurface of vegetables, but are contained in the kernels, the pippins, and emulſive ſeeds. They are extracted by breaking the cellules in which they are encloſed; that is to ſay, by pounding and preſſure. It is obſervable, that ſeeds with a ſingle cotyledon or lobe, do not contain oil, but much fecula; but the two-lobed, &c. contain oil; and in general all ſeeds which make an emulſion with water.

There are three genera of fixed oils. 1. Pure fixed oils, fat, congealing, which do not take fire with nitric acid. Such are the oil of olives, of ſweet almonds, and of a kind of cabbage called cole, (generally named rape-oil,) and of the ben-nut from Egypt and Arabia. The mode of extracting oil of almonds, may ſerve as an example for the reſt. Take the ſweet almonds, new and well dried in the air; rub them in a clean rough cloth, to carry off that reddiſh-yellow powder which lies on their ſurface; bruiſe them in a marble mortar, or cruſh them between millſtones, to reduce them to a pulp; ſhape this pulp into a flattened ball or cake, which wrap as tight as poſſible in a piece of ticking; then put it in the preſs. Fourcroy directs it to be preſſed in ſacks made of ruſhes. The oil paſſes through the interſtices of the cloth, by expreſſion, into a veſſel beneath. The parenchyma remains on the cloth; this is called the *mace*, and is ſometimes moiſtened with water, and preſſed again; but this produces an oil leſs pure, which depoſits a ſediment: the firſt is called *virgin oil*. 2. Drying oils, which do not congeal, are acted upon by nitric acid, and become dry by expoſure to the air. Such are, the oil of linſeed, of nuts, of pinks, &c. 3. Concrete oils and vegetable butters. The diſtinctive character of theſe is to become ſolid as ſoon as extracted. Leſs oxygen is required for the combuſtion of concrete oils than others, becauſe they have more in their compoſition. This Berthollet has proved very clearly. He boiled ſome oil of the firſt and ſecond kind upon copper, and compared it with the third ſort. The copper in the laſt operation was oxydated green, but no oxyd was formed with the two firſt genera of oils.

Oils of this nature are, butter of cocoa, of the croton ſebiferum, wax of Louiſiana, and of the gall in China. For an example, we ſhall give the mode of extracting the butter of cocoa. Several methods are in uſe for this purpoſe; but the two following are moſt deſerving of attention. 1. Machy's proceſs, from the Journal de Pharmacie, p. 56. Four ſpecies of cocoa are diſtinguiſhed, the large and ſmall Caracca, the Berbice, and that of the iſlands. The latter is uſed in this proceſs: let it be as freſh as poſſible; rub it in a rough cloth to cleanſe the ſurface; bruiſe it, both bark and ſeeds, and put it into a hair-cloth; ſpread the powder or duſt upon another hair-cloth ſomewhat finer. Place it over the fire in an open veſſel containing a little water; over the hair-cloth lay the ticking which is to be uſed in expreſſing the butter, and ſome linen rags, to confine the vapours of the water when it begins to boil: theſe vapours uniformly penetrate the powdered cocoa; then put the plates of the preſs into boiling water; make up the cakes in the ticking; then take out the preſſing-plates and dry them; put the cakes of cocoa between the plates, and ſet the preſs to work; the butter runs immediately. Sixteen parts of cocoa yield five or ſix parts of butter.

2. Joſſe's method, as deſcribed by La Grange. Dry the cocoa ſlightly by the fire, and pick it very clean; pound it in a mill, and afterwards on a ſtone. When brought to a paſte, heat it gently, and mix three parts of boiling water with ſixteen of the paſte. The mixture then takes a firmer conſiſtence; wrap it in ticking, and put it in the preſs between two warm plates of iron. The product, this way, is ſeven or eight parts in fixteen, if the preſſure has been even and ſtrong. But, as this mode of expreſſion draws out ſome of the colouring matter, it requires purifying. For this purpoſe, Joſſe provided a tin funnel, ſoldered into a copper veſſel forming a ſand-bath; this veſſel, has a hole in the bottom to let through the tube of the funnel, which is lengthened ſo as to go into the neck of a bottle. Place this apparatus in a furnace, put a filtre of blotting paper into the funnel, and pour on the butter of cocoa which is to be purified; then put water into the copper veſſel, and keep it hot enough to preſerve the butter in a fluid ſtate, ſo as to paſs eaſily through the filtre. Twelve or thirteen pounds of butter of cocoa may thus be purified in about three hours time.

In examining the chemical qualities of fixed oils, we ſhall chooſe, as an example, the oil of olives, for the properties of all the others are nearly the ſame. By diſtillation in a retort, with the pneumatic apparatus, it affords an acid phlegm of a penetrating ſmell, a light oil, a denſer oil, and a large quantity of hydrogen gas mixed with carbonic acid. The quantity of reſidual coal is not abundant, and contains no alkali. By re-diſtilling theſe, ſebacic acid, and an oil which becomes lighter each time, are obtained. This is known by the name of *philoſophical oil*; the alchemiſts prepared it by diſtilling, for ſeveral ſucceſſive times, a fixed oil, with which they had impregnated a brick. It is not exactly known how far this decompoſition may be carried, though it is ſaid that fixed oil may this way be reduced into the diſengaged inflammable principle, water, acid, air, and earth. It may be deprived of its colouring matter by diſtillation over ſand or clay. Expoſed to the air, it eaſily combines with oxygen; it is changed, becomes thicker, and rancid. To prove this, by way of experiment, put water in a veſſel, and cover the ſurface with oil. If oil be put into a bottle, and oxygen gas be introduced, the effect is quicker; the oxygen is preſently abſorbed.

When the combination of pure air is favoured by the volatilizing of the oil, then there is an inflammation or combuſtion. To make this combination act, the oil muſt be volatilized by the application of ſome hot ſubſtance; the flame thus produced is capable of ſuſtaining the degree of volatility and of maintaining combuſtion; and, if a current of air be kept up in the middle of the wick and the flame, the great quantity of oxygen occaſions a more rapid combuſtion, and a ſtronger heat; hence the light is brighter, and there is no longer any ſmoke, for the ſmoke is burnt and deſtroyed by the great heat. This is the principle of *Argand's lamp*.

Oils which contain mucilage, extractive bodies, &c. are generally coloured: they may be purified by water only, which feizes on the mucilage, &c. The water fhould be ftrongly agitated; or it may even be flightly heated. If water be thrown on burning oil, it caufes it to give a ftronger flame, and a fudden detonation takes place, proceeding from the decompofition of the water, which affords oxygen to the oil, and allows much hydrogen gas to efcape; fome carbonic acid is formed alfo.

Sulphur unites with oil, forming fulphure of oil, or *rubies of fulphur*, or *balfam of fulphur*. Boil fublimed fulphur with four times its weight of oil of olives, till the folution has acquired a dark-red colour. When the oil is well faturated, the fulphur will be obtained in a regular form, and is precipitated in cryftals by cooling. By diftilling this combination, fulphurated hydrogen gas will be obtained.

Oil diffolves phofphorus; by this means Pelletier obtained it in cryftals. It is fuppofed that fulphurated and carbonated hydrogen act upon oils alfo. Charcoal has the property of clarifying or whitening oil; boil the oil over charcoal; after a flight ebullition, pafs the oil through a cloth, or filter it; the oil thus obtained is very clear, and makes no depofit.

Fixed oils do not appear capable of uniting with pure metallic fubftances, excepting copper and iron, on which they have a confiderable action. But they combine with metallic oxyds, and form thick concrete combinations, of a foapy appearance, as may be obferved in the preparation of unguents and plaifters. In docimaftic operations, fixed oils are ufed to reduce metallic oxyds. Berthollet defcribes an ingenious and fimple procefs for immediately combining a fixed oil with any metallic oxyd, in the faponaceous form. It confifts in pouring a folution of foap into a metallic folution; the acid of the latter feizes the fixed alkali of the foap, and the metallic oxyd is precipitated in combination with the oil, to which it communicates its colour. In this manner a beautiful green foap is formed with fulphat of copper, and a brown foap with fulphat of iron; thefe compounds may perhaps be ufeful in painting. Scheele has difcovered, that by combining oil of fweet almonds, of olives, of rape, or of linfeed, with half the quantity of the oxyd of lead, and adding a fmall quantity of water to the mixture, a fubftance is feparated, which he calls the *fweet principle*. By evaporating the water, this principle is obtained, of the confiftence of fyrup. By a ftrong heat it takes fire; part is volatilized in the diftillation without burning; the refidual coal is very light. The fweet principle does not cryftallize, nor does it appear fufceptible of fermentation; nitric acid, diftilled four times from it, produces oxalic acid. This principle appears to be a kind of mucilage. Scheele imagined that it might be decompofed by repeated diftillation. When the oil or fat is frefh, the fulphuric acid finds no appearance of the oxyd of lead, and the liquor does not grow thick. If the oil be ftale and rancid, oxyd of lead is difcovered, which is precipitated by the fulphuric acid. Its diftillation requires the fame heat as for the fulphuric acid; part of the fweet principle paffes over undecompofed, in form of a thick fyrup, preferving its tafte; it then becomes empyreumatic; then a brown oil rifes; and a light friable coal remains in the retort, which contains no lead. The fweet principle mixes with alcohol, and is precipitated with it in the gelatinous form.

The preparations called *ointments* or *plaifters*, may be made by combining fixed oils with metallic oxyds. Take three parts of the femi-vitreous oxyd of lead, fix parts of oil of olives, and fix parts of water; put thefe into a copper veffel, over a fire which will keep up a moderate ebullition; ftir the mixture without ceafing, with a wooden fpatula, till the mafs becomes of a white colour, and has acquired the confiftence of a foftifh ointment. Take care to add warm water from time to time, as that in the veffel evaporates, that the ointment may never be dry. When the ointment is of a proper confiftence, take the veffel off the fire, let it cool, then pour the matter into cold water to form it into a mafs.

Acids act more readily upon fixed oils than do the metallic oxyds. Achard, Cornette, and Macquer, have made experiments refpecting thefe compounds. Achard added concentrated fulphuric acid, by fmall portions, to fixed oil. This mixture, being continually triturated, becomes at length converted into a brown mafs, foluble in water and alcohol. The concentrated fulphuric acid renders fixed oils black, and caufes them to refemble bitumens. This phenomenon appears to arife from the reaction of the hydrogen of the oil on the oxygen of this acid.

Weak nitric acid acts upon oil by yielding a portion of its oxygen; in which cafe the oil thickens, and takes the form of fat. But if the acid be concentrated, and affifted by heat, then there is inflammation, particularly with the drying oils. The muriatic and carbonic acids act but weakly on fixed oils; the former, however, in a concentrated ftate, combines with them to a certain degree, according to Cornette. The oxygenated muriatic acid thickens them much and appears, by the abforption of its oxygen, to convert them into a fubftance nearly refembling wax. This affinity of oil for oxygen occafions the action of oils in the revivification of metals.

Barytes, lime, ftrontian, magnefia, and alkalis in general, unite with oils, and form what is called *foap*. The earthy foaps are eafily produced by the action of double affinity. For this purpofe, pour into a folution of foap a nitric folution of barytes, lime, or ftrontian; the acid unites with the alkali of the foap, and the earthy fubftance is precipitated with the oil.

Soaps prepared with alkalis are more or lefs folid or hard; with potafh they are generally foft; thofe with foda are therefore preferred. To make the amygdaline foap, firft prepare fome cauftic foda: Boil one part of good Alicant foda, and two parts of quicklime, in a fufficient quantity of water, filtre the liquor through a cloth, and then evaporate, till a phial which would contain eight parts of clear water may contain eleven parts of this liquid, which is now called *foap-lye*. Mix in a glazed pan one part of this foap-lye with two parts of the oil of fweet almonds; let this digeft in a heat that will juft keep it fimmering; continue the coction, ftirring it gently with a piece of wood, till, by dropping fome of the mixture on a fmooth ftone, it appears that the foap coagulates, and that the water runs from it. Take out the foap before it gets cold, and run it into moulds.

This foap may be prepared alfo without heat, by mixing the oil and the foap-lye in the proportions beft fuited to the purpofe, which proportions cannot be exactly fet down unlefs the alkali could be always at the fame point of concentration; it muft therefore be added by degrees, till the matter becomes of a folid confiftence, or rather till the combination is complete; finifh the operation by ftirring the mixture well, and then leave it to fettle in a cool place. In the arts, they ufe oil of olives, of nuts, of rape-feed, fat, fifh-oil, and even animal fubftances, as wool, cuttings of cloth, &c. Chaptal prepared foap with fuch matters; we fhall fpeak of them when we come to treat of animal fubftances.

Coloured foaps are made alfo; in which cafe the materials are foda, fulphat of copper, cinnabar, &c. according to the colour required. In the union of oil with alkali in the cold, there is a difengagement of caloric. In general the drying oils, or thofe of the fecond genus, do not make fuch good foaps as thofe of the firft and third. What caufes the thickening of the foaps, is, firft the temperature; and fecondly becaufe the alkalis have more affinity with oil than they have with water; befides this, there is an abforption of oxygen during faponification, that is, the oil becomes concrete by abforbing oxygen.

Soaps fhould have a fweet or infipid tafte. Soaps, if properly made, are all foluble in water; the folution is always thick and opaque, even when filtered. Diftilled in a retort,

tort, with the pneumatic apparatus, the products are water, oil, and ammoniac; the coal contains a good deal of fixed alkali. Lime-water, and all the earthy and metallic salts, decompose soap. Alcohol dissolves it also with the assistance of a little heat, and forms *essence of soap*, which is to be sweetened with a volatile oil.

A soap is prepared with ammoniac, known by the name of *volatile liniment*, or *animal soap*. Mix oil of sweet almonds with one-fourth of its weight of ammoniac, in a wide-necked bottle, shaking it till the substances are perfectly united.

Oil combines with sugar, forming a kind of soap, mixing easily with water, and kept in suspension. The trituration of almonds with sugar and water makes *almond-milk, orgeat*, and other emulsions.

VOLATILE OILS.

Volatile or essential oils differ from fixed oils by the following characters: Their smell is strong and aromatic; their volatility is such, that they rise with the heat of boiling water; and their taste is very acrid. They are likewise much more combustible than the fixed oils. These oils thicken into resins by contact with oxygen, congeal in a great degree of cold, and furnish little saline crystals of a camphorated smell; they combine more difficultly with alkalis.

These oils are the less plentiful, not being so generally distributed through the vegetable system; they exist only in the sweet-smelling plants, sometimes in the leaves, at other times in the roots, the flowers, or the outer rind of the fruit, and sometimes, though rarely, in the whole substance of the plant. Some are concrete, others always liquid; they vary also in colour.

The following are the parts of vegetables in which volatile oils are contained: In iris, dictamnum, kidney-wort, &c. the *root*. Sandal, sassafras, rhodium, &c. the *stem*. Cinnamon, cassia lignea, winteranus, &c. the *bark*. Peppermint, rosemary, thyme, balm, wormwood, &c. the *leaves*. Roses, lavender, cloves, &c. the *calyces* of the flowers. Camomile and orange-flowers, the *petals*. Pepper, cubebs, juniper-berries, &c. the *fruits*. Nutmeg, anise, fennel, and most umbelliferous plants, in the *seeds*. The concrete oils are those from roses, parsley, elecampane, kidney-wort, and star-wort.

The following are the distinctions of volatile oils with respect to colour. 1. Yellow, as from lavender. 2. Brown, from cinnamon and cloves. 3. Blue, from camomile. 4. Sea-green, from St. John's wort. 5. Green, as from parsley. Heavy oils, sinking in water, are those of sassafras and cloves.

The volatile oils, which are drawn out by expression, are those contained in visible cells, as in lemons, oranges, cedra, and bergamot; by merely pressing the rind of the fruit, the oil runs out. Or they may be grated, by which means, the rind being torn, the oil drops into the vessel beneath. Having thus rasped a certain quantity of fruit, collect the rind, which will be like a pulp; press this between two plates of glass to extract the volatile oil. This oil deposits the impurities it carried along with it, and clarifies, if left to itself at rest.

By distillation, the most usual and the best method is to take the plant in the time of its greatest strength, and when its odour is the strongest, and to choose such part of the plant as exhales the strongest smell. Put it into the cucurbit of an alembic without a balnæum mariæ; add water enough to soak the plant sufficiently, and to keep it from touching the bottom of the cucurbit. A peculiar kind of receiver is to be adapted, called the Florentine receiver. This vessel lets out the excess of water by an opening on its belly somewhat below the neck, by which means the oil is collected in the neck, and cannot escape. Urge the fire suddenly to the heat necessary to make the water boil. The water in this distillation rises much loaded with the smell of the plant, and carries with it all its volatile oil. This water, when at the temperature of 80°, is clear and transparent; but, at a few degrees below, the dissolved volatile oil begins to separate, rendering it turbid and somewhat milky; the water then retains no more than is necessary to give it the aromatic odour which constitutes *distilled water*, *water charged with rectified spirit*; the rest of the oil floats on the surface of the water, or sinks to the bottom, according to the specific gravity of the oil. Continue the distillation till the water begins to look clear, observing to add water from time to time, that the plant may always be covered.

There is still another mode of extracting volatile oils, which is called distillation *per descensum*, and was performed by applying the fire over the plant; it was more particularly used in extracting oil of cloves; but this kind of distillation, as we have already remarked, in p. 192, is now entirely disused.

Volatile oils lose their smell by heat; as they are very volatile, fire alone does not decompose them. When heated in close vessels, a large quantity of hydrogen is disengaged. When heated with contact of air, they quickly take fire, and emit a very thick fume, which becomes condensed into a fine and light coaly matter: they leave very little fixed coal after their inflammation; because they are so volatile, that the coaly matter is formed in the part which is volatilized. By exposure to the air they become thick, and in process of time assume the character of resin. Needle-formed crystals are deposited; but these have not, as some have pretended, properties analogous to camphor; these concretions seem to approach to the nature of resins, and to contain an acid salt similar in its properties to the flowers of benzoin. Deyeux and Vauquelin discovered the properties of the benzoin acid, in the concretions deposited in the water of canella, so early as the year 1791.

Volatile oil, by being long kept in a bottle, will be partly decomposed; water will be collected at the bottom of the bottle; large crystals also are formed, which appear to be oxalic acid; lastly, a part of the oil remains undecomposed. Proust seems to have been among the first who examined accurately the crystalline ramifications which sometimes form in essential oils. By evaporating these oils in the open air, at a temperature varying from —6° to +10 of Reaumur, he obtained crystals, which he conceived to be camphor.

In every essential oil, according to Proust, there are two substances which have a tendency to combine with oxygen; one, the radical of a resin, the other the radical of an acid. The resinous radical seems to have the strongest affinity; the acid base operates only through a long period of time. These oils cannot be often exposed to the air, nor distilled repeatedly, without exhibiting some mark of acidity. Proust attributes the conversion of these substances into resins to the absorption of atmospherical oxgen. *An. de Chem.* tom. iv. p. 179.

Margueron remarks, that some of the volatile oils assume the concrete state in a temperature about 8° above the freezing point of water; while others, again, retain their fluidity far below that point. This chemist observed carefully the phenomena which take place, by exposing these oils in small flasks to a temperature of 11° below freezing. In the upper and internal part of the flasks, ramifications were to be perceived, similar to those which are formed on the glass panes of windows during an intense frost. The oil of bergamotte, during its exposure to this cold, exhibited in its substance a quantity of small elliptic laminæ; that of citrons had deposited small crystals; the oil of oranges was the least fluid; and that of canella alba was partly congealed. By exposing these oils for two hours to an artificial cold of —22°, some of the corks were driven out of the flasks by the formation and sudden expansion of an elastic fluid, and the upper part of the flasks were at the same time covered with numerous saline, crystallized, dendritual, ramifications.

The inferior surface of the flask, containing the volatile oil of peppermint, was covered with small needles, which were

were white, and melted readily between the fingers. Applied to the tongue, they produced the fresh and penetrating taste of the oil. Their solution in alcohol became white by the addition of water. The oil in the flask had acquired a kind of sluggish fluidity; its smell was less lively, and its colour deeper than formerly. It was soluble in alcohol, and had lost a portion of its weight.

Ramifications were formed in the upper part of the flask, containing the oil of oranges. In uncorking the flask, a portion of an elastic fluid escaped; and this oil exhibited the same appearances with that of peppermint, except that it was more deeply coloured, and had lost its fluidity so as to adhere to the flask like oil of turpentine. Some particles were separated from it by mixing it with water, which remained constantly at the bottom of this fluid. Exposure to the artificial cold produced no other effect except giving rise to some crystalline laminæ of an elliptic form. At 4° below zero it resumed its fluidity.

Volatile oil of lemons lost its fluidity by exposure to cold, at the same time that an amber-coloured liquor and several small crystals were separated from it. The colour and taste of the oil had become less lively. The amber-coloured liquor had an empyreumatic smell, a bitter and slightly acid taste; it was miscible with water, reddened tincture of turnsole, and did not precipitate lime-water; but it effervesced with carbonat of potash. This liquor was in the proportion of one 10th of the oil. The crystals had no very regular shape; they were insoluble in cold, but melted in warm, water, and formed a pellicle on its surface during refrigeration. They melted by heat, and crystallized again in the form of small needles by cooling; they did not burn in a flame of a candle. Dissolved in alcohol, they gave a red tinge to tincture of turnsole.

Margueron varied these experiments, by putting some distilled water into the flask containing the oils, and subjecting the mixtures to the temperature of 11° below freezing. During the moment the water passed to the state of ice, several of the corks were forced out, and an aromatic principle disengaged. The flask containing the oil of peppermint was covered with a kind of capillary vegetation; the other oils exhibited nothing worthy of being remarked. The action of the cold on the oil of peppermint, had heightened the colour of the oil, and had weakened its smell; the crystalline needles separated from it were of a white colour, silky and brittle. They had the smell of peppermint applied to the tongue; they had a fresh and penetrating taste. They did not take fire with the flame of a candle, but melted, and assumed by cooling transparency and a solid form. The solution of these crystals in water, gave a red tinge to tincture of turnsole. The transparency of the alcoholic solution was not disturbed by the addition of water. From these experiments Margueron concludes, that cold disengages from volatile oils a part of their aroma, heightens their colours, renders them of a thicker consistence, and separates from them concretions, some of which appear to be of a saline nature.

Volatile or essential oils unite with sulphur. These compositions are called *balsams*; as, *terebinthinated balsam of sulphur*, and *anisated balsam of sulphur*. 1. For the terebinthinated balsam of sulphur, take two parts of sublimed sulphur, commonly called flowers of sulphur, and six of oil of turpentine; mix them, and leave them in digestion till the oil is saturated with the sulphur. 2. For the anisated balsam, the only difference is to add to the above ingredients, four parts of volatile oil of aniseed; let them digest as before.

Volatile oils dissolve phosphorus. When the oil is well saturated, crystallized phosphorus is produced; by adding alcohol to the solution, a precipitate is made, which, seen through a magnifier, is an octahedron truncated at top and bottom, and sometimes lengthened out at the sides so as to appear an hexangular prism. Volatile oils have also the property of dissolving sulphurated hydrogen gas.

Water dissolves these oils, which produces the *aromatic distilled waters*. The mode of proceeding we have already described, in the distillation of a plant for obtaining its volatile oil. Fourcroy has proposed a very simple and cheap process: he directs to pour a few drops of volatile oil into a large quantity of water, to agitate the mixture, and then let it settle, to clarify the liquor, and separate the undissolved oil; by this simple operation, the water is very aromatic, sometimes even more so than what is distilled in large quantities from vegetables too much exhausted of oil; and the process requires neither distillatory apparatus, nor fire, nor loses any time; it may be performed in any place and in all seasons; large bottles, or common casks, will answer the purpose.

Waters called inodorous, are produced by distilling certain plants in balneum mariæ, without any other water; they are weak, herbaceous, and of small duration. The water which holds the extract, or odorant mucilage, in solution, grows thick, is filled with mucous flocks, and gives out a musty or mouldy smell: such are the essential waters of borrage, lettuce, plantain, &c.

The acids have not all the same effects upon volatile oils. 1. The concentrated sulphuric acid thickens and converts them into a kind of coal or bitumen; if weak, forms a kind of soap, or *savonule*. 2. The nitric acid, if concentrated, causes them to burst into a flame; but, if weak, it converts them by degrees into resins. 3. The muriatic acid makes them saponaceous; the oxygenated muriatic acid thickens them, and makes them resinous.

Volatile oils do not unite without difficulty with earthy substances and alkalis. The only combination of this kind which is well known, is that of potash with a volatile oil, which is called *savonule*, or *Starkey's soap*, from the name of the person who first tried it; but his process is tedious and imperfect. Other modes have been proposed by Stahl, Rouelle, Baumé, Geoffrey, Achard, &c. but Pelletier's succeeds the best: Take equal parts of turpentine and alkali of tartar; triturate them together, and add by degrees about one-fourth of the weight of the whole of carbonat of ammoniac.

Volatile oil unites with sugar.—If a bit of sugar be rubbed against the peel of a lemon, or an orange, it imbibes volatile oil, and forms an oleo-saccharum, soluble in water, and very proper for aromatizing certain liquors. These oils are used as cordial, stimulant, antispasmodic, &c. remedies. Externally applied, they are powerfully antiseptic, and stop the progress of caries in the bones.

Of CAMPHOR.

Camphor is a volatile oil, rendered concrete by carbon. This substance is obtained from a species of laurel which grows in China, Japan, and in the islands of Borneo, Sumatra, Ceylon, &c. The tree which produces it, sometimes contains so large a quantity, that it need only be cleft, in order to obtain very pure tears of camphor, of considerable size. It is obtained also by distillation. The roots, or other parts of the tree, are put into an alembic with water, which is covered with a capital, containing ropes of rice straw. On the application of a sufficient heat, the camphor is sublimed in small greyish grains, which are afterwards united into larger masses. This crude camphor is impure; the Dutch purify it by sublimation, after previously adding an ounce of lime to each pound of the camphor.

Camphor is much more volatile than the other essential oils, and sublimes with the most gentle heat; it crystallizes in hexagonal laminæ, attached to a middle stem. By a sudden heat it melts before it rises. Its smell is strong, and insupportable to some persons; it takes fire readily, burns rapidly with much smoke, and leaves no carbonaceous residue. The camphorate principle exhibits some very curious and interesting phenomena. Benedict Prevost discovered these in his experiments made for the purpose of exhibiting to the sight the emanations of odorous bodies.

If

If a bit of camphor be laid on glass, or in a very clean saucer, and just covered with pure water, the water will immediately recede, and leave a dry circle round the camphor. If a bit of camphor be put upon very pure water, it will move about with great rapidity. If a small drop of any liquid odorous body, or oil, be thrown on the surface of the water, the motion ceases immediately. If drops be drawn from the surface of a glass of water, and dropped into the glass where the bit of camphor is in motion, at the 50th or 60th drop the motion ceases; but it continues, if the water be only touched with a bit of metal well polished. If the bit of camphor be now put into the water which has been touched by the wax, the rotatory motion of the camphor begins as usual, but in a few seconds it ceases of itself. The camphor, thus placed upon water, dissolves faster than in moist air; and in dissolving it acquires a round form, and becomes transparent. This solution takes place only at the point of contact of the air and water, as Venturi proved by the following experiment: If a cylindrical piece of camphor be put in water, and loaded so that about one half shall be under the surface, it will corrode a little above the surface of the water, so that by degrees it separates into two pieces.

Argil, or pure alumine, has the property of decomposing camphor. Take one part of camphor and six of argil; dry the clay, and reduce it to powder, then pass it through silk; reduce the camphor to powder by means of alcohol; and mix the whole together in a mortar. When well mixed, add a little water, not too much, but just enough to form a paste, and make it up into balls about as big as an olive; place these on a hair-cloth, and leave them to dry in the shade. When perfectly dry, put them into a retort, which place on a sand-bath; fix on a receiver, which is previously to contain some distilled water, and then lute the joinings close. When the apparatus is thus disposed, heat the retort gradually, keeping it for some hours at a low heat; then increase the fire. If the fire has not been skilfully managed, it may happen that part of the camphor is sublimed in the neck of the retort; continue the operation however till no more oil is seen to run; then stop the fire; and, when the apparatus is cool, unlute, and take the sublimed camphor out of the neck of the retort, as well as what remains at the bottom. Beat the whole in a mortar, and repeat the operation as before, until, with a strong heat, there is neither sublimation nor oil.

Alumine may also be used to advantage in this decomposition. This alumin is to be prepared by means of ammoniac; wash it with distilled water to make it as pure as possible; then dry it slightly. Take two parts of alumine, or three if wet, to one part of camphor; and proceed as above directed. In either case, there will be found in the receiver a volatile oil of a gold-yellow colour, floating on the surface of the water. This oil is of a sharp biting taste, but leaves a sense of coolness on the tongue; its smell is aromatic, like thyme or rosemary. It entirely evaporates by free exposure to the air. With alkalis it forms savonules; it is soluble in alcohol. The distilled water contained in the receiver, is very aromatic, pungent, reddening tincture of turnsole, and effervescing with alkaline carbonats, which proves that some acids is formed during the operation. What remains in the retort is of a fine black colour, and weighs more than the clay or alumine used in the operation: this matter is carbon intimately mixed with the alumine. To separate the carbon from the alumine, and have it pure, the alumine must be saturated with an acid.

Acids dissolve camphor. Sulphuric acid, assisted by heat, dissolves it, and becomes red. The nitric acid dissolves it without any intestine motion, and forms a yellow liquid, which, because it floats on the acid, has been called improperly *oil of camphor*; but this preparation is very imperfect; for, it cannot be mixed with any other substance without the camphor being revived. The muriatic acid, in the state of gas, dissolves camphor; as do likewise the sulphureous and fluoric acid gases. If water be added to these solutions, they become turbid, and the camphor is separated in flocks, which float on the surface of the liquid, and does not appear to have sustained any change in its properties. If oxygenated muriatic gas be put into oil of camphor prepared with nitric acid, it immediately changes to a rose-colour, and becomes yellow a moment afterwards, which last colour remains to the end of the operation.

CAMPHORIC ACID.

The nitric acid acts upon camphor in a manner different from what we have hitherto noticed. Kosegarton found, that, by distilling over camphor eight times the quantity of nitric acid, an acid was produced which had different qualities from the oxalic acid. But the nature and habitudes of the camphoric acid have been more recently investigated by Bouillon la Grange. This chemist prepares the camphoric acid, by distilling four ounces of camphor in a sand-bath with one pound of nitric acid, at 36°. During the distillation, a considerable quantity of nitrous gas and carbonic acid gas are disengaged. One portion of the camphor is volatilized, while the other seizes on the oxygen of the nitric acid. When vapours cease to be disengaged, the vessels are to be unluted, and the camphor which has been sublimed returned into the retort, and a fresh portion of acid added to it. The process of distillation is to be repeated in this manner, till the whole of the camphor is converted into an acid; four pounds fourteen ounces of nitric acid are required to acidify four ounces of camphor. The most certain mark of complete acidification, is the crystallization of the liquor which remains in the retort. This acid is purified, by dissolving it in warm water, filtering the solution, and evaporating it till a thin pellicle forms on the surface; the camphoric acid then crystallizes by cooling. The camphoric acid may be formed more speedily, by using a stronger nitric acid. But in this case a portion of the camphor is lost, by being dissipated along with the gas. La Grange has also a method of extracting it by means of oxygen gas. Extract the oxygen gas from super-oxygenated muriat of potash; fill a jar with it, which place in the mercurial pneumatic cistern, and introduce a little water into it. Then put a bit of camphor, and a morsel of phosphorus, in a cupel; have a bent tube, one extremity of which must be in the jar, and the other in the pneumatic cistern, under a jar filled with water. Things thus disposed, light the phosphorus with a red-hot iron wire: the phosphorus flames, and then the camphor. The flame produced by the camphor is very bright; much caloric is disengaged; the jar is covered with black matter, which by degrees comes off, and covers the water placed over the mercury in the jar: this is carbon; a gas is collected at the same time, which has all the properties of carbonic acid gas. The water contained in the jar is very odorous, and contains camphoric acid in solution.

Camphoric acid has a slightly acid bitter taste, and reddens the tincture of turnsole. It crystallizes; and its crystals resemble those of muriat of ammoniac. It effloresces in the air, and dissolves difficultly in cold water. An ounce of this fluid, in the ordinary temperature of the atmosphere, is required to dissolve six grains of camphoric acid; but the same quantity of boiling water dissolves forty-eight grains. This acid is wholly dissipated on burning charcoal, emitting a thick aromatic smoke. In a more gentle heat it melts, and is sublimed. When distilled alone, it first melts, and then sublimes. Mineral acids dissolve it entirely. It decomposes sulphat and muriat of iron. Fixed and volatile oils dissolve it; it is soluble also in alcohol, and is not precipitated by water; in which it differs from the benzoic acid, which is precipitated by water from its alcoholic solution. It unites readily with earths and alkalis; these combinations are called *camphorats*.

Of Camphorats.—The camphorats of lime, magnesia,

sia, and alumine, are prepared by soaking these earths in water, and adding the camphoric acid in crystals; boil, filter the liquor hot, and concentrate. That of barytes should be made with the pure earth; dissolve it in water, and add the camphoric acid crystallized. The camphorats of potash, soda, and ammoniac, should be prepared with the carbonats dissolved in water; saturate the solution with crystallized camphoric acid; heat, strain, and the camphorats are obtained by evaporation and cooling.

If the camphoric acid which is used be very pure, the camphorats have no odour; if otherwise, they will preserve a smell of camphor. The camphorats of alumine and barytes leave a sense of acidity on the tongue; the others are rather bitter. They are all decomposed by caloric; the acid flies off, and is sublimed; the base remains pure, except that of ammoniac, which evaporates entirely. If urged with the blow-pipe, the acid burns with a blue flame, which, in the camphorat of ammoniac, changes at last to red. They are mostly soluble; those of lime and magnesia are the least so. Mineral acids dissolve them all. Alkalis and earths act according to their affinities for the camphoric acid: the order of affinities is, lime, potash, soda, barytes, ammoniac, alumine, and magnesia. Many metallic solutions, and several of the neutral salts, decompose the camphorats, as the nitrat of barytes, most of the calcareous salts, &c. Those of lime, magnesia, and barytes, yield their acid to the action of alcohol.

Fixed and volatile oils dissolve camphor by the assistance of heat. These solutions, by cooling, gradually deposit crystals in a vegetation similar to that which is formed in solutions of ammoniacal muriat; namely, a middle stem, in which very fine horizontal threads are inserted. This kind of feathers, examined by the magnifier, is very beautiful and regular.

Camphor is one of the most powerful remedies the art of medicine possesses. It dissipates inflammatory tumors in a short time, by external application. It is used as an antispasmodic, and as an antiseptic remedy in contagious disorders, putrid fevers, and, in general, in all disorders which are attended with nervous affections, or putridity. It is of importance to be known, that camphor often mitigates heat and pain in the urinary passages. It is given, triturated with yolk of eggs, sugar, gums, or in the state of oil of camphor; and is sometimes used in the composition of diet drinks.

OF RESINS.

Volatile oils, exposed to the air, grow thick sooner or later; what remains, after this spontaneous evaporation, is called *resin*. The ancients believed, that, in the conversion of oils into resins, nothing but water was evaporated; but it is now known, that there is no resinification, if the vessels which contain them are entirely full, or if deprived of the contact of air. The process is as follows: The oil absorbs a pretty considerable quantity of oxygen, and loses a part of its carbon, which, uniting with the oxygen of the atmosphere, furnishes carbonic acid; a proof that a resin is only a volatile oil with a greater quantity of oxygen, and a smaller quantity of carbon.

But resins may be made artificially, by means of nitric acid with a volatile oil. Take a glass tubulated alembic, with a receiver proper to preserve liquid and gaseous products; in the cucurbit of the alembic put six penny-weights of volatile oil of turpentine, and close the aperture with a cork, in which is fixed a funnel-shaped tube of glass; through this introduce, by slow degrees, and drop by drop, twelve penny-weights of pure concentrated nitric acid: then carbonic acid gas, azotic gas, and nitrous gas, will be disengaged. By rectifying the product in the receiver, Prussic acid is obtained; and, in the retort employed in the rectification, an acid mixture will be found, one part of which crystallizes in cooling; this is oxalic acid; the rest is a mixture of nitric and malic acid. The matter remaining in the cucurbit used in the first experiment, is a brownish mass of a peculiar smell, of a tenacious viscous consistence, analogous to resins. The black colour of this substance arises from the sudden precipitation of the carbon; whereas, in natural resinification, the carbon gradually unites with oxygen, and forms carbonic acid, which volatilizes. There is still a fourth operation in resinification; for part of the hydrogen of the oil combines with the oxygen of the atmosphere, forming water which volatilizes also.

Resins are inflammable, soluble in alcohol and oils, but not in water. Several trees produce them; they are sometimes liquid, sometimes hard. They are obtained sometimes by incision; sometimes it is necessary to distil a part of the tree. The principal species are the following: Balsam of Mecca and of Copahu, or Copaiba; Chio turpentine, afforded by the turpentine-tree which yields pistachio nuts; Venice turpentine, from the larch-tree; and Strasburg turpentine, from the fir.

In the arts, the turpentine of Chio is distilled in a water-bath, and furnishes a volatile oil, very white, limpid, and odorous, called *essence of turpentine*. In medicine, a remedy is prepared with turpentine, known by the name of *boiled turpentine*. Put turpentine in a glazed pipkin, with three or four times its weight of water; boil it till the turpentine has acquired a proper consistence to form a mass, which may be known by throwing a little of it from time to time in cold water. Turpentine is also used in the combination called *Starkey's soap*, before described.

Balsam of Canada differs from the fir-turpentine only in its sweeter smell.

PITCH.—This is a resinous juice, proceeding from a kind of fir called *picea*, or *epicea*. There are several sorts. That which is melted and strained through sacks is the purest; it is received in barrels, and is then called *white pitch*, or *Burgundy pitch*. White pitch, mixed with lamp-black, constitutes *black pitch*. White pitch, long kept in fusion with vinegar, dries, becomes brown, and forms colophony. The dregs of pitch are burned in a fire-place whose chimney leads into a small chamber, terminated by a cone made of cloth: in this last, the smoke condenses, and forms the fine soot, called *lamp-black*.

GALIPOT, or resin of the pine, affords the soft pine-apples. Holes are bored in the lower part of this tree, through which the resin flows into troughs. Other incisions are made higher up, when the former afford no more. When emitted in the fluid state, it is called *galipot*; the portion which dries on the tree, in yellowish masses, is called *barras*. These juices are melted, and, when thickened by heat, are filtered through straw-mats, and poured into moulds in sand. They then form masses, called *arcançon*, or *bray-sec*. If water be added, the matter becomes white, and forms resin, or pitch resin. Galipot is distilled in the large way in many parts of France, and affords an oil, called *huile-de-raxe*, or *caulking-pitch*. The tar, which is the empyreumatic oil of this substance, is prepared with the branches and roots of the pine. The wood of this tree is laid in heaps, covered with turf, and set on fire. The oil, disengaged by heat, not being capable of escaping through the turf, is precipitated into a shallow tub, by means of a channel, and is collected for sale by the name of *tar*.

The other resinous substances are mastic, from the lentisk or mastic-tree; sandarac, from the juniper; labdanum, from the cistus of Candia; dragon's blood, from the dracæna-draco; resin anime, from the American jetaiba; copal, from New Spain; resin elemi, from America.

The combination of several resins, coloured with cinnabar and minium, constitutes what is called *Spanish wax*. To make this wax, take two parts of turpentine, two of colophony, one of cinnabar, one of minium, and four parts of gum-lac; melt the lac and the colophony, then add the turpentine, and mix in the colouring matters.

Of

Of BALSAMS.

Authors differ as to what constitutes a balsam. La Grange defines it, a resin united by the act of vegetation with the benzoic acid. There are several species. 1. Benzoin; this is distinguished into two kinds: the benzoin amygdaloides, formed of white tears, resembling almonds, united by a brown matter; and common benzoin, which is brown, and without tears; it emits a very agreeable smell, when fused or touched with a hot needle. The benzoin comes from the kingdom of Siam, and the island of Sumatra. It affords very little volatile oil on account of its solidity. Boiling water extracts an acid salt, in the form of needles, of a strong smell, which crystallizes by cooling. It is likewise obtained by sublimation, and is then called flowers of benzoin. This operation is made in two glazed earthen pots, placed one above the other, and closed at the place of junction with paper. The sublimation must be performed with a gentle heat, otherwise the salt will be brown. The paper cone, formerly used as a subliming chimney, instead of the upper pot, causes the loss of a great part of the concrete acid. We have explained the properties of this acid in p. 325. Benzoin, distilled in a retort, affords a very acid phlegm, a concrete and brown salt of the same nature, with a brown and thick oil. The residual coal contains fixed alkali. Benzoin dissolves in alcohol; and its tincture, precipitated by water, affords the *lac virginale*. The salt of benzoin, or benzoic acid, is used as a good incisive remedy in pituitous disorders of the lungs and veins. Its oil is discussive, and is externally applied in paralytic disorders.

2. Balsam of Tolu, Peru, or Carthagena. It is imported either in cocoa-nut shells, or in yellowish tears, or in a fluid state. It flows from the toluifera, placed by Linnæus among the decandria monogynia. It may be extracted from the shells, by steeping them in boiling water, which renders it fluid. It comes from South America, in the track between Carthagena and Hombre de Dios, called by the islanders Tolu, and by the Spaniards Honduras. By analyzing, it affords the same products as benzoin, and more particularly the concrete acid. It is made into a syrup, and is used in disorders of the lungs. Some naturalists distinguish balsam of Peru from that of Tolu. The acid of these two balsams does essentially differ from benzoic acid.

3. Storax calamita is in tears, either red and clean, or brown and unctuous. Its smell is very strong. It flows from the oriental liquid amber, a plant very little known. Duhamel observed a juice of a similar odour flow from the aliboufier. Newman analyzed the storax calamita, and obtained a very small quantity of essential oil, a concrete acid salt, and a thick oil. This balsam is applied to the same uses as benzoin, and is more particularly consumed by perfumers. It was formerly imported enclosed in reeds or canes; we now receive it in the form of loaves, or irregular masses, of a reddish brown colour, mixed with some tears of a lighter colour, and of a very agreeable smell.

4. Liquid storax, or common storax. Bouillon La Grange, who has analyzed this substance, says, that it is almost entirely volatile in the fire, and emits an odour similar to that of benzoic acid. Heated in a pneumatic apparatus, it affords, 1. An acid phlegm having the agreeable odour of benzoic acid. 2. A white, light, acrid, and penetrating, oil. 3. A more deeply coloured, concrete, slightly acid, oil. 4. A saline substance sublimed into the neck of the retort. 5. A mixture of carbonic acid and carbonated hydrogen gases. 6. A very light charcoal. If storax be exposed to atmospheric air, a pellicle is soon formed on its surface which gradually acquires a solid consistence. The storax becomes granular, very bitter, and less odorous. It appears to absorb oxygen from the atmosphere, which converts it more completely into the state of a resin. These changes take place more speedily, if oxygen gas be employed instead of atmospherical air. Very beautiful crystals may be obtained by dissolving it in water and evaporating the solution slowly. Alkalis, and the mineral acids, produce a very marked action on storax. The alkalis unite with the benzoic acid and form benzoats, while the acids dissolve the lime that is found in it, and give to it a red colour. Water precipitates this substance from its solution in alcohol. If the precipitate be left exposed to atmospherical air, it becomes first brown, and afterwards of a deep red colour. The residue burns on lighted coals, and emits a slightly aromatic odour. A white earthy substance is left behind. Water has no action on this matter; alkalis give it a deep colour; the sulphuric, nitric, and muriatic, acids dissolve the earthy matter; ammoniac forms in it a precipitate which has all the characters of magnesia. Oxalic acid shews in it the presence of lime.

5. Artificial balsam of vanilla. This is the silique of a plant, which climbs and fastens round trees like ivy. It comes from America; and is found in Peru, Mexico, and St. Domingo. It furnishes benzoic acid.

Of GUM RESINS.

Gum resins are juices mixed with resin, and an extractive matter, which has been taken for a gummy substance. They never flow naturally from plants, but are extracted by incision, in the form of emulsive white, yellow, or red, fluids, which dry more or less quickly. Water, alcohol, wine, or vinegar, dissolve them only in part. They differ in the proportion of resin and extract, and their analysis affords various results.

Gum resins may be divided into two genera: 1. Such as are soluble and fetid; as, gum ammoniac, assafetida, &c. 2. Such as are purgative; as, scammony, euphorbium, gum guttæ, &c. The gum resins are very numerous; the principal species are,

1. Olibanum consists of yellow transparent tears, of a very disagreeable smell. The tree which affords it is supposed to be the cedar with cypress leaves. By distillation, a small quantity of volatile oil, together with an acid spirit, are obtained, and the coally residue, arising from the extractive part, is very considerable. It is used in medicine for fumigations.

2. Galbanum is a fat juice, of a brown yellow colour, and nauseous smell, brought to us from the Levant. In Syria, Arabia, and at the Cape of Good Hope, it flows from incisions made in a ferulaceous plant, named *bubon galbanum* by Linnæus. Distilled with a naked fire, it affords a blue essential oil, which afterwards becomes red; and also an acid spirit, with a ponderous empyreumatic oil. It is a very good discussive remedy, and is powerfully antispasmodic.

3. Scammony is of a blackish grey colour, a strong and disagreeable smell, a bitter and very acrid taste. The Aleppo scammony is distinguished by its greater purity from that of Smyrna, which is ponderous, black, and mixed with foreign substances. It is extracted from the convolvulus scammonia of Linnæus. The root of this plant, cut in pieces, and pressed, affords a white juice, which is black when dried. The different specimens of scammony contain various proportions of extract and resin, and its medical effects differ accordingly. It is prescribed as a purge, in the dose of from four to twelve grains. Mixed with a sweet extract, such as that of liquorice, it forms the common diagridium; the juice of quinces is likewise used for this purpose. The common mode of administering it, is after previous trituration with sugar and sweet almonds.

4. Gum guttæ is yellow, reddish, without smell, and of a very acrid and corrosive taste. It comes from Siam, China, and the island of Ceylon. It is extracted from a large tree, not much known, called by the natives *coddam pulli*. It contains much resin, which renders it strongly purgative, in a dose of from four to six grains. It

It ought not to be internally used, but with the greatest caution.

5. Euphorbium is in yellow tears, which have the appearance of being worm-eaten; it has no smell. It flows from incisions made in the *euphorbium*, which grows in Ethiopia, Lybia, and Mauritania. It contains a very acrid resin, and is so strongly purgative, that it is reckoned among poisons. It is not used, unless externally in caries.

6. Assafetida is sometimes in yellowish tears, but most commonly in loaves, formed of a number of pieces, agglutinated together. It has a very fetid smell of garlic, with a bitter and nauseous taste. It is extracted from the root of a species of ferula, which grows in the province of Chorasan in Persia, and is called *assafetida* by Linnæus. The root of this plant is fleshy and succulent. By expression, it affords a white juice, of an abominable smell, which the Indians use as seasoning for food, under the name of 'food of the gods'. It is internally used as a powerful antispasmodic, and is applied externally as a discutient remedy.

7. Aloes is a juice of a deep red or brown colour, and very bitter. It is distinguished into three species: succotrine aloes, hepatic aloes, and caballine aloes: these differ only in their respective degrees of purity, the first being the best. A. De Jussieu saw the preparation of the different kinds of aloes at Morviedro, in Spain, from the leaf of the common aloe plant. Deep incisions are made, from which the juice flows; this is decanted from its fecula, and thickened by the sun's heat, in which state it is packed in leather bags, under the denomination of succotrine aloes. The juice obtained by pressure from the leaves, after it is purified by repose, and dried, is the hepatic aloes. The same leaves, by stronger pressure, afford a portion of juice, which, mixed with the dregs of the two foregoing, constitutes the caballine aloes. The first sort contains a much less quantity of resin than the two last, which are more strongly purgative. It is used in medicine as a drastic purge, and is acknowledged to possess the property of exciting the menstrual flux in women, or the hemorrhoids in men. It is much esteemed as a good hydragogue.

8. Myrrh is brought to us in the form of reddish brilliant tears, of a strong and rather agreeable smell, bitter taste, and exhibiting white lines, of the form of a nail, in their fracture. Some of these tears are entirely gummy and insipid. Myrrh comes from Ethiopia, Egypt, and especially from Arabia, in the country of the Troglodites. The plant from which it is extracted does not appear to be known. It contains much more extract than resin. It is used as an excellent stomachic, antispasmodic, and cordial, remedy. Cartheuser advises literary men, whose stomachs are delicate, to chew this, and swallow it with the saliva. It is used in surgery, either in powder, or dissolved in alcohol, to cleanse foul ulcers, and to stop the progress of caries.

9. Gum ammoniac sometimes has the form of tears, white within, and yellow without, and is sometimes in masses resembling benzoin. They are easily distinguished by their white colour and fetid smell. It is suspected, from the admixture of seed it contains, that this gum resin, which comes from Africa, is extracted from an umbelliferous plant. The solubility of this substance in water and in alcohol, and more particularly its inflammability, are properties in which it resembles the resino-extractive matters of Rouelle. Gum ammoniac is medicinally used as a discussive remedy in obstinate obstructions, it is given in doses of a few grains, in pills or emulsions, and likewise enters into the composition of many discussive and resolvent plasters.

10. Sarcocolla. This is brought from Persia or Arabia, in tears, or in little friable masses.

11. Sagapenum. The plant from which this flows is not known; it is brought to us from Persia, and some other parts of the Levant.

12. Bdellium. The tree producing this is not known. It is in pieces or tears of different sizes, of a golden yellow, or somewhat red, colour.

13. Opoponax. This is in tears of various sizes, of a fatty consistence, though friable, reddish without, whitish within.

Caoutchouc, or Elastic Gum.—This has been hitherto improperly classed among gum resins. The tree which furnishes it is called *siringa*, by the Indians of Peru; in the province of Esmeraldas, in Quito, they call it *hevea*; and, in the province of Mainas, caoutchouc: M. Richard has proved, that the tree is of the family of the *euphorbia*. Horizontal incisions are made quite through the bark, a white and fluid juice issues forth, which is applied, in successive coats, on clay moulds, and dried by the sun's heat. Various sketches of designs are made on the surface with an iron tool. It is then exposed to the smoke; and, when perfectly dried, the clay is crushed and taken out. The bottles, and various utensils of elastic gum, which are imported into Europe, are made in this manner, and are vulgarly called Indian rubber. The dry caoutchouc, such as it is brought to Europe, exposed to the heat of a fire, softens, swells, emits a fetid odour, and burns at the same time that it shrinks.

Elastic gum is not soluble in water; but water softens it; and, if boiled in a solution of alum, it becomes so soft, that, several pieces may be easily joined together. Alcohol has no effect upon it. Nitric ether is the true solvent of caoutchouc. Sulphuric ether, according to Berniard, does not dissolve it completely. Weak nitric acid acts in the same manner on this substance as on cork, changing its colour to a yellow. Concentrated nitric acid very quickly destroys it; but the muriatic acid does not affect it in the least. The volatile oil of lavender, and likewise those of aspic and of turpentine, dissolve it by the help of a slight heat; it may be then spread upon paper, or used as a varnish for stuffs. A mixture of volatile oil and alcohol forms a better solvent than pure oil, and the varnish dries sooner. This substance may be dissolved also in yellow wax melted and boiling; it should be put in by degrees till the wax is saturated: this solution, laid upon stuffs with a brush, makes an elastic varnish, not very glutinous, nor apt to scale off.

These various solutions are rather an alteration of caoutchouc than an analysis; for after evaporation they always remain glutinous. It differs from other vegetable substances because ammoniac is obtained by distilling it. It is used in making probes and syringes, as a varnish for the stuff of which aerostatic machines are made, for rubbing out pencil marks, cleaning prints, &c.

Birdlime.—This has been generally placed among resinous substances, but it has never been correctly analysed. It is known merely that it is found in the inner barks and berries of many plants; that it is insoluble in water, gives by analysis the same products as resins, is not completely soluble in alcohol, but entirely so in ether, and that water makes the solution turbid.

Of FECULA.

All the vegetable matters contained in the juices of plants, and not held in solution in them, are in general called by this name. There are two species of fecula: 1. Green fecula, drawn from the juices of plants; the green colour is very uncertain, and not lasting. 2. Amylaceous fecula, drawn principally from corn and grain. There are also two kinds of seeds, very different in their nature. 1. Those which make emulsions with water; they are commonly oily, two-lobed, and furnish no fecula. 2. Such as make no emulsion; these seeds are one-lobed or single, and abound in fecula. All parts of plants may contain fecula. The following contain it in the *root*: orchis, briony, arum, corn-flag, &c.

The fecula are sometimes found along with the most potent poison, as in the root of a very acrid plant called manioc, whence is drawn, by the Americans, a mild nourishing

nourishing fecula, which they call *cassava*. They strip the root, rasp it, and put it into a sack of rushes, made in the form of a cone, and of a very open texture, which they suspend to a staff, placed across two upright posts. At the lower extremity of this sack, they hang a heavy vessel, which by its weight presses the root, and receives the juice which flows out, and is a most acrid and dangerous poison. When the fecula is well pressed, and deprived of its juice, it is dried in the smoke, sifted, and then forms cassava. This farina is spread on a hot plate of iron, and turned till both its surfaces acquire a reddish yellow colour, which denotes that it is sufficiently baked. In this state it is called *cassava-bread*. When the farina is heated in a vessel, and agitated from time to time, it takes the form of grains, called *couac*. A very fine and mild fecula, called *moussache*, falls to the bottom of the expressed juice, and is used for pastry.

To prepare the fecula of bryony, the fresh roots are deprived of their bark, rasped in pieces, and submitted to the press. The juice is white, and deposits a very fine fecula, from which, at the end of twenty-four hours, the liquid is decanted, and it is dried. As this fecula contains a certain quantity of extract, left by the juice, it is very acrid, and purges violently: by washing, it becomes finer, and whiter, but at the same time loses its purgative virtue. This method of preparing the fecula of bryony affords but a very small quantity, but a much greater may be obtained, by moistening, with water, the mass remaining in the press, straining this water through a hair sieve, to separate the grosser fibres, and leaving it at rest, and to deposit its fecula, at which time the water is to be decanted off, and the powder dried. This last fecula is not purgative, like the former, because it has been deprived of its extractive matter by the water. Baumé has observed, that the fecula of bryony is absolutely the same as starch, and might be made into hair-powder, to the great saving of corn. The fecula of the roots of arum, and corn-flag, are prepared in the same way for medical uses.

Salep, salop, salab, &c. is the root of a species of orchis, prepared by the orientals. They select the finest bulbs of this plant, which they peel and boil, after previously soaking them in cold water. They are then strung, and dried in the air. M. Jean Moult describes another process for preparing salop, which may be used with every kind of orchis. The roots, either dry or under water, are rubbed with a brush, to take off the external pellicle; after which, by drying in an oven, they become very hard and transparent. These are very easily reduced into powder, which, with hot water, forms a nourishing jelly, much praised by Geoffroy, in all disorders arising from an acrid state of the lymph, and especially in consumptions, and the bilious dysentery.

The stem or trunk of some trees contain fecula; such are the palm-trees, a numerous family, which grow under the equator. Sago is a dry fecula, reduced into grains by the action of fire, and comes to us from the islands of Molucca, Java, and the Philippines. It is obtained from a kind of palm, called *landan*, in the Moluccas. The trunk of this tree contains a sweet pith, which the inhabitants take out after having split the wood: they then bruise it, and put it into a kind of cone, or funnel, made of bark, and pour on a large quantity of water. This fluid carries with it, through the sieve, the finest and whitest part of the pith, the fibrous part remaining behind. The water is received into pots, and gradually deposits the fecula The clear water is then decanted, and the deposited matter is passed through perforated plates, which give it the form of small grains. The red colour on their surface arises from the action of fire, used in the drying. These grains, or sago, become soft and transparent in boiling water, and form, with milk or soup, a light and nutritive liquid, strongly recommended in phthisical disorders.

The lichen Islandicus, furnishes a sort of fecula from the leaves; the Icelanders make a very delicate drink of it.

But it is principally from the single seeds, that the greatest quantity of fecula are produced. No plant, considered in whatever light, has the least similarity with *wheat*: it has not only botanical distinctions from all others, but in chemical analysis also. For instance, no meal but that of wheat will form with water what is properly called *dough*; for that of rye is very different, and other grain still more so.

Of FLOUR.

The substance called *flour*, is in generally dry, friable, insipid, capable of acquiring taste and digestibility, by the action of fire, and composed of several substances easily separable from each other. It exists in the seeds of gramineous plants, but more especially in wheat, rye, barley, oats, rice, buckwheat, &c. Leguminous plants likewise appear to contain a compound analagous to flour; but the flour of wheat, as above observed, can only be said to possess the requisite properties, because it is the only farina in which the different substances are duly proportioned to each other. Though the economical use of the flour of wheat, as the principal article of nourishment, has been established from time immemorial, it is but lately that chemists have begun to examine it. Messrs. Beccari an Italian physician, and Kessel Meyer, in Germany, are the first chemists who endeavoured to separate the different substances contained in flour. Messrs. Rouelle, Spielman, Malouin, Parmentier, Poulletier, and Macquer, continued and carried the experiments of these philosophers much farther. Parmentier, especially, has prosecuted this inquiry with uncommon zeal and activity. His researches into the nature of alimentary substances, the component parts of flour, the different species of fecula, and on all nutritive vegetables, are, without doubt, the most complete and exact of any that have been made in this way.

Water is an agent of the greatest utility, and least capable of altering the several matters it takes up, or separates, in the order of their solubility. This fluid is used, with the greatest success, to obtain the different substances of which wheat flour is composed. To perform this true analysis, a paste is made with flour and water, and kneaded in a vessel of water, underneath a stream from a cock; the water carries off a very fine white powder, and the kneading must be continued till this fluid passes off clear. The flour is then found to be separated into three substances; a greyish and elastic matter remaining in the hand, which has been called the *gluten*, or *vegeto-animal* part, on account of its properties; and a white powder, deposited by the water, which is the *fecula*, or *starch*. The substances are held in solution by the water, one of which, called *albumen*, appears after evaporation in the form of concrete flocks; if the evaporation be carried to siccity, another substance is discovered, called the *mucoso-saccharine* matter. Wheat-meal, then, contains four distinct parts: the fecula, the gluten, the albumen, and the mucoso-saccharine substance: hence it differs from all other vegetables.

Of Starch.—The starch obtained by analysing flour, is not that which is used in the arts. When prepared in the large way, two sorts are usually made, *fine* and *common* starch. The fine sort is made with bran, and the juice of four cherries. The common is made with damaged corn ground on purpose; it serves to make paste. This substance is very fine, and soft to the touch; its taste is scarcely sensible. Its colour is of a grey and dirty white, when extracted by the process we have described; but the starch-makers render it extremely white, by suffering it to remain in an acid water for a time, which they call the *sour water*. It appears from the experiment of Poulletier, that the fermentation which takes place in this fluid, whitens and purifies the starch by attenuating, and

and even destroying the extractive mucous substance with which it is vitiated at first. Starch, chemically considered, is a mucilage of a peculiar nature. This mucilage, which has been improperly considered as an earth by some chemists, differs greatly from the glutinous part. It burns without emitting an empyreumatic smell. By distillation with a naked fire, it affords an acid phlegm, of a brown colour, and a very thick empyreumatic oil towards the end. Its coal is easily reduced to ashes, which contain fixed alkali. By distillation, it gives the same products as gum and sugar.

Starch is not soluble in cold water, but when boiled in water, it forms a kind of glue, called *starch* by the laundresses, and used, with a mixture of blue, for stiffening linen. This starch, when dried, presents a solid transparent mass, similar to gum in some respects, but differing from it by not being soluble in cold water.

Starch, when heated with six times its weight of nitric acid, the acid becomes decomposed, and the starch passes to the state of oxalic acid. Chaptal remarks, that if diluted nitric acid be digested on starch, the acid is decomposed, and the starch passes to a state resembling that of the ligneous fibre. Jamieson of Leith, in a paper which he read to the medical society of that place, gave an account of some very singular results which he obtained, by digesting starch in muriatic acid. This acid, which concentrated and colourless, dissolved starch in a temperature equal to 90° of Fahrenheit. By increasing the temperature, the solution acquired a brownish colour, and at length a brownish black precipitate was formed, which seemed to possess all the properties of charcoal. On adding caustic soda to the liquor, and subjecting it to evaporation, a small quantity of acetit of soda was obtained. By distilling the muriatic acid from starch, a carbonaceous residue was obtained, which inflamed readily with nitric acid, and which in some cases was so inflammable, as to take fire by simple exposure to the air.

Of Gluten.—The glutinous part, is a tenacious, ductile, elastic, matter, of a whitish grey colour. When drawn out, it extends about twenty times its length before it breaks, and appears as if composed of fibres, or filaments, placed beside each other, according to the direction in which it has been drawn. If the force ceases, it resumes its original form by its elasticity. By drawing it out, in different directions, it may be made so thin, that its polished surface resembles the texture of animal membranes. In this state it adheres strongly to dry bodies, and forms a very tenacious glue, which was used by some persons to join broken china, long before chemists found the means of obtaining it in large quantities. Beccari has observed, that the proportion of glutinous matter is from a fifth, to a third, and more, in flour of the best quality; he has likewise observed, that this quantity varies in different seasons, and according to the nature of the corn.

The smell of the glutinous matter is faint, and resembles that of mucilage; exposed to a fire capable of suddenly drying it, it swells up prodigiously. In a dry air, or mild heat, it dries very well. It is then semi-transparent, and hard, like glue, and snaps short like that substance, its elasticity being gone. If in this state it be placed on burning coals, or applied to the flame of a candle, it exhibits all the characters of an animal substance; it decrepitates, swells, liquefies, curls up, and burns like a feather, or a piece of horn, emitting, at the same time, a strong and fetid smell. By distillation, it affords, like animal substances, water, impregnated with ammoniac, ammoniacal carbonat, and an empyreumatic oil. Its coal is very difficultly incinerated, and does not contain fixed alkali.

Fresh gluten, exposed to a hot and moist air, becomes changed, and putrifies absolutely in the same manner as animal substances. When it retains a small quantity of starch, this last passing to the acid fermentation retards and modifies the putrid fermentation, and converts the substance into a state nearly similar to that of cheese. Rouelle the younger prepared a cheese with the gluten, which singularly resembled in its smell and taste, that of Gruyere, or of Holland. Water does not at all dissolve this glutinous matter. By boiling in this fluid it becomes solid, loses its extensibility and adhesive quality, but does not acquire either taste or solubility in the saliva. Nevertheless, we must observe, that the gluten owes its elasticity and solidity to the water which formed the paste. In fact, this vegeto-animal portion, though capable of becoming solid and elastic, is pulverulent, and without cohesion in the flour; but, as soon as water is added, its particles absorb the fluid, and adhere together, forming the elastic substance called *gluten*. Water, therefore, contributes greatly to the formation of this substance, and it may perhaps be considered as a compound, saturated with, and incapable of absorbing a larger quantity of water. This is so true, that it absolutely loses its adhesion and elastic properties by drying.

Most saline substances act more or less efficaciously on the gluten. The caustic fixed alkalis in the fluid state dissolve it by boiling. This solution is turbid, and deposits, by the addition of acids, a gluten which is not elastic. The mineral acids dissolve the gluten. The nitric acid dissolves it with great activity, and Berthollet has observed, that this acid disengages the azotic gas, as it does from animal substances. When this elastic fluid has been emitted, the solution affords a large quantity of nitrous gas, and becomes of a yellow colour. By evaporation it affords crystals of the oxalic acid. The sulphuric and muriatic acids form brown or violet solutions of this substance, from which a kind of oily matter separates; the gluten being truly decomposed. Poulletier, who has made many experiments on this substance, has discovered, that ammoniacal salts may be obtained from these combinations, dissolved in water, or spirit of wine, and evaporated in the open air. Vauquelin and Alexander Brongniart found that gluten triturated in acetous acid dissolved with great facility. This solution is not transparent; it may be kept a long tim . By slow evaporation and adding a few drops of alkali, the gluten is revived with all its properties. Here then we have a good method of preserving gluten unchanged.

Other experiments have shewn, 1. That the ashes of flour contain eighty-four grains of calcareous phosphat in the pound; so that a person who eats a pound of flour a-day, will take in little more than three pounds six ounces of calcareous phosphat in the year. 2. That the flour of wheat gives no carbonat of lime by incineration, while the straw furnishes a considerable quantity, with scarcely any sensible appearance of phosphat of lime.

The Vegetable Albumen.—Fourcroy, observing that a matter coagulable by heat was separated from juice of cochlearia, cresses, &c. along with the colouring matter, took two pounds of the juice of the young cresses, and filtered it in the cold. The coarser part of the fecula was separated in this way. The liquor was of a clear green colour. Exposed to the air in a flat vessel, in two hours the liquor became muddy, and a finer green fecula than the first was disengaged, which was separated by filtering it. The ley was now of a pale green colour. When poured in boiling water, a coagulation took place of a great number of small whitish flocks; similar flocks appeared in another portion of this juice, which had been left exposed to the atmosphere; and sulphuric acid separated a similar matter from a third portion. The substance obtained in these three different ways, washed in water, exhibited all the properties of animal albumen. It dissolved in alkalis, was rendered more solid by boiling water, gave a green tinge to blue vegetable colours, and afforded ammoniac in distillation; with moisture in a warm atmosphere, it exhaled a fetid ammoniacal smell, and exhibited every symptom of putrefaction. This enables

enables us to understand why the cruciform plants are so readily decomposed. Dried in the air, this substance assumed the ductility and transparency of glue.

If the water used to separate the farina from the gluten of wheat be filtered, and afterwards exposed to heat, white flocks of a concrete matter will be separated, which possess all the properties of albumen. So that wheat contains a gluten similar to the fibrous part of animals, and another similar to the albumen. In distillation, vegetable albumen affords ammoniacal carbonat, a red fetid oil, and carbonated hydrogen gas.

The Mucous Extractive Part of Flour.—This substance, denominated by its discoverer the *mucoso-saccharine* matter, exhibits all the phenomena of sugar in its combustion and distillation. It is this which excites the acid fermentation in the water that floats above the starch; for, as Macquer well observes, the latter is not at all soluble in cold water. It cannot be doubted, notwithstanding the small quantity of this substance contained in the farina of wheat, but that it is materially concerned in the fermentation by which paste is leavened and made to rise. This intestine motion, so necessary in the making of good bread, is not yet well understood. It may perhaps consist in the commencement of fermentation, which is putrid in the gluten, acid in the starch, and perhaps vinous in the mucoso-saccharine matter: and from these three incipient fermentations mutually impeding each other, the lighter compound, which by baking forms bread, may probably arise. At all events, it is certain, that the three substances we speak of are so combined and altered in bread, that they can no longer be separated. The action of heat is sufficient, without fermentation, to produce this intimate combination; for unleavened bread, according to Malouin and Poulletier, does not afford the glutinous matter. From the foregoing facts we see, how greatly other kinds of flour differ from that of wheat, and still more those leguminous and farinaceous seeds, such as beans, pease, chesnuts, &c. are far from possessing the qualities necessary to make good bread.

OF VEGETABLE COLOURING MATTERS.

The colouring parts of vegetables have hitherto been examined by philosophers, with reference to the doctrine of colours, as a part of optics; but the dyers, who consider only the manner of extracting and fixing them for commercial purposes, have followed a different route. Hellot, Macquer, and Berthollet, have been successively employed in making chemical observations on the art of dying, and on the colouring principle; and they have proved, that a number of the phenomena of dying, were easily explained upon chemical principles.

Macquer distinguished two kinds of colours, the *extractive*, and the *extracto-resinous*. The first are obtained from vegetables by decoction, and are transparent. The second are obtained also from plants; but they are precipitated in cooling. The same chemist speaks of two other sorts of colours, the *oily*, and the *resino-oily*. But Berthollet, from a series of experiments and observations, has demonstrated, that the colouring principles are not such as are indicated by Macquer; that the greatest part of colouring matters have a great affinity with earths; that most colours have also a great affinity for the white metallic oxyds; and that the colouring principles have a strong affinity for oxygen. The art of bleaching is founded upon this property, because, after this absorption of oxygen, the colouring matters are soluble in alkalis; the different shades, for instance, which the leaves take in the course of the summer, are occasioned merely by the absorption of oxygen, which changes their colour to yellow or brown. Lastly, the colouring matters have a strong affinity with animal fibrous matters.

Fourcroy, in his lectures at the Polytechnical School, has divided colours in a manner more exactly agreeing with vegetable analysis than Macquer. He divides colours into extractive, extractive oxygenated, carbonated, and oily. Yet Berthollet's division is more useful for practice. But we cannot here be expected to enter into details of the processes used in dying; we are not, under CHEMISTRY, to teach the art, but the principles of the art; and these we shall divide into three parts: 1. Of mordants. 2. The substances useful in dying. 3. Examples, by which students may be enabled to make experiments themselves.

OF MORDANTS.—The name of *mordant*, is given to the intermedium between the colouring matter and the stuff to be dyed, whether to facilitate their combination, or to modify it. By the use of mordants, the colours are occasionally changed, receive brightness, are fixed, and made lasting. The mordant is not always a simple agent; but, in the mixture whereof it is composed, it sometimes forms fresh combinations; so that the substances employed do not act immediately of themselves, but by the combinations which result from them.

The chemical agents used in dying are, the sulphuric, nitric, and muriatic, acids; the muriats of tin, lime, magnesia, soda, ammoniac, and the oxygenated muriat of mercury: the muriatic salts in general have the property of rendering colours darker, and of increasing their strength.

The oxygenated muriatic acid, is used where several colours are required, and to have them clear. It is employed also to prove the strength of colours, and to compare the strength of colouring matters of the same kind. It is useful in whitening the ground work of painted cloths; and in discharging the colours of pieces which have met with some accident in dying, or which are faded through age.

The nitro-muriatic acid is much used in metallic solutions, as of tin, bismuth, &c. The solution of tin is very useful in the art of dying. The oxyd of tin is much disposed to abandon its solvent, to combine either with the stuff or with the colouring matters; it gives to colours a white base, not subject to change; it produces no combustion in the colouring matters most disposed to change their colour from that cause, such as shumach and nut-galls. Purified tartar, and vinegar, are of use also in dying. The acidulous oxalat of potash produces very good effects in certain situations.

Alum is of very extensive use in dying. The application of alum must be considered as a general and indispensible operation of silk-dying, as without it the greatest part of the colours will have neither beauty nor strength. The proportion of alum to colouring matter should be as four to sixteen, or one fourth. Dissolve the alum in a kettle of warm water, stirring it to prevent the alum from crystallizing; add a solution of soda in the proportion of a sixteenth part of soda to one whole part of alum; some add besides a very small quantity of tartar and arsenic. The raw material must be well impregnated with this solution; take each time about one pound of the silken thread, pour the remainder of the liquor over the whole of the silk collected in another vessel; let it soak four-and-twenty hours; then expose it to a running stream for an hour and a half or two hours, and wash it. Soaking in a decoction of nut-galls is as necessary an operation for cotton or flax.

Sulphat of iron is greatly used in dying, especially for black colours, and grey, and other shades which are darkened by it means. Solutions of iron by the acetous acid, and by some other vegetable acids, are employed also in dying; but these preparations are generally made on the spot where they are used.

Sulphat of copper is employed occasionally, but not often. The oxyd of copper combines with most colouring matters, which precipitate it from acids; it often communicates an agreeable colour; but, as its own natural colour, which influences that of its combination, is soon changed by the air, it can only produce colours variable and not lasting. It has been remarked also that the sulphat of copper corrodes the stuffs more than that of iron; this

this arises partly from there being a more active acid in one than in the other.

Sulphat of zink has hitherto been little used in dying. It makes the colours darker, but this arises principally from the iron it contains. In general, the precipitates produced by sulphat of zink grow somewhat darker by time, which proves that the oxyd of zink produces some combustion in colouring matters; yet it combines with them but in small quantities. Hence it appears why it gives deeper colours than the oxyd of tin, though both are white. The action of verdigris in dying black arises principally, perhaps entirely, from the uncombined oxyd, which serves to precipitate the iron not combined with the astringent principle, by itself combining with sulphuric acid. Acetit of lead forms a plentiful precipitate with the solutions of colouring substances; it darkens the colours, and makes them strong, but dull. Its greatest use is in forming the principal mordant for painted cloths, in which it forms a combination of the base of alum with the acetous acid.

Fixed Alkalis.—Potash is of extensive use in dying; it facilitates the dissolution of the colouring matters, and deepens the colours. As fixed alkali has a strong action upon substances of an animal nature, and dissolves them when caustic, much precaution is necessary, both with regard to the proportion of this salt made use of in any process, and also to its more or less caustic state.

When the salt of soda is made use of, regard must be had to the state it is in; for, if in crystals, it contains more than half its weight of water of crystallization; so that, when it comes to effervesce, one part produces as much effect as two parts of the crystals. Soap is used in dying, principally indeed for cleaning the silk; white hard soap, prepared with olive-oil, is the best.

Sulphur is used in dying, for an operation called *soufrage*, or sulphuring. This operation is destined to communicate to silks which are intended to be white, and also to woollen stuffs, the greatest degree of whiteness they can receive. It communicates also an elasticity which produces the noise called *rustling*. But sulphured silk does not easily take the dye; previous to dying, it must be unsulphured, by soaking and drawing several times through the hand in warm water.

The oxyd of arsenic was formerly much used in dying, particularly in painted cloths; but its inutility is now acknowledged, and this poisonous substance is very little used. The arsenite of potash is used also. Orpiment is also employed in some of the processes of dying, especially with indigo. The quality of the water is an essential matter in the art of dying. Waters act upon the colouring matters principally by the salts with an earthy base which they contain. These salts are, the nitrats, muriats, and carbonats, of lime and magnesia, and the sulphat of lime.

Substances used in Dying.—These are astringents in general, and nut-galls in particular. The *nut-gall* is an excrescence found on the young branches of the oak. There are different species of gall-nuts, some inclining to white, yellow, green, brown, red, ash-coloured, or black. They differ much in size; and they are round or irregular, light or heavy, smooth or rough, as it happens. Those which are small, blackish, granulated, and heavy, are the best; they are called nut-galls of Aleppo, and are brought to us from Aleppo, Tripoli, and Smyrna. The astringents which resemble nut-galls are, oak saw-dust, the nut-galls of our own country, and the myrobolans citrinus.

The maceration of a stuff in a decoction of nut-galls, is called by the French chemists *engallage*. This gives it a degree of weight of which it cannot afterwards be deprived, and which cannot even be diminished beyond a certain degree by repeated washings.

Stuff thus prepared may be combined with any other colouring matters, and the colours thereby acquire fixity, if they have it not of themselves, so that the astringent principle communicates its strength to the triple combination, or whatever combination may be formed; but the colour usually becomes darker by the combination. If stuffs already dyed are to undergo this operation, it must be done cold, or the colour will suffer a change.

The maceration is made with different proportions of the nut-galls, or other astringents, according to the quality of the astringents, and the effects required. The following are general directions for the process: Boil the bruised nut-galls for two hours in a quantity of water proportioned to that of the material to be macerated; let it cool till you can just bear your hand in it. Divide it into equal parts, as near as may be, to macerate the stuffs in portions of about a pound each; and pour the remainder upon the whole. Leave it thus for four-and-twenty hours, if intended to be dyed with madder, or of a black colour; for other colours, ten or twelve hours are enough. Then press the cotton or wool, and dry it.

Of Indigo.—This is a colouring matter resembling fecula. There are two species of the indigo-plant, the true, and the base. When the indigo-plant is nearly ripe, it is cut and put into stone troughs, with water to ferment, which it soon begins to do. When left to be quite ripe before it is cut, it gives a more beautiful colour, but it yields less; if over-ripe, it yields still less, and the indigo is of a bad quality.

Berthollet, in his work upon dying, has described the process used in America and in Africa for extracting it. During the operation, there is a vegetable fermentation, and a disengagement of ammoniac and carbonic acid gas: this last fact is certain, since by putting extinguished lime diluted with water, or milk of lime, into the troughs, the precipitation will be hastened. Bergman, who has a good dissertation upon indigo, states, that it owes its colour to iron: but this cannot be correct, since, if it were so, indigo would be soluble in alkalis.

If to an alkali be added any substance greedy of oxygen, especially sulphure of arsenic, and the whole be poured over indigo, it is easily dissolved by losing its oxygen. This fact, which was discovered by a manufacturer, has thrown great light upon the history of indigo. This is now the practice of dyers who use indigo: they deprive the colouring matter of its oxygen, which they restore afterwards by exposing the stuffs to the air. Berthollet established this after a great quantity of experiments. He knew that indigo contained much carbon and hydrogen; so that, if any concentrated acid, except the sulphuric, be poured upon indigo, it causes it to pass through several colours in succession, and at last to become black, because its hydrogen combines with the oxygen of the acid, and the carbon remains predominant.

Besides hydrogen and carbon, indigo contains a pretty large quantity of oxygen, a little azot, and a small portion of iron; but its proportion of carbon is greater than that of any vegetable substance; which caused Berthollet to remark, that those colouring matters which contained most carbon in their composition, are also richer in colour, and give the most lasting tints. Hence we deduce, 1. That indigo in its natural state contains oxygen. 2. That, till deprived of oxygen, it cannot combine with lime or alkalis. 3. That these substances which can deprive it of this portion of oxygen, render it soluble in alkalis and lime. 4. That this solution is decomposed, and the indigo returns to its natural state, by contact with the atmospheric air, from which it attracts the oxygen it had been deprived of.

Powdered indigo, digested in alcohol, gives first a yellow colour, then red, and lastly brown. Water separates from this dye a brownish resinous matter. Ether acts upon indigo nearly in the same manner; but oils, either fixed or volatile, have very little effect upon it.

The

The concentrated sulphuric acid attacks indigo briskly, and the mixture becomes opaque and black; if water be added, it clears, passing successively through all the shades of blue, according to the quantity of water. If the sulphuric acid be weakened with water, it only attacks the earthy principle, which in indigo is confounded with some of the mucilaginous parts.

Concentrated nitric acid attacks indigo with such violence, that it bursts into flame; if weakened to a proper degree, it acts less briskly; the indigo becomes ferruginous; the residue, after the operation, has the appearance of umber, making only a third part of the indigo. Fixed alkali precipitates from the nitric acid, which has acted upon indigo, a little oxyd of iron mixed with calcareous earth, &c. but, if too much alkali be added, part of the precipitate will be dissolved again, and the colour of the liquor becomes darker than before.

Muriatic acid, digested or boiled with indigo, takes to itself the earthy part of the iron, and a little of the extractive matter, which gives it a yellowish-brown colour, but does not affect the blue colour of the indigo at all. If the indigo is precipitated from sulphuric acid, then the muriatic acid will dissolve a certain portion of it, and make a liquor of a dark-blue colour. The other acids, as the tartareous, acetous, and phosphoric, have the same effect upon indigo as the muriatic acid; they dissolve it very well when precipitated. The oxygenated muriatic acid has little action on the indigo in substance; but it destroys its colour when in solution. Indigo detonates strongly with nitre.

OF WOAD.—This is a plant of the family of the cruciferes. The colour is extracted by fermentation from the bruised leaves of the plant; the fermentation is promoted by wetting them with the most tainted or stinking water that can be procured. The strongest kind of woad is called *pastel*; the weaker sort *vouede*.

OF MADDER.—This is the root of a plant of which there are two kinds. Madder, as prepared for the dyers, has different qualities. That which is prepared from the main root, is called *clustered madder*; the other sort, or *not clustered*, comes from these twigs or runners which creep under ground, and have there become roots.

The red colour of madder is soluble in alcohol, which, by evaporation, leaves a residuum of a deep red. Fixed alkali makes a violet precipitate from this solution, sulphuric acid a fawn-colour, sulphat of potash a beautiful red; and precipitates of different colours are obtained with alum, nitre, chalk, acetit of lead, muriat of tin, &c.

OF COCHINEAL.—Cochineal is an insect brought from America. They collect two sorts of cochineal at Mexico: the wild or wood insect, called in Spanish *grana sylvestra*; the other is called *grana fina*. On the word *grana* it is necessary to observe, that cochineal was long considered as a vegetable grain; father Plumier was among the first who detected this error.

The decoction of cochineal produces a crimson colour inclining to violet. A small quantity of sulphuric acid gives the liquor a red colour inclining to yellow; and a slight precipitate is formed of a beautiful red colour. The muriatic acid produces nearly the same change of colour, but without any precipitate. A solution of tartar changes the liquor to yellowish red; a small precipitate of a pale yellow is gradually formed; but the supernatant liquor remains yellow. By pouring in a little alkali it becomes purple; the alkali quickly dissolves the precipitate, and the solution is purple. A solution of tin gives a rose-coloured precipitate, and makes the liquor yellow. The solution of alum brightens the colour of the infusion, and makes it redder: a crimson precipitate falls down, and the liquor preserves a crimson colour inclining to red. Various other phenomena are produced by different solutions, as detailed by Berthollet.

CARMINE.—Is the lake obtained from cochineal by means of alum; but the cochineal is mixed with a certain quantity of the bark of a tree from the Levant, called *autour* by the French chemists, of a colour somewhat paler than cinnamon; and also with *chouan*, a seed quite unknown to us, but brought likewise from the Levant, and of a yellowish-green colour. It appears that these two substances form with the alum a yellow precipitate, which serves to brighten the colour of the lake; and part of the yellow colouring matter communicates a flame colour to the scarlet. Carmine was formerly prepared from *kermes*, whence the name.

OF KERMES.—This is an insect also, though formerly considered as a tubercle, or excrescence of plants; it is found in several parts of Asia, and the south of Europe. If the living insect be crushed, it yields a red colour; its smell is not disagreeable; the taste is bitter, acrid, and pungent. When dried, it communicates the same odour and taste to water and alcohol, with a dark red colour; the extract obtained by these infusions retains the same colour.

OF LAC.—This is a substance of a red colour, brought from India in different shapes. It is formed in cells like a bee-hive, being the work of a kind of flying ants, who fix it on the small branches of a species of *croton*, hence called *croton laciferum*. There are several species of lac; the principal kinds are, 1. Stick-lac; which is what the insects build round small sticks or branches which the inhabitants place on purpose to support their work: this is the richest in colour. 2. Seed-lac; this is not so high coloured. 3. Shell-lac; this is brought over in pieces of various sizes, more or less transparent; it is thought that the Indians have previously extracted the colouring matter.

OF ARCHIL.—The archil used in dying is a paste of a violet red colour. There are two sorts, prepared from two species of *lichen*. The most esteemed is made from the *lichen roccella*, growing on rocks near the sea at Cape Verd and the Canaries; the other, from the *lichen parellus*, growing on the rocks of Auvergne in France.

Prepared archil gives its colour very quickly to water, ammoniac, and alcohol. Its solution by alcohol is used for thermometers; and, if the air be closely shut out, the liquor loses its colour in a few years; air restores the colour, which is again destroyed by time. The aqueous infusion loses its colour in a few days if deprived of air.

The infusion of archil is of a crimson inclining to violet; acids give it a red; as it contains ammoniac, which has already modified its natural colour, fixed alkalis produce but little alteration; they make it somewhat darker, and more inclined to the blue tinge. Alum makes a precipitate of a brown red; the liquor remains of a yellowish red. The solution of tin gives a reddish precipitate which falls down very slowly.

OF CARTHAMUS.—Carthamus, or base saffron, *carthamus tinctorius*, of which the flower only is used in dying, is an annual plant cultivated in Spain, Egypt, and the Levant. Carthamus contains two colouring parts: one yellow, the other red; the first only is soluble in water; its solution is always thick; acids render it clear; alkalis make it of a deep orange-colour; both produce a fawn-coloured precipitate, by which the liquor becomes clear. Alum makes a slight precipitate of a deep yellow colour. In order, to obtain the red colour, the soluble part of the carthamus must first be carefully washed away. The remainder is mixed with the *cendres gravelées*, or salt of soda; and the mixture, being lixiviated, forms a bath. But as the alkali alters the colour, and renders it dull, the dyed stuff is plunged in water rendered acid by lemon juice: the acid seizes the alkali, and leaves the colouring matter, which it enlivens, and causes to become red. A coloured fecula is obtained by a similar process, which, mixed with Briançon chalk in powder, composes the rouge used by the ladies.

OF BRAZIL WOOD.—This wood, which is of great use in dying, takes its name from that part of America whence

whence it was first brought to us; it is called also *fernambucca, St. Martha's wood, Japan*, and *Sapan* wood, from the different places which produce it. A fresh decoction of Brazil wood gives a slight reddish precipitate, with sulphuric acid; the liquor is transparent, and of a yellow colour. Nitric acid makes the liquor yellow also; but, if a large quantity be added, it produces a deep orange-colour, and becomes transparent after depositing a precipitate nearly similar to the above, but more plentiful. The muriatic acid acts in the same manner as the sulphuric.

Of Log-wood.—This has different names according to the places where it grows most plentifully; it is very common in Jamaica, and on the east coast of the bay of Campeachy. It gives its colour both to aqueous and spirituous menstrua; alcohol extracts it easier and more abundantly than water. Its dye is a beautiful red, inclining to violet and purple, which is principally observed in the watery decoction, which, if left to itself, becomes yellowish, and at last black; acids bring it to a yellow; alkalis fix the colour, and bring it to purple or violet. The sulphuric, nitric, and muriatic acids, occasion a slight precipitate, slow in forming. Sulphat of iron turns it immediately of a blue colour, like ink: and makes a pretty considerable precipitate of the same colour.

Of Dyer's Weed.—This is the *reseda luteola* of Linnæus; it is very common, being found in almost all parts of Europe. The decoction is of a yellow colour inclining to brown; if much water be added, the yellow inclines to green. Alkalis darken the colour; acids make it paler.

Of Yellow Wood.—This is a large tree, *morus tinctoria*, growing in the Antilles, chiefly at Tobago. This wood is very full of colouring matter; when the decoction is well impregnated, it is of a deep red yellow; weakened with water, it becomes orange-coloured. Acids make it turbid; alkalis make it stronger, and almost red.

Of Arnotto.—This is a dry hard paste, brownish on the outside, and of a fine red within. It is brought over in lumps wrapped up in leaves, from America, where it is prepared from the seeds of a tree, *bixa orellana*, by maceration in water, and leaving them to ferment. It dissolves much easier in alcohol than in water; hence it is an ingredient in yellow varnish, where an orange tint is desirable. Arnotto is generally mixed with an alkali, which promotes its solution, and gives it a colour less inclined to red.

There are several other ingredients proper for producing a yellow dye; as, broom, camomile, fenugreek, curcuma, terra merita, fustic, plant-seed of Avignon, the leaves of the willow, the bark and young branches of the Italian poplar and of some other species of poplars, the seed of red clover, the golden rod of Canada, the flowers of the Indian pink, the bark of the quercitron, or yellow oak of New England, &c. The green shell of walnuts turns brown in very weak oxygenated muriatic acid. It is very useful in dying, as its colours are very agreeable and very lasting.

Of Sumach, *and other matters which give a fawn-colour.*—Common sumach is a shrub which grows naturally in Syria, Palestine, Spain, and Portugal. An infusion of sumach, which is of a fawn-colour somewhat inclining to green, quickly grows brown in the air. The bark of the elder makes a decoction of the same colour, which grows turbid and brown in the air; with a solution of alum, it deposits a considerable yellow precipitate.

The decoction of most vegetables, particularly the barks, as of quinquina, &c. the herb patience, sandal-wood, &c. give a colour which differs only in certain shades, and with re-agents their characters differ very little from each other. Some colouring matters are soluble in oils. Orcanet, or the red root of a species of bugloss, communicates its colour to oil. Alcohol dissolves several of them; the green fecula are soluble therein, as well as in oil.

We may conclude, from what has been said, 1. That the colouring parts of plants have an attraction, in various degrees, for oxygen, and are all changed more or less by that principle. Another proof of this is, that, if pieces of apple be exposed under jars, they soon become black; cuttings of green-wood, the Spanish thistle, artichokes, &c. present the same phenomena. 2. That muriatic oxygenated acid changes, and turns them either yellow or white.

Directions *for using* Vegetable Dyes.—To apply colours to a stuff with effect, it must first be prepared and disposed to receive the principal colour. For this purpose it must be washed, bleached, and deprived of that glutinous matter which protected it from the destructive action of the air, while connected with the animal from which it is taken; and it must be impregnated with the mordant or corrosive, which fixes the colour, and communicates some particular properties.

For bleaching of cotton, and disposing it to receive the dye, a liquid soap made of oil and soda is used, by which the stuff is deprived of that gloss or varnish, which would not permit the dye to adhere in a proper manner; and its pores are opened, so that it may the better receive and imbibe the colouring principle. When the stuff is thus prepared, the next thing is to impregnate it with the mordant, or that principle which is to fix the colour, and which must so far alter its nature, that no water, soap, nor boiling, can extract it again.

When the cotton has undergone these previous operations, plunge it into a solution of alum, or of muriat of tin, and afterwards put them into the dying-vat. By the decomposition which takes place between the mordant and the principle which holds the colour in solution, the colour is driven upon the base of the mordant, and adheres to it. To those whose studies direct them particularly to the art of dying, we would recommend a perusal of Bartholiet's work on the subject, and several memoirs of Chaptal, lately printed in the Annales de Chimie. See also the article Dying, in this Encyclopædia.

Of FERMENTATION.

Vegetables differ from minerals principally in this, that the latter remain always in their natural state, unless a powerful force breaks their equilibrium; but the vegetable may destroy itself by fermentation, which proves that the principles of vegetables do not always remain in the same state. Three sorts of fermentation are distinguished, the *vinous*, the *acid*, and the *putrid*. Fermentation is a spontaneous motion in vegetables, tending continually to disorganise their parts.

Vinous Fermentation.—Experience has shewn, that all vegetable matters are not capable of passing to the vinous fermentation, but that the union of several peculiar circumstances is necessary for this purpose. These *conditions* are, 1. A saccharine mucilage. This substance only is capable of passing to the vinous fermentation, and of forming wine. 2. A degree of fluidity, slightly viscid. If the vegetable fluid be either too thick, or too thin, it will not ferment. 3. A degree of heat, from twelve to fifteen degrees of Reaumur's thermometer, or between fifty-five and sixty-five of Fahrenheit. 4. A large mass, in which a rapid commotion may be excited.

When these four conditions are united, the vinous fermentation takes place, and is known by the following characteristic phenomena. 1. An intestine motion is excited in the liquor, which increases till the fermentation is well established. 2. The bulk of the mixture is quickly augmented, and this augmentation follows the progress of the intestine motion. 3. The transparency of the fluid is diminished by opake filaments, which are agitated, and carried to every part of the fluid. 4. A degree of heat is produced, equal to eighteen degrees, (seventy-two and a half Fahrenheit,) according to the Abbé Rozier. 5. The solid parts, mixed with the liquor, rise and float, in consequence of the disengagement of an

an elastic fluid. 6. A large quantity of carbonic acid gas is disengaged. This gas forms a stratum in the upper part of the fermenting vats, which may be easily distinguished from air. In this stratum it was, that Dr. Priestley and Duc de Chaulnes made their valuable experiments. Candles, plunged in this stratum, are extinguished, and animals die therein; lime-water is precipitated, and caustic alkalis crystallize perfectly. This acid, contained in the fermenting vats of brewhouses, frequently produces the most fatal effects on the workmen. 7. The disengagement of this gas is accompanied with the formation of a great number of bubbles in the viscid liquor, through which the carbonic acid must pass. All these phenomena gradually cease, in proportion as the liquor loses its sweet and mild taste, and becomes brisk, penetrating, and capable of producing intoxication.

If the fermentation be stopped or hindered, then the gaseous principles are retained; this is what occasions wine to be musty. Musty wines are imperfect wines, shut up before the fermentation was completed; if the carbonic acid be disengaged from musty wine, the remaining liquor will have but little strength, and contains scarcely any alcohol.

The juice of grapes is not exclusively susceptible of the vinous fermentation. Apples and pears afford cyder and perry. This species of wine is often excellent, and affords good brandy. Cherries afford a tolerable wine, from which a kind of brandy is distilled, called *kirchenwasser* by the Germans. Apricots, peaches, and plums, afford a wine of inferior quality. Impure sugar, dissolved in water, ferments readily: from this kind of wine, a spirit, called rum, taffia, guildive, &c. is made. The seeds of gramineous plants, and especially barley, afford a species of wine, called beer. See the article BREWING, vol. iii. p. 131.

The above facts prove, that the saccharine matter is the only principle of vegetables capable of passing to the vinous fermentation, and that water is necessary for the production of this intestine motion. Modern chemists think, that the vinous fermentation consists only in a change in the proportion of the principles of the sugar. A great part of its oxygen seizes the carbonaceous matter of the sugar, and forms carbonic acid, which is disengaged during this fermentation; while the hydrogen, united with a small portion of the carbon, constitutes wine, and is capable of forming a very light combustible subtle body, containing much less carbon than the sugar, and much more inflammable: this is alcohol. The product of all these fermenting substances, is a liquor more or less coloured, of an aromatic smell, a penetrating and hot taste, which, in small doses, assists the action of weak fibres, but produces intoxication when taken too largely. It is universally known by the name of *wine*. The wine of grapes, for example, is composed of a large quantity of water, an aroma peculiar to each wine, of a principle approaching to alcohol, an essential salt called *tartar*, and an extracto-resinous colouring matter, which produces the colour in red wines.

As soon as wine is put into the tub or vat, a kind of analysis begins, which is shewn by the separation of some of its constituent principles, as the tartar, which sticks to the sides of the vessel, and the lees, which fall to the bottom. The precipitation called *lees* consists of the seeds and skins of grapes, impure tartar, and sulphat of potash. By distillation with a naked fire, it affords brandy: treated in a retort, it affords acid phlegm, oil, ammoniac; and its coal contains carbonat and sulphat of potash. The incineration of the lees of wine in the open air affords a caustic potash, mixed with carbonat and sulphat of potash, and known in commerce by the name of *cendres gravelées*.

Wine dissolves many substances, by virtue of the water, the alcohol, and the essential acid salt, of which it is formed. It unites with extracts, resins, certain metals, &c. On these properties depend the preparations of medicinal wines, such as, 1. Emetic wine, prepared by macerating four ounces of crocus metallorum in two pounds of good white wine; the liquid is filtered, or is used without filtration, in paralytic or apoplectic cases. 2. Chalybeat wine, made by digesting one ounce of steel filings with two pounds of white wine: it is an excellent tonic and aperitive medicine. 3. The wines of vegetables, prepared either with red wine, in which astringent or aromatic plants are macerated; or with white wine, which is usually employed with antiscorbutic plants; or with Spanish wine: the wine of squills, and also the liquid laudanum of Sydenham, are prepared with this wine. The latter is made by digesting for several days two ounces of sliced opium, one ounce of saffron, a drachm of powdered cinamon and cloves, in a pound of Spanish wine. This medicine is a very good sedative, taken in the dose of a few drops, especially in cases in which it is feared that opium may weaken the patient, or stop some useful evacuation.

The action of fire is commonly used to decompose wine and separate it into its several principles. The first product, by the distillation of wine is called *brandy*. Chaptal says, that, to obtain brandy of good quality, the shape of the vessels is not a matter of indifference; his apparatus therefore it will be necessary to describe. A kettle is to be made, wider than it is high, with the bottom hollowed in, that the fire may be at an equal distance from every part of the bottom; the sides are raised perpendicularly, so that the kettle exhibits a portion of a cylinder, and is covered with a very large top or head, with its refrigerant, this head has a grove about four inches deep at the lower run within; the sides have an inclination of 75°, at which degree the drop of brandy will run without falling back into the cucurbit of the alembic; the rostrum or beak of the head is to be high and as wide as the head itself; it diminishes gradually, and terminates in a pipe or worm; the refrigerant accompanies the beak, and has a cock at its extremity to let out the water, which is continually dropping from above.

Wine produces by distillation, 1. Brandy. 2. An acid liquor. 3. An extract of a red colour, containing tartar; the colouring part may be separated by the addition of alcohol, which acts on the tartar.

OF BRANDY.

This fluid is naturally colourless; when it has any colour, it is owing to the extractive matter it has taken up from the wood of the cask. Its taste is biting and hot; its strength depends on its lightness in comparison with water. Brandy is of very extensive use, in the arts and in society. Ratafia is made of it; it serves to preserve fruits. It dissolves camphor; this is called camphorated spirit of wine. Brandy from corn is obtained by distilling the liquor drawn from meal by fermentation; in Holland they let it become acid first. It is extracted also from the lees of wine, or the skins of the grapes. They must be left in tubs to undergo a dry fermentation at first; then let them be moistened; but, as the heat of fermentation will have occasioned a beginning of putrefaction, ammoniac rises, and it will be necessary to throw back the first product.

OF ALCOHOL.

Brandy, by distillation in close vessels, produces a liquor more volatile, called *alcohol*, or spirit of wine. Put brandy into a water-bath of tin; place this in the cucurbit of an alembic, and fix on the head and worm-tub. Distil with a moderate heat; separate the first product, which is about one fourth of the quantity employed; a second product is obtained, which should be equal in quantity to the first: mix these together: this is the purest and strongest alcohol. Continue the distillation till

till all the alcohol is extracted; the last product is the weakest of course. By distilling this alcohol over again, and reducing it to about two-thirds of the quantity, it becomes very pure, and then is called *rectified alcohol*.

Lowitz succeeded in depriving alcohol of all the water not necessary to its composition, by distilling it with a large quantity of alkali. To separate this water, first shake the alcohol in a bottle together with dry potash; then pour as much of this alcohol over potash strongly calcined, and still warm, as the salt will absorb; it will take in general half its own weight. Adapt a receiver to the retort, and after twenty-four hours proceed to distillation with so gentle a heat, that the drops may fall only at an interval of two seconds. When the distillation slackens, unlute the apparatus, and preserve the alcohol which has passed over; it is generally about two-thirds of the original quantity; that which comes over afterwards is weaker, and at last a pure phelgm. The specific weight of the alcohol thus obtained, is lessened from 815 to 791, at a temperature of 16° of Reaumur. The residuum in the retort may serve for fresh experiments, as long as any fresh portions of alcohol can be absorbed. There remains in the alembic a thick fluid, which precipitates brown flocks, arising from some drops of oil separated in the distillation.

Hence it may be observed, that the purity and strength of alcohol must differ according to the processes used in obtaining it. A method of discovering its purity has long been sought after.—It was formerly supposed that alcohol, which readily catches fire, and leaves no residue, is very pure; but it is at present well known, that the heat excited by its combustion is sufficiently strong to dissipate all the phlegm it might contain.—Another proof has been proposed, by means of gunpowder: when alcohol, set on fire in a spoon upon gunpowder, does not inflame it, it is considered as bad; if, on the contrary, it sets it on fire, it is judged to be excellent. But this proof is very fallacious; for, when a large quantity of the best alcohol is burned on a small quantity of gunpowder, the water it affords during its combustion moistens the powder, and prevents its taking fire; whereas it may be inflamed by burning a very small quantity of phlegmatic alcohol on its surface. This method is therefore no more to be depended on than the former.—Boerhaave has described a very good process for ascertaining the purity of this fluid: it consists in throwing the very dry powder of carbonat of potash into alcohol; this unites with the superfluous water of the alcohol, and forms a more ponderous and coloured fluid than the alcohol, with which it does not mix, but falls to the bottom. Baumé, on the consideration that alcohol is lighter the purer it is, has contrived an aerometer, by which the degree of purity of this fluid, and of all volatile liquors, may be accurately ascertained. When the instrument is plunged in alcohol, it sinks deeper, in proportion as the fluid is purer. The method of constructing this instrument, as well as the results afforded by different quantities of alcohol, may be seen in his Elements of Pharmacy, and may be applied to determine the strength of alcohol by the hydrometer. Bories's aerometer is reckoned by Chaptal to be more correct than that of Baumé, because a thermometer is adapted to it. Perfectly rectified alcohol, according to Baumé, should weigh but sixteen pennyweights ten grains in a bottle containing one ounce of water; the temperature is 10° above freezing. La Grange says, that, when rubbed in the hands, it should evaporate quickly, leaving neither moisture nor smell; if otherwise, it is badly rectified, and not pure.

Having given the processes for obtaining it, we are now to examine the substance itself.

Alcohol is a perfectly transparent fluid, much sharper and hotter than brandy, and much lighter; the strongest is from 38 to 40°. Its principal chemical property is it extreme volatility: it boils at 64°, and rises in vapours. Heated with the contact of air, it soon takes fire, an exhibits a light flame, white in the middle, and blue at the sides; it completely burns away, when pure. Many chemists have attempted to discover the product afforded by alcohol in burning. They found that its flame is accompanied with neither soot nor smoke; and that the volatilized matters when condensed, are pure water, without taste or smell, absolutely in the state of distilled water. Boerhaave, from this phenomenon, supposed that the flame is produced by the water; and this opinion is confirmed by the knowledge we at present possess, respecting hydrogen gas obtained by the decomposition of water, and the water obtained by burning hydrogen gas with oxygen gas. Lavoisier discovered, that, when alcohol is burned in a chimney adapted to receive the vapours, a larger quantity of water is obtained than the whole of the spirit made use of amounts to; whence it follows, that this liquor contains a large quantity of hydrogen.

If alcohol be passed through a very hot porcelain tube, water is precipitated in the bottle adapted to the tube, and a very small quantity of carbonic acid is disengaged, and a little carbonated hydrogen gas; a little naked carbon remains in the tube. To perform this experiment, lay the porcelain tube through a furnace; to the upper extremity adapt a syphon-tube, ending in a funnel; the lower extremity is to receive a recurved tube, which goes into a doubly-tubulated bottle, whence goes another tube which runs under a bell-glass in the pneumatic-chemical apparatus. Make the porcelain tube red-hot, and pour in the alcohol by little and little through the funnel. This experiment proves that alcohol consists of hydrogen, carbon, and a small quantity of oxygen.

Alcohol, exposed to the air, evaporates at a temperature of 10° above frezing. If water be poured over rectified alcohol, there is an increase of heat, which arises from the reciprocal action of the two substances upon each other. This solution produces spirits, whose strengths are greater in proportion as the quantity of alcohol is greater. If snow or ice be used instead of water, its mixture with alcohol makes the thermometer fall 17° which, according to Baumé, arises from the great tendency of that fluid to evaporate.

Alcohol combines in general with simple combustible bodies, but with different degrees of facility.

Sulphur readily unites with alcohol. Phosphorus digested with alcohol, changes into a kind of white transparent oil, remaining at the bottom of the vessel undissolved. This oil does not congeal but in a great degree of cold; but, by frequent washings, the phosphorus recovers its consistence; after which it takes fire more readily by heat, but no longer shines in the dark, and loses its yellow colour; though the liquor drawn off from this oil smells strongly of phosphorus, it has but a slight luminous power, which it shews the moment it is mixed with water. If the combination of phosphorus and alcohol be distilled in a gentle heat, and the distillation be stopped in time, phosphorus in crystals may be obtained by cooling. This combination, with the addition of water, precipitates phosphorus. The strong acids and alcohol act very strongly upon each other; and by this reciprocal action *ether* is produced. From the mixture of an acid with alcohol in certain proportions, arise the preparations called *dulcified acids*.

Three parts of alcohol mixed with one part of sulphuric acid, produce a liquor which retains the name of *Rabel's water*, though the inventor's process was very different and very complicated, like most of the receipts of the old chemists. Dulcified spirit of nitre, now called *nitric alcohol*, is made also with great facility. Put two parts of alcohol over one of nitric acid, and leave them to digest in the cold for twelve days: the acid will be considerably softened; it is now only an aperitive, or diuretic.

Two parts of alcohol and one of muriatic acid digested together, yield what is called *sweet spirit of salt*. This is

is a bad preparation, as the combination is not complete. All the dulcified acids are decomposed by alkalis. It seems that, in the preparation of dulcified acids, a little ether it formed; but the quantity of water and acid, hinder this from being exactly known.

Alcohol readily unites with the boracic acid; this liquor flames, and burns with a red colour. Its action with the other acids has been little examined. It readily dissolves potash; this is the method used for purifying potash, and procuring it in crystals, as detailed in p. 224.

By the digestion of the alkali obtained from tartar in alcohol, two remedies are compounded, called acrid *tincture of tartar*, and *metallic tincture*, or *lilium of Paracelsus*, which last only differs from the first in that the alkali used in preparing it has been rendered caustic by heat.

Alcohol unites with all the deliquescent salts, and keeps them from being precipitated by water. If, for instance, a solution of muriat of lime be taken with alcohol, and set on fire, it will give a red colour; with muriat of strontian and alcohol, a purple red. Some of the metallic salts are also soluble in alcohol; as, the super-oxygenated sulphat of iron, the nitrat of copper, the muriats of iron and copper, and the oxygenated muriat of mercury: all the salts of copper burn with a beautiful green flame. Guyton has given a table, in the Journal de Physique, of the degrees of solubility of salts in alcohol.

Soap is very soluble in alcohol, especially if a little potash be added: this solution, when perfumed, is called *essence of soap*. Some of the immediate products of plants are soluble in alcohol, others are not; some are soluble in alcohol and in water, others only in one of the two, others again in neither, as the ligneous substance.

Among the substances soluble by alcohol, are extracts, sugar, and some vegetable acids, as tartareous acidule, oxalic, camphoric, and benzoic, acids. If distilled water be added to a solution of camphoric acid, there is no precipitation; but a precipitate is obtained by pouring water into an alcoholic solution of benzoic acid; which exhibits a marked difference between these acids. If alcohol be distilled in a water-bath with odoriferous plants, the spirit seizes the principle of smell, and rises with it, carrying up at the same time a certain quantity of volatile oil, which causes it to become white by the addition of water: in pharmacy these are called *spirituous distilled waters*.

Volatile oils are entirely soluble in alcohol; if thick and much coloured, they become less so. Camphor also is soluble in alcohol, but is precipitated by water: in this way is prepared camphorated alcohol.

Alcohol dissolves resins and gums also: these solutions are called *tinctures*, *elixirs*, *quintessences*, &c. The resins may be separated from the alcohol again, by pouring water over the tinctures. The solution of a gum resin in weakened alcohol, gives a resinous precipitate; but the water continues coloured, and holds a part of the gum in solution. This proves that the alcohol dissolves, by help of the resin, a small portion of the gum; and, reciprocally, that the water dissolves a small part of the resin by the help of the gum; so that the analysis of a gum-resin by water and alcohol cannot be very exact.

Balsams dissolve in alcohol. Benzoin, for instance, in alcohol, gives a tincture, called *virgin water*. A few drops of this in water turn it white, which has gained it the name of *virgin milk*. Water does not decompose the tinctures formed with extracto-resinous substances; as, rhubarb, saffron, opium, &c. because they are equally soluble in either liquid.

The property of alcohol to dissolve resins, has given rise to a mode of spreading them on the surfaces of bodies for ornament or preservation, under the name of *varnishes*. For the most beautiful varnishes, the most transparent resins should be used. To these tinctures are occasionally added a certain quantity of volatile oil; as, oil of turpentine, oil of aspic, or the greater lavender; these give consistence to the varnish, hinder it from drying too fast, and serve to unite the resinous parts when the alcohol has evaporated. In this manner, sandarac, mastic, copal resin, lac, and colophony, make very good varnish.

Of ETHERS.

The oldest of all is the sulphuric ether. Put a certain quantity of alcohol into a retort, and pour over it by degrees an equal weight of concentrated sulphuric acid; agitate and stir the mixture, that the retort may not break by the heat. Place the retort on a warm sand-bath; adapt two large balloons, or receivers, plunged into vessels of cold water; and care must be taken to keep the first receiver cool with wet cloths. When the apparatus is mounted and luted, urge the mixture to ebullition, which will take place at 78° of heat; then a fluid will be produced, which, by cooling, condenses into a white liquor, light, of an agreeable smell, which, from it properties, has received the name of *ether*. If the operation be skilfully conducted, no permanent gas will be disengaged till about one half of the alcohol is converted into ether. As soon as the sulphureous acid appears, the receiver should be changed; then no more ether will be produced, but a little yellowish oil is volatilized, called *sweet oil of wine*; there is water also, and acetous acid, but not an atom of carbonic acid. When sulphuric acid makes about four-fifths of the mass remaining in the retort, an inflammable gas is disengaged, having the smell of ether, and burning with a white oily flame: to this gas the Dutch chemists have given the name of *carbonated hydrogen gas*, or *olifiant gas*, because, mixed with oxygenated muriatic acid, it forms oil. At this time the temperature in the retort is raised to 88 or 90°. When the sweet oil of wine no longer flows, change the receiver again; nothing is now produced but sulphureous acid, and the water formed before by the carbonic acid gas; and in the retort there remains a mass, the greatest part of which is sulphuric acid blackened by carbon

Fourcroy and Vauquelin assert, that a mixture of equal parts of sulphuric acid and alcohol, will not boil till there are 78° of heat, but alcohol alone boils at 64°, whence they conclude, that alcohol is restricted by the affinity of sulphuric acid, which fixes it. They compare this effect with what takes place in every other vegetable substance exposed to heat, whose principles fly off according to the order of their affinity for caloric, carrying with them a small quantity of the more fixed elements. Thus, in proportion as the sulphuric acid attracts alcohol and water, of which it promotes the formation, the ether which is produced attracts caloric, and becomes volatilized; and, when the greater part of the alcohol has been converted into ether, the mixture becomes more dense; it requires a more considerable heat; and, the affinity of the sulphuric acid for the undecomposed alcohol being increased, the principles of that acid are disjoined; so that, on the one hand, its oxygen is driven upon the hydrogen of the alcohol, and forms water, which volatilizes by degrees; while, on the other hand, the ether, retaining a greater quantity of carbon with which it can volatilize at that temperature, gives rise to the sweet oil of wine, which ought to be considered as ether more loaded with carbon; as is proved by its increased weight, less volatility, and its lemon colour.

From this simple theory, which is drawn from the facts and observations contained in their writings, we are led to the following useful conclusions: 1. That the formation of ether does not arise, as was supposed, from the immediate action of the principles of the sulphuric acid upon those of the alcohol, but upon the re-action of the elements of the alcohol upon each other, particularly of the oxygen and hydrogen, occasioned only by the sulphuric acid. 2. That alcohol may be converted into ether withou the assistance of heat, by increasing sufficiently the

the proportion of sulphuric acid. 3. That the operation is divided into two periods, in one of which sweet oil of wine is not formed; as soon as this oil appears, scarcely any more ether comes over, and at the same time the sulphuric acid is decomposed by the hydrogen only, whence results sulphureous acid. 4. The formation of the mild or sweet oil of wine may be avoided, by keeping the mixture in a temperature of between 75 and 78° by the skilful addition of a few drops of water in the retort. 5. Alcohol differs from ether in containing more carbon and less hydrogen and oxygen; and the sweet oil of wine is to ether nearly what ether is to alcohol.

There are three periods in the formation of ether; the first is that in which ether and water are formed with the assistance of external heat. In the second, the disengagement of the ether takes place without being accompanied by any sulphureous acid: and the third is that in which oil of wine, olifiant gas, acetous acid, sulphureous acid, and carbonic acid, are disengaged. The formation of water takes place during these three stages from the beginning to the end of the process.

It frequently happens that the ether thus procured, retains a little sulphureous acid; rectification therefore becomes necessary, to bring the preparation to its highest degree of purity. Several means are employed: some use potash, others magnesia, &c. Dize has lately proposed the oxyd of manganese for this purpose; he observes that his process produces about a sixth part more than the usual mode with the retort and receivers. From the experience of performing this in the large way for three years, he recommends his method to the public. It consists in neutralizing the sulphureous acid (contained in the unrectified ether) with powdered oxyd of manganese. Then draw off the ether in a water-bath of tin; this is to be plunged into a cucurbit three parts full of water; fix on the head, and a proportional worm-tub fixed in a kettle which is to be continually supplied with fresh water from the lower part, so that the water, which is heated above, is constantly ejected by the hole made in the upper part; thus, the water in the worm-tub is kept always at the same degree of coolness. Then proceed to distillation, raising the heat to 36°.

Ether is much more inflammable than alcohol; it catches fire if a taper be brought in contact with the vessel which contains it. It burns with a whiter, larger, and more luminous, flame; and, what constitutes an essential difference, it is accompanied by a small quantity of soot, leaving a black coally mark on any thing held over it. Its taste is hot and pungent; it is so volatile, that, by pouring a known quantity from one wide-mouthed bottle into another, it will be found to have lost a fourth part. During its evaporation, it produces a great degree of cold, so that ice may quickly be produced by its means: fill a phial with water, and, having wrapped it up in a fine rag, plunge it into ether; when the rag is soaked, take it out, and expose it to the air; the evaporation may be promoted by shaking the bottle; put it in again when the rag is dry; in seven or eight minutes the water will be converted into ice.

Ether does not unite readily with water; even with agitation it requires ten parts of water to dissolve it: which shews a ready way of proving whether that liquor has been changed by alcohol. Ether has no action upon earths and fixed alkalis; it takes from them merely their uncombined and superabundant acid; hence they are employed in rectifying ether. Caustic ammoniac unites with it in all proportions. Sulphuric acid causes great heat in combining with ether, and by distillation will convert a great part of it into the sweet oil of wine. Fuming nitric acid excites a considerable effervescence, and the ether becomes deeper coloured.

Ether has the property of taking up gold from its solution: Pour ether over a solution, and mix them by shaking the phial; as soon as the mixture is at rest, the ether separates from the nitro-muriatic acid, which the reader should recollect is the usual solvent for gold, and swims above it; then the acid, deprived of the gold, becomes white, while the ether at the same time takes a yellow colour: and thus is quickly formed a tincture of gold, or that famous, but useless, preparation, *aurum potabile*, potable gold. For soon after the gold separates from the ether, recovers its metallic brilliancy, and sometimes is found in crystals on the surface.

Ether quickly dissolves the oxygenated muriat of mercury; it dissolves volatile oils and resins, in the same manner as alcohol; and accordingly physicians often use ethereal tinctures.

Ether is considered as a powerful tonic, and antispasmodic remedy. It is used in hysteric disorders, and spasmodic cholics, and is of excellent service in cases where digestion is ill performed on account of weakness of the stomach. It must be administered, however, with prudence, because its excessive use is dangerous. It is likewise successfully applied externally in headachs, burns, &c. Hoffman, who made many experiments with the sulphuric acid, and alcohol, used a medicine composed of sweet oil of wine dissolved in alcohol, which he called his mineral anodyne liquor. The Faculty of Medicine at Paris have added ether to this liquor, and prescribe it to be prepared by mixing two ounces of the alcohol which passes in distillation before the ether, two ounces of ether, and twelve drops of sweet oil of wine. This medicine is employed for the same purposes as ether, but is far from having the same efficacy.

The nitric acid with alcohol furnishes also an ethereal liquor. Several chemists have proposed modes for preparing it, as, Navier, Woulf, La Planche, Bogues, &c: but the following, by Chaptal, is most used: Take equal parts of alcohol and nitric acid at 30 or 35°; put the mixture into a tubulated retort, and place it on a sand-bath; adapt two receivers one to the other, the first is to be plunged into an earthen pan with water, or a shallow trough; the second is to be kept covered with a wet cloth; and from the tubulation goes a syphon which plunges into the water. When the heat begins to act upon the mixture, much vapour is disengaged, which condenses on the sides of the vessels, whose exterior is to be cooled continually. About one-fourth of very pure nitric ether is obtained.

Nitric ether, obtained by this process, is a yellowish fluid, as volatile and evaporable as sulphuric ether, whose smell it resembles, though it is stronger, and not so agreeable; its taste likewise is hotter, and more pungent than that of sulphuric ether. Its flame is brighter, and the smoke it emits, when burned, is denser than that of the sulphuric ether; it leaves a larger coally residue; and, lastly, like the sulphuric ether, it takes gold from its solutions, and suspends a certain quantity. Navier observes, that this tincture of gold, laid on glass or on a plate of metal, would evaporate, and leave the surface gilt. Phosphorus, which dissolves but slowly in sulphuric ether, dissolves better in nitric ether, to which it communicates a slight phosphoric property.

Deyeux, who made observations on nitrous ether, thinks that this ether owes its volatility to the nitrous gas which continually inclines to exhale from it. To determine the presence of this gas, he made the following experiment: Pour eight parts of water over one of nitric ether; put the mixture into a bottle furnished with a recurved tube plunging under a bell-glass filled with water; after a certain time, bubbles will be disengaged, which displace the water under the jar. He then examined the product of this operation; he first washed the gas contained in the receiver several times, to separate the aeriform fluids it might contain; this having produced no sensible effect, he then mixed a portion of this gas with atmospherical air; there was a considerable absorption, and at the same time the upper part of the tube was filled with vapours; this was much more apparent, when with another portion of this gas he mixed oxygen gas; the moment

ment they were in contact, there appeared in the receiver a vapour as red as the most concentrated nitrous acid could exhale. If a lighted taper be plunged into this gas, a flame is produced similar to the combustion of nitric ether. He concluded, therefore, that this gas, when separated, always carried with it a certain quantity of nitric ether; and that its spontaneous disengagement is always much slower than when assisted by water. He attributes the presence of nitrous gas to the extreme facility with which the nitric acid is decomposed; and he does not regard it as essential to the constitution or formation of nitric ether, since, when deprived of it, this ether is preserved like other ethers, without breaking the vessels which contain it.

This ether has often a yellow colour. Deyeux endeavoured to separate this; and he perfectly succeeded by the following process: Distil four parts of nitric ether upon one part of sugar in powder; the operation goes on quietly, with hardly any disengagement of air; the liquor obtained is very aromatic, and much less coloured. A second distillation over fresh sugar whitens it still more; but the nitric ether is decomposed at each operation. The heat of boiling water is sufficient; the melted sugar is of a yellow colour; and at the surface is an oil of the same colour, of a sharp taste and penetrating smell, very combustible, leaving a mark upon stuffs, soluble in oils, alcohol, and sulphuric ether, and with alkalis forming soap: this is the *true sweet oil of wine*. Deyeux concludes that this oil is the cause of the yellow colour of nitric ether.

The residue of nitric ether is of a lemon yellow colour, its smell is acid and aromatic, and its taste is penetrating, and resembles that of distilled vinegar. It affords, by distillation, according to Baumé, a clear liquor of a milder taste than that of nitric ether, being an agreeable acid, which reddens syrup of violets, unites with water in all proportions, and effervesces with carbonat of potash. The retort contains a yellow friable matter, of the appearance of amber, which attracts the humidity of the air, becomes of a pitchy consistence, and is soluble in water without rendering is mucilaginous. This, which Baumé calls a gummy saponaceous substance, if the distillation be continued, affords a few drops of a very clear acidulous fluid, of an oily consistence, and slightly empyreumatic smell. A spongy, brilliant, tasteless, very fixed, coal remains. Bucquet affirms, that, if the liquor which remains after the formation of nitric ether be evaporated, it assumes the consistence of a mucilage, and at the end of a certain time affords saline crystals resembling hairy caterpillars, which have been called crystals of Hiærne, from the name of the chemist who first described them. It has since been discovered, that this residue is the oxalic acid, which proves that the combustible base of that acid is contained in alcohol.

The nature of the gas disengaged, during the distillation of a mixture of alcohol and nitric acid, has been lately investigated by the Dutch chemists. The production of this gas, is more or less rapid according to the strength of the acid, and of the alcohol. After this gas ceased to be produced, nitrous gas was given out, and the liquor at last was found to consist chiefly of acetic acid. Little or no ether is formed during this process. The gas has a disagreeable and etherous smell, which it did not lose by standing; it burned slowly and with a yellowish flame, by bringing it into contact with the flame of a candle. It is wholly absorbed by water, which acquires the smell of the gas. Alcohol appears to absorb it in a shorter time, and in a greater quantity than water. It is absorbed, though slowly, by a solution of potash. The sulphuric and muriatic acids disengage it from this combination, with its properties unchanged; ammoniac has no action on this gas. Oxygen does not alter it, but if a mixture of these fluids be fired, a very violent explosion takes place. Sulphuric, nitric, and muriatic, acids, change this gas into nitrous gas. By passing it through glass tubes red hot, a thick vapour came out of the tubes, which precipitated lime water, and was inflammable. The inside of the tubes was covered with an empyreumatic oil. The gas was now no longer absorbable by water, and it had the smell of nitrous gas. Oxygen, and the oxygenated muriatic acid, produced in it the red vapours, which are sure marks of the formation of the nitric acid; the residue was carbonated hydrogen gas. These experiments seem sufficient to show, that this substance was a compound of nitrous gas, and of a substance consisting of hydrogen and carbon.

By mixing this inflammable gas, with oxygenated muriatic gas, a very considerable diminution of volume took place. In this experiment, the oxygenated muriatic acid converted the nitrous gas into nitric acid, and was itself reduced to the state of ordinary muriatic acid; for the liquor which is formed, and which trickles down the sides of the vessels in which the gases are mixed, affords crystals of the nitrat and muriat of potash, when that alkali is added.

The Dutch chemists are of opinion, that, besides the nitrous gas, the other constituent part of this inflammable gas is ether, though in a state somewhat different from the ordinary state of that substance. They call this gas, therefore, *etherized, or etherated nitrous gas*. If one part of nitric acid be mixed with six of alcohol, and digested on zink, the gaseous oxyd of azot is first disengaged, and afterwards this peculiar kind of inflammable gas. When this gas was exposed to the re-agents which take oxygen from nitrous gas, such as a solution of copper in ammoniac, of muriat of tin, or an alkaline sulphure, it was converted into the gaseous oxyd of azot, which having no tendency to combine with the other, quitted it, and of course, restored to it its primitive inflammability.

Muriatic ether is produced by the following process from Pelletier and Klaproth: Pelletier's method is to put eight parts of manganese and twenty-four parts of muriat of soda into a large tubulated retort; add twelve parts of sulphuric acid and eight of alcohol, and proceed to distillation; and a liquor will be produced, from which $\frac{13}{32}$ of pure ether may be obtained by distillation and rectification. A good ether may be obtained by passing oxygenated muriatic acid through alcohol: it is even a shorter process than the foregoing.

Klaproth distilled equal parts of alcohol and oxygenated muriat of tin. The residue in the retort, is a brown, transparent, resinous, mass; what passes over still contains acid holding tin in solution: this muriat is to be separated by means of caustic potash, and the liquor distilled a second time. This ether is very volatile, swims upon water, catches fire at a distance, takes up gold dissolved in nitro-muriatic acid, and iron from oxygenated muriatic acid.

The Acetous Fermentation.

Boerhaave called the operation by which wine passes to the acid state by the name of acetous fermentation. There are three conditions necessary to the acetous fermentation. 1. The presence of a mucilage or mucous matter. 2. A heat from 18 to 25°, (75 to 90° of Fahrenheit.) 3. The presence of oxygen gas.

All wines are equally proper to make vinegar; it is made also with cider and perry. Gums and amylaceous fecula, dissolved in boiling water, are capable of undergoing the acid fermentation. Chaptal made vinegar by collecting the carbonic acid which was disengaged during the vinous fermentation; he obtained it also by mixing alcohol with sour milk. Vinegar may be drawn from the lees of wine; it must be squeezed in the press, then put into casks, and left to ferment.

Boerhaave, in his Elements of Chemistry, has described a very good process for making vinegar. Two large casks are provided, and a false bottom of wicker is fixed, at some distance from the bottom, within each, on which vine-branches and grape-stalks are spread: wine is then poured in;

in; so that one of the vessels is filled, and the other only half full. The fermentation commences in the latter: when it is well established, it is filled up with wine added from the other tun. By this means, the fermentation is retarded in the full vessel, and accelerated in the other. When it has arrived at a considerable degree in this last, it is again filled up, by transferring part of the fluid from the other; the fermentation consequently recommences in the first vessel from which the liquor was last taken, and becomes slower in that which is filled up. The alternate filling and emptying of the vessels is continued till the vinegar is perfectly formed, which usually happens in twelve or fifteen days. When the effects of this fermentation are attended to, much ebullition and hissing is perceived; the liquor becomes hot and turbid, exhibits a great quantity of filaments and bubbles, agitated in every direction; a strong acid smell, not at all dangerous, is emitted, and a large quantity of air is absorbed. It is necessary to impede the fermentation every twelve hours. These phenomena gradually become less, the heat decreases, the motion decays, and the fluid recovers its transparency: a sediment is deposited, in reddish flocks, which adhere to the sides of the vessels. Numerous experiments have shown, that the smaller the quantity of wine, and the more perfect the access of air, so much the more readily does it pass to the state of vinegar. The vinegar must be carefully drawn off, in order to separate it from its lees, which, without this precaution, would quickly cause it to undergo the putrid fermentation. Vinegar does not deposit tartar by standing, like wine; this salt is dissolved, and combined with the alcohol and water during the fermentation. It is even probable, that the presence of this salt influences the developement of the properties of vinegar. This fluid has more or less colour, according to that of the wine used in its preparation; but in general, vinegars, which have the least colour, are far from being of as light a colour as the white wines, because they hold in solution the colouring matter of the tartar, which has likewise been developed by the production of the acid.

Vinegar, prepared in the method here described, is very fluid; of an acid and spirituous smell, and of a sour taste, of different degrees of strength: it reddens blue vegetable colours. When exposed to a warm temperature, in imperfectly closed vessels, it becomes changed, losing its spirituous part, and depositing a great quantity of mucilaginous flocks and filaments, at the same time that it assumes a putrid smell and taste. In order to preserve it, it is necessary to boil it for a short time, as Scheele has observed; but this did not succeed with Nicholson.

When vinegar is distilled by a naked fire, in an earthen alembic, or in a glass retort, on a sand-bath, a phlegm of a lively and agreeable smell, but scarcely acid, first passes over; this is succeeded by a very white acid liquor, called *distilled vinegar*, or *acetous acid*. The following products have less smell, and more acidity, as the distillation advances. If these products be taken separately, distilled vinegars, differing from each other in acidity and smell, may be obtained; but it is usual, in this process, to draw off about two-thirds of the liquor, which constitutes the purest vinegar. The portion which comes over afterwards is more acid, but it has an empyreumatic smell, which may be dissipated by exposure to air; it is likewise slightly coloured. This operation shews, that the acetous acid is less volatile than water. The remaining vinegar is thick, of a deep and dirty colour, deposits a certain quantity of tartar, and is considerably acid. If it be evaporated in open vessels, it takes the form of an extract; and if, when dried, it be distilled in a retort, it affords a reddish acid phlegm, an oil at first light coloured and afterwards heavy, with a small quantity of ammoniac. The remaining coal contains much fixed alkali. Vinegar may be concentrated by exposing it to frost. The frozen part consists almost entirely of water; the part which remains fluid, being decanted off, is found to be much more acid: the quantity of vinegar thus obtained is small.

The acid of vinegar, separated from tartar and the colouring matter, by distillation, is capable of uniting with a great number of bodies. It does not readily combine with alumine, with which it forms crystals, in small needles, whose properties are little known. It is the acetit of alumine. This acid unites readily with magnesia, and affords a salt, which is very soluble in water, and does not afford crystals, but is converted into a viscous deliquescent mass, by evaporation. The acetit of magnesia is decomposed by fire, by the mineral acids, by barytes, by lime, and by the alkalis. It is very soluble in alcohol.

The acetous acid combines with lime, and decomposes chalk, whose acid it disengages, in the form of an elastic fluid. The salt it forms with lime, crystallizes in very small needle-shaped prisms, of a satin appearance. The calcareous acetit is bitter and sour, and effloresces in the air. It much resembles the acetit of magnesia, differing principally in not being near so deliquescent as that.

To form these salts, the earths should be taken in the carbonat state; the acetous acid, being poured over them, dissolves them, by disengaging the carbonic acid. They are all deliquescent, more or less, and may be crystallized by slow evaporation. But the combination of acetous acid with glucine will not crystallize; it is reduced to a gummy appearance, preserving always a slight ductility; it has something of a saccharine taste, but more of the acid, and is very astringent. The acetit of barytes is a very good re-agent to detect the presence of sulphuric acid in vinegar; it has the greatest affinity for the acetous acid. All the earthy acetits are decomposed by fire; they afford a very small quantity of an acid oily liquor; and the base, blackened by carbon, remains in the retort. Alkalis and mineral acids decompose them also. Salts are formed, by the combination of acetous acid with alkalis, which were called *terra foliata tartari*, *crystallized terra foliata*, and *spirit of Mindererus*. They are now called *acetits*.

Vinegar acts on almost all metallic substances, and its combinations are attended with a variety of important phenomena. The oxyds of gold and silver with acetous acids form acetits; but these salts have not been yet examined. It does not appear to dissolve the oxyd of arsenic; but this last substance distilled with an equal part of the acetit of potash, afforded Cadet, and the chemists of the Academy of Dijon, a red fuming liquor of a nauseous smell, very tenacious, and of a singular nature. Cadet had before observed, that this liquor inflames fat lute. The academicians of Dijon, being desirous of examing a yellowish matter of an oily consistence, collected at the bottom of the vessel, which contained the arsenico-acetous fuming liquor, decanted a portion of this superfluent liquor, and poured the rest on a filter of paper. A few drops had scarcely passed, when immediately an offensive and very thick fume arose, which formed a column from the vessel to the cieling; a kind of ebullition was excited on the borders of the matter, and a beautiful rose-coloured flame issued forth; all which lasted a few seconds. A full account of the experiments of these learned academicians, may be seen in the third volume of the Elements of Chemistry of Dijon. They compared the liquor we have spoken of to a liquid phosphorus; we think it is a pyrophorus of the same kind as those we shall presently mention. The residue of the distillation of the acetit of potash with oxyd of arsenic, consists, for the most part, of potash.

Vinegar dissolves the oxyd of cobalt, and forms a solution of a pale rose colour. It has no action on bismuth, or its oxyd, but it dissolves that of manganese. It dissolves nickel directly, according to Mr. Arvidson; this solution affords green crystals, of the form of a spatula. The acetous acid does not appear to act on antimony, but it appears to dissolve the vitreous oxyd of this metal: since

ſince Angelus Sala made an emetic preparation with theſe two ſubſtances.

Zink, and alſo its oxyd, are readily diſſolved by diſtilled vinegar. Monnet obtained cryſtals from this ſolution in the form of flat plates. The acetit of zink fulminates on hot coals with a bluiſh flame. By diſtillation it affords an inflammable liquor, a yellowiſh oily fluid, which ſoon becomes of a deep green; and a white ſublimate, which, when ſet on fire by a candle, burns with a beautiful blue flame; the reſidue is in the ſtate of a pyrophorus, not very combuſtible.

The acid of vinegar does not diſſolve mercury in its metallic ſtate; but this combination may be made by dividing the mercury into very ſmall particles, as was done by Keyſer. Mercury, in the ſtate of oxyd, readily unites with vinegar. The acid may be boiled either on the red oxyd of mercury, named *precipitate per ſe*, on turbith mineral, or mercury precipitated from its nitric ſolution by potaſh. The fluid becomes white, but recovers its tranſparency when boiling hot; it is then to be filtered, and ſilver-coloured cryſtals fall down, in ſcales reſembling boracic acid. This acetit of mercury has been called *mercurial foliated earth*. It may be immediately prepared by pouring a nitric ſolution of mercury into a ſolution of acetit of potaſh; the nitric acid unites with the fixed alkali of this laſt ſalt, and forms nitre, which remains diſſolved; while the oxyd of mercury, combining with the acid of the vinegar, is precipitated in the form of brilliant ſcales. The mixture being then filtered, the mercurial acetit will remain on the filter. This ſalt is decompoſed by the action of fire, and its reſidue affords a kind of pyrophorus. It is quickly altered by combuſtible vapours.

Tin is not much altered by vinegar. This acid diſſolves only a ſmall quantity of that metal, which ſolution, by evaporation, afforded Monnet a yellowiſh ſubſtance reſembling gum, and of a fetid ſmell.

Acetous acid diſſolves zircon in a divided humid ſtate. This combination, which is very ſoluble in water, does not appear to be capable of cryſtallization. This ſalt undergoes leſs change from the heat, than nitrat of zircon, probably, becauſe it adheres leſs ſtrongly to the water of ſolution, and becauſe it is dried at a lower temperature. Like the other ſalts of this claſs, it poſſeſſes a very ſtrong aſtringent taſte. It is ſoluble in alcohol, but does not deliqueſce in the air.

The acid of vinegar acts more ſtrongly on lead than on moſt other metals, and diſſolves it with the utmoſt facility. When thin plates of this metal are expoſed to the vapour of heated vinegar, they become covered with a white powder called *ceruſe*, which is an oxyd of lead, containing a little vinegar. Ceruſe ground with one-third part of chalk, forms the *white lead* uſed as a paint. In order to ſaturate vinegar with lead, the acid is poured on ceruſe in a matraſs; the mixture is ſet to digeſt on a ſand-bath, and after ſeveral hours is evaporated to a pellicle; by cooling it affords white cryſtals, forming either irregular needles, if the fluid has been too much concentrated; or flat parallelipipedons, terminated by two ſlant ſections, when the evaporation has been well made. This acetit of lead is called *ſalt or ſugar of Saturn*, on account of its ſweet taſte, which is at the ſame time very ſtyptic. A ſalt of the ſame nature is made, by boiling equal parts of litharge and of vinegar, and evaporating it to the conſiſtence of ſyrup. This is the extract of Saturn of Goulard, which long before his time was known by the name of *vinegar of Saturn*. Acetit of lead is decompoſed by heat; it affords an acid, ruddy, and very fetid, liquor, different from radical vinegar or pure acetit acid, of which we ſhall preſently treat. The reſidue is a very good pyrophorus. This ſalt is decompoſed by diſtilled water, by lime, by alkalis, and by the mineral acids. The extract of Saturn, diluted with water, and mixed with a ſmall quantity of brandy, forms the vegeto-mineral water.

Vinegar quickly diſſolves iron; the effervеſcence which takes place in this ſolution, ariſes from the diſengagement of hydrogen gas afforded by the water, which ſeems to be decompoſed. The liquor has a red or brown colour; and by evaporation affords only a gelatinous magma, together with ſome long brown cryſtals. The acetit of iron has a ſtyptic and ſweetiſh taſte; is decompoſed by fire, which drives off its acid; attracts the moiſture of the air, and is decompoſed in diſtilled water. When heated till it no longer emits a ſmell of vinegar, it leaves a yellowiſh oxyd attracted by the load-ſtone. The acetous ſolution of iron affords a very black ink with nut-galls, and may be ſucceſsfully uſed in dying. The alkaline Pruſſiats precipitate a very bright Pruſſian blue. The black, yellow, and brown, oxyds of iron, the native carbonat of iron, or the ſparry iron ore, afford ſolutions with vinegar of a very fine red colour.

Acetous acid diſſolves copper with very great facility, and by the aſſiſtance of heat it gradually aſſumes a green colour. But this acid acts more readily on this metal when already oxydated by vinegar, and converted into the ſubſtance called *verdigris*. Verdigris is prepared, according to the improved method of Chaptal, (*Ann. de Chem.* tom. 25.) as follows: Put the expreſſed huſks of grapes in tubs to ferment, giving them as much air as poſſible, by moving them about with the hands; when the heat of fermentation begins to ſlacken, put them in layers, between plates of copper, in earthen veſſels prepared for the purpoſe. At the end of ten, twelve, or fourteen, days, theſe plates will be covered with ſmall ſilky cryſtals; they are then piled together on ſticks in a loft. They are left to themſelves for three or four days, then dipped in water, and replaced. This immerſion and drying is to be repeated once a-week for ſix or eight weeks: then the verdigris is ſcraped off from both ſides of the copper with a wooden ſpatula.

Verdigris readily diſſolves in acetous acid or vinegar; the ſolution is of a beautiful green colour, affording cryſtals, called *verdet*, or *cryſtals of Venus*, properly acetit of copper. Chaptal directs to diſſolve the verdigris in acetous acid, to evaporate the ſolution to a pellicle, and then let it cool to obtain the cryſtals. The ſame chemiſt endeavoured to ſimplify the operation, by oxydating the copper in the cheapeſt manner, and preſenting it in that ſtate to the acetous acid; he particularly uſed the oxygenated muriatic acid. At length he propoſed a method, at once ſimple, ingenious, and cheap, which conſiſts in mixing a ſolution of ſulphat of copper with a ſolution of acetit of lead: there is immediately an exchange of baſe; and the acetit of copper, which floats over the precipitated ſulphat of lead, requires only to be concentrated by evaporation to furniſh the cryſtals of verdet.

The verdet or acetit of copper has a ſtrong taſte, and is a violent poiſon. It is decompoſed by the action of fire, effloreſces in the air, and becomes covered with a powder, whoſe green colour is much paler than that of the ſalt itſelf. It is completely diſſolved in water without decompoſition. Lime-water and alkalis precipitate the oxyd of copper. When this ſalt is pulverized and diſtilled in an earthen or glaſs retort, a fluid is obtained at firſt pale and ſcarcely acid; but affords afterwards one ſo ſtrong, as to reſemble the concentrated mineral acids. The receiver muſt be changed during the operation, in order that the phlegm and the acid may be had ſeparate; the latter is called *radical vinegar*, or *acetic acid*. It has a green colour, ariſing from a certain quantity of the oxyd of copper which comes over. When the diſtillation ceaſes, and the bottom of the retort is red hot, the reſidue is a brown copper-coloured powder, blackened by carbon.

Peres has another proceſs for obtaining this acid. Take a bit of verdigris, and ſprinkle it with good vinegar till all the oxyd of copper is diſſolved; then reduce it to powder, and put it into a retort with twice the quantity of concentrated ſulphuric acid; diſtil with a gentle heat, and vapours of acetic acid will preſently ariſe, which muſt be

be collected in the receiver. The residue, washed, and evaporated, furnishes crystals of sulphat of copper.

Acetic acid, or radical vinegar, has so strong and penetrating a smell, that it is impossible to support it for any length of time; its causticity is such, that it corrodes and burns the skin, and it is extremely volatile and inflammable. When heated with contact of air, the rapidity with which it burns is the greater the more highly it is rectified. This experiment has induced chemists to believe, that vinegar is an acid combined with an alcohol; it may, perhaps, be considered as a kind of natural ether. This notion is rendered probable by the penetrating and agreeable smell emitted by the first portions of this acid in distillation. Acetic acid evaporates entirely when exposed to the air; it unites to water with much heat. This acid was formerly regarded as acetous acid with a greater quantity of oxygen; but late experiments have fixed the ideas of chemists on this head. Peres was the first who asserted that the acetic acid was not acetous acid with an excess of oxygen: his experiments convinced him that the acetic acid was nothing but acetous acid much concentrated and deprived of the greater part of its carbon.

About the same time, Adet published a very interesting paper on the same subject, but drawing conclusions somewhat different from those of Peres. He distilled acetit of copper with the hydrargyro-pneumatic apparatus: besides the usual products, he collected $\frac{33}{288}$ of gas. Then examining each of the products separately and attentively, he found that the brown mass remaining in the retort was a mixture of carbon and brown oxyd of copper, containing eight parts of oxygen; which convinced him, that more than seventeen parts of oxygen has been taken from this oxyd, which ought to be found again in the liquid or gaseous products. The elastic fluids which he collected, were composed of 10·805 parts of hydrogen gas, and 22·686 of carbonic acid, which last was made up of 16·297 parts of oxygen, and 6·339 of carbon; the oxygen, of which the green oxyd of copper was deprived, is therefore found, except 1·048, in the acid gas. This convinced the author, that the acetous acid had not taken up oxygen to convert itself into acetous acid. This experiment, and many others, made Adet conclude, 1. That the acid of vinegar, as it does not absorb oxygen in its successive combinations with metallic oxyds, cannot furnish two different acids. 2. That it exists always in the highest degree of oxygenation of which it is capable; consequently that it is always in the state of acetic acid. 3. That there is no acetous acid, unless under that denomination are included the tartareous, oxalic, and malic, acids, which, by absorbing oxygen, pass to the state of acetic acid. 4. That the only difference which exists between the acetic acid extracted from the acetat of copper, and that drawn from vinegar, arises from the smaller quantity of water contained in the first.

Since Adet's paper appeared, Chaptal has made other experiments, the results of which come much nearer to the opinion of Peres. He has demonstrated very clearly, that there is a difference between the acetous and acetic acids, and that this difference is not merely in the quantity of water they respectively contain, but that the acetic acid contains a smaller proportion of carbon than the acetous.

In order to bring Adet's hypotheses to the test of experiment, Chaptal reduced the acetic acid to the same degree of specific gravity with the acetous acid, by adding to it a quantity of distilled water. The smell and taste of the two acids were still very different; and the action of the acetic acid on metallic oxyds was more speedy and more energetic than that of the acetous. Acetic acid, for instance, dissolved the oxyd of copper, precipitated from the sulphat by potash, and formed with it beautiful crystals on cooling. The acetous acid, with the same oxyd, acquired merely a bluish green colour, and a green and saline crust was precipitated on the side of the vessel containing the liquor. Eleven parts of acetic acid require for saturation 6·98 of pure potash, while the same quantity of acetous acid require only 5·73.

When sulphuric acid was added to equal parts of acetic and acetous acids, of the same degree of concentration, a very considerable degree of heat was produced. The mixture with the acetic acid appeared at first of a pale yellow colour, while in the acetous no change was produced. The mixture with the acetous acid boiled sooner than the other; and, after the evaporation of about one-third, it assumed the tinge of very deep coloured wine. The mixture with the acetic acid was much paler. During distillation much sulphureous acid was disengaged, and at the end of the operation the residues had lost their colour, and consisted merely of concentrated sulphuric acid. The acetous acid appeared to Chaptal to be brought to the state of acetic, by its decarbonization in the retort. One hundred parts of potash were saturated with each of the two acids, and the salts which they formed subjected to distillation in a retort. By this process, residues of a black colour were obtained. The acetat afforded seventeen parts of its weight of carbon, and the acetit only thirteen. There is therefore more carbon in the acetous than in the acetic acid. Similar phenomena take place in the distillation of the acetat of copper; the acetous acid is deprived of its superabundant carbon; one part of this carbon combines with the oxygen of the copper, and forms the carbonic acid, which is disengaged, while the other remains in combination with the oxyd itself. The acetous acid deprived in this manner of its carbon, passes over in the state of acetic acid. Metallic oxyds, and some acids, seem to be the only substances capable of effecting this decomposition. From these, and other experiments, Chaptal concludes: 1. That the difference between the acetous and acetic acids depends on the different proportions of carbon which they contain. 2. That the acid is in the state of acetous acid in metallic salts; and, 3. That it passes to the state of the acetic, only by being deprived of a portion of its carbon. *An. de Chem.* tom. xxviii. p. 113.

The acetic acid, combined with earths, alkalis, and metals, forms different salts from those of the acetous acid; they are called *acetats of potash, soda, mercury, zink,* &c. Lassone has shewn, that the ammoniacal salt formed by radical vinegar, or the acetic acid, is very different from that formed by the common acetous acid, and called *spirit of Mindererus*. Although we do not possess a sufficient knowledge of the properties of all the acetats, yet their form, taste, solubility, &c. sufficiently shew that they really differ from the acetits. The Marquis de Courtanvaux, has shewn, that it is only the last portion of the acetic acid obtained by distillation from crystals of verdigris which is inflammable; and that it likewise has the property of being congealed by cold. This last portion, when rectified, crystallized in the receiver in large plates and needles, and did not become fluid at a less heat than about sixty-two degrees of Fahrenheit. In this property, likewise, it resembles the oxygenated muriatic acid.

The acetic acid is given to persons to smell to in fainting-fits. For more commodious use, very small crystals of sulphat of potash are put into a bottle, and sprinkled with acetic acid: this is improperly called volatile salt of vinegar.

Acetic acid decomposes alcohol, and forms ether with the same facility as the mineral acids. For this purpose, acetic acid is poured on an equal quantity of alcohol in a retort. A considerable degree of heat is excited. The retort is then placed in a sand-bath, with two receivers fitted on, the outer being plunged in cold water or pounded ice. The mixture being quickly brought to ebullition, a dephlegmatic alcohol passes first, afterwards the ether; and, lastly, an acid, which is stronger as the distillation advances:

advances: a brown mass, considerably resembling a resin, remains in the retort.

The acetic ether must be rectified by a gentle heat with potash. This ether has a very agreeable smell, peculiar to itself; it neither reddens nor greens the blue vegetable colours; it rather makes paper stained with turnsole darker. Poured on the back of the hand, it evaporates instantly, leaving no humidity on the skin, but a degree of softness. In a long narrow bottle with an equal quantity of water, it will swim on the surface in the proportion of four sevenths; that is to say, three sevenths of its volume combine with the water, and disappear. This ether loses none of its properties by age.

The acetous acid, or common vinegar, assisted by heat, dissolves the precipitate of gold made from oxygenated muriatic acid by adding a fixed alkali. This acetous solution of gold precipitated by ammoniac affords fulminating gold, as Bergman has shewn. Vinegar does not act on platina or silver while they are in the metallic state, but it dissolves their oxyds.

Vinegar combines with many of the immediate principles of vegetables. It dissolves extracts, mucilages, and essential salts; unites with aroma, and is considered as the proper solvent of gum resins. It has even, after a certain length of time in the way of distillation, a considerable action on fat oils, which it converts into a saponaceous state. But the combination of vinegar with vegetable substances has been by no means accurately examined

This acid is used to extract some of the vegetable principles, more especially that of smell; and vinegars of different nature, either simple or compound, are prepared for medical use. The vinegars of squills, colchicum, &c. afford an example of the first; the theriacal vinegar, and the vinegar of the four thieves, are of the second kind. These medicines are prepared by maceration and digestion continued for several days. As the acid is volatile, it is distilled from aromatic plants, whose odorant principle it takes up; the distilled vinegar of lavender, used as a perfume, is of this kind; these liquors are in general less agreeable than spirituous distilled waters.

Vinegar is much used, as to season food. It is likewise of excellent use in medicine, as a refreshing and antiseptic fluid. A syrup is made with sugar, which is given with great success in burning or putrid fevers, &c. This acid, externally applied, is astringent and bracing. All its combinations are likewise applied to medical uses. The acetit of potash and of soda, which are known by the names of *terra foliata tartari*, and *mineral acetous salt*, are powerful deobstruent and aperient remedies; they are administered in the dose of from half a drachm to a drachm. The spirit of Mindererus, or solution of ammoniacal acetit, taken in the dose of a few drops in a proper liquid, is aperient, diuretic, cordial, antiseptic, &c. It often succeeds in the leucophlegmatia, or swelling of the external parts of the body. The acetit of mercury, or mercurial terra foliata, is an excellent antivenereal; it is the principal ingredient in Keyser's pills. The extract of Saturn, vinegar of Saturn, and the vegeto-mineral water, are applied externally as deficcatives. These medicines, being strongly repellent, ought to be administered with great caution, especially when applied to parts which are ulcerated or without skin. Boerhaave mentions several young women attacked with consumptions, in consequence of the external use of preparations of lead.

Ceruse enters into the composition of drying unguents and plasters, and verdigris is a component part of several collyria and unguents. Acetic acid, or radical vinegar, is used as a very powerful stimulant to be respired by such as fall into fainting fits. For the convenient use of this remedy, a certain quantity is poured on sulphat of potash grossly powdered, which is kept in a well-closed bottle; this medicine is universally known by the name of *salt of vinegar*. Acetic ether has not yet been applied to any use; neither is it known whether it has any peculiar virtues, differing from those of other ethers.

PUTRID FERMENTATION OF VEGETABLES.

All the vegetable substances, which have passed the vinous and acid fermentation, are susceptible of a third intestine commotion, by which they are changed; this is called the putrid fermentation. Stahl, and several other chemists, have thought, that this kind of fermentation is merely a consequence of the two preceding, or rather that these three phenomena depend on a single process, or motion, which tends to destroy the texture of solid substances, and to change the properties of fluids. It is true, in fact, that if certain vegetable substances be left to themselves, they pass through the three fermentations successively, and without interruption. For example; all saccharine matters, dissolved in a certain quantity of water, and exposed to a degree of heat of about sixty or eighty degrees, afford, first wine, afterwards vinegar, and at last the acid character is destroyed; they putrify, lose all their volatile principles, and become dry, insipid, and earthy. But it must be observed, that a great number of vegetable substances do not pass through these three kinds of fermentation, at least as far as sense can distinguish. Insipid mucilages, and solutions of gum in water, become sour, without exhibiting any appearance of wine; and the glutinous matter appears to pass immediately to putrefaction, without previously becoming acid. It therefore appears, that though these three fermentations succeed each other in many of the vegetable principles, there are, nevertheless, many others which are capable of the two last, without the foregoing, or even of putrefying, without exhibiting previous signs of acidity. These last participate of the nature of animal substances, and afford ammoniac by the action of heat, and azotic gas by the nitric acid. It appears to be from this character, that the vegeto-animal substances putrify so readily.

The intestine motion which changes the nature of vegetable matters, and reduces them to their elements, requires the following conditions. Humidity, or the presence of water, is one of the most necessary; dry and solid vegetables, such as wood, are not at all changed, while they remain in that state; but if they be moistened, and their fibres separated, the intestine motion soon commences: water, therefore, appears to be one of the causes of putrefaction; and we shall see, in the animal kingdom, that the decomposition of this liquid appears to produce fermentation. Heat is not less necessary. Cold, or the temperature of ice, not only opposes this spontaneous destruction, but retards its progress, and in some measure restores the former state of substances which have begun to change. The degree of heat necessary to putrefaction, is much less than that which maintains the vinous and acid fermentation, since it require no more than about forty-five degrees of temperature; but a stronger degree of heat is more favourable to this process, provided it be not so strong as to volatilize all the humidity, and entirely to dry the substances which it putrefies. Access of air is a circumstance which singularly promotes putrefaction, since vegetable substances are very well preserved in a vacuum. This preservation, however, has its limits; and the contact of air does not appear to be indispensable for carrying on putrefaction, like the two conditions before mentioned.

The putrefaction of vetables has its peculiar phenomena. Vegetable fluids, which putrefy, become turbid, lose their colour, and deposit different sediments; bubbles rise to the surface, and mouldiness appears at the beginning. Vegetable matters, simply moistened, and soft, exhibit the same phenomena; the commotion is never so great as in the vinous and acetous fermentations. The bulk of the matter which putrefies does not appear to increase, neither does its temperature rise; but

but the most important phenomena is the change of smell, and the volatilization of an acrid penetrating urinous principle, similar to ammoniac, and which, on examination, is found to be that substance. Hence the putrefactive fermentation has been distinguished by the name of the alkaline fermentation, and the ammoniac has been considered as its product. The penetrating smell flies off by degrees, and is succeeded by a nauseous faint smell, not easily described. The decomposition is then at its height; the putrefying vegetable matter is then very soft, or fluid, like a syrup; it experiences a great number of successive modifications in the odorant principle which exhales. Lastly, It dries, its disagreeable smell is dissipated by degrees, and nothing remains but a blackish, and, as it were, coally residue, known by the name of earth, *humus vegetabilis*, in which nothing is found but certain saline and earthy substances. Such is the order of the phenomena observed in the spontaneous decomposition of vegetables which putrefy: but this decomposition, carried to that point in which bodies are reduced to their saline or earthy skeleton, requires a very long time; and it may even be added, that it has not yet been properly observed by any person. This reproach, which is cast on chemists and philosophers for their inattention to animal matters, is much more deserved with regard to vegetable substances. No philosopher has yet undertaken to observe the complete putrefaction of these last, though many have begun to describe the phenomena which take place in that of animal matters. We may therefore conclude our detail of the spontaneous and natural analysis of vegetables, by adding, simply, that the short account we have given shews, that vegetable putrefaction attenuates, volatilizes, and destroys their humours, and reduces them to their earthy state. That nothing is yet certainly known concerning the phenomena and limits of this kind of putrefaction, which requires to be properly distinguished from that of animal matters. Lastly, As this fermentation is much more evident, and has been better observed, in the fluids and solids of animal substances, the detail we shall enter into, respecting these last, will complete our sketch of the known facts relating to putrefaction.

Of ANIMAL SUBSTANCES.

Animal substances are distinguished from vegetable, by their texture, appearance, composition, &c. Their most remarkable differences are, 1. The power of loco-motion in animals. 2. The irritability of all their organs. 3. Sensation arising from the brain.

Generic Characters. I. A fresh bone, in water, by the action of fire, in a retort, yields, 1. A heavy fetid oil, forming soap with alkalis. 2. Carbonic acid gas. 3 Carbonated hydrogen gas, of an insupportably fetid odour. 4. A plentiful volatile oil. 5. A concrete salt, sticking to the sides of the retort, which is carbonat of ammoniac; a plentiful residuum, very difficult of solution, which is calcareous phosphat.

II. All animal substances pass to the putrid fermentation: they yield ammoniac, nitric acid, a gas of a dangerous nature, very hurtful to miners, producing disorders in the skin, and putrid fevers; from this decomposition arise jail-distempers, &c. If the gas which is disengaged is loaded with sulphur, it is called sulphurated hydrogen gas; if with carbon, it is carbonated hydrogen gas; if phosphorus, phosphorated hydrogen gas.

III. Alkalis dissolve all animal substances; they disengage ammoniac. With alkalis, an oil is obtained which did not exist before, but is formed during the operation. Chaptal availed himself of this property to fabricate soap from wool. He observed during this process, that heat disengaged ammoniac formed by a part of the hydrogen and azot. The residue, deprived of azot in the proportion of hydrogen, inclines to the oily state, which is only the combination of hydrogen with carbon. What passes in this operation is the same as the action of blue-stone in a wound: ammoniac is formed and disengaged, and the escar approaches to the oily state.

IV. Sulphuric acid carbonises animal substances, precipitates the carbon, and also separates ammoniac from it.

V. Nitric acid acts upon them in a brisk and rapid manner; it disengages azot, and turns them yellow, afterwards red. For a residuum, there is Prussic acid, ammoniac, two or three vegetable acids, and a fat oil formed from the animal substance.

VI. Azot is another general and distinguishing character of animal substances.

Animal matters consist of liquids and solids, which make up their texture. Liquids circulate in the vessels interposed in the texture of the solids. Liquids are distinguished into recrementive, excrementive, and compound or recremento-excrementive. *Recrementive*, as blood, serving to the nourishment of animals, not parting through the body but through disease. *Excrementive*, that which separates from the body, as urine. *Recremento-excrementive*, as bile, which is separated from the blood to be mixed with it again; and milk, which is excrementive to the mother, alimentary to the child. The constituent parts of animals are divided into liquids, soft parts, and solids.

Of BLOOD.

We are to consider blood as a liquid, circulating in the arteries and veins, by means of the heart, which is the *primum mobile*.

Blood is redder in those animals which have capacious lungs, and inspire a great deal of air; it is blacker in those which live in the water. The changes which the blood seems to undergo in various disorders, must be attributed to the lymphatic system, or the absorbent nature of its vessels; for the nature of the blood itself is not altered. Its taste is insipid with a slight smell of garlic; it thickens some time after being excluded from the body. Its temperature is from 28 to 32° of Reaumur. It may be regarded under six heads. 1. According to the part it is taken from. 2. The age of the subject. 3. The sex. 4. The temperament. 5. Different states of disease. 6. The different classes of animals.

The experiments on blood are generally made from that of oxen or of men, which agree in some respects; that of birds and fishes is different. It may be considered also, 1. In a mass, as arterial blood. 2. Separated, as venous blood. 3. Both these mixed together. 4. Its elements. In blood we distinguish, 1. The coagulum, or colouring part. 2. The serum. 3. The fibrous part. If venous blood be left in the vessel in which it was received, a part of it sticks like glue to the sides of the vessel. To ascertain the nature of blood, it is to be examined, 1. By heat. 2. By acids. 3. By alkalis.

The blood, while hot, and in motion, remains constantly fluid and red; when it cools at rest it takes the form of a solid mass, which gradually and spontaneously separates into two parts; the one red, which floats above, whose colour becomes deeper, and which remains concrete till it is altered by putrefaction, is called the *coagulum*; the other, which occupies the lower part of the vessel, is of a yellow greenish colour, and adhesive; it is called *serum*, or *lymph*. By continuing exposed to the air, it becomes purple at the surface, and of a darker colour below. Exposed in a very wide flat-bottomed vessel, it thickens, changes colour, and becomes concrete in dried leaves like hyacinth. Combined with air, it takes more room in these vessels, as may be proved by the air-pump. Drawn from a vein at 24°, it solidifies as at a lower temperature.

Exposed to a gentle heat, it changes colour, coagulates, looks like liver, becomes carbonated, and dries, giving out a liquid with the smell of amber; this water is formed in the drying. In a water-bath, at a temperature

ture below boiling water, it coagulates; and this coagulum, pressed and calcined, shews to the magnetical needle unequivocal marks that it contains iron.

By distillation with a naked fire, in closed vessels with the pneumatic apparatus, blood affords, 1. Prussiat of ammoniac. 2. A very fetid thick oil. 3. Sulphurated hydrogen gas, fetid. 4. Carbonated hydrogen gas. 5. The carbon which remains is in bright crystals, resembling carbure of iron; it contains, 6. Phosphat of soda. 7. Phosphat of lime. 8. Carbonat of soda. 9. Iron. This coal is very difficult to reduce; its ashes are of a red colour; the iron may be separated by washing, or by the magnet. The presence of iron in blood may be proved by only mixing with it a little of the nut-galls in powder; in less than forty-eight hours the mixture becomes perfectly black.

Blood may be calcined in a crucible; in which case only fixed products are obtained. Distil dried blood, and boil the liquid product with quicklime; a saline calcareous combination is produced. Decompose this salt with phosphoric or sulphuric acid, by distillation in a retort; and an acid comes over, discovered by Berthollet, and called by him *zoonic acid*.

Fresh blood mixed with oxygen, acquires a colour more lively and red. Mixed with hydrogen gas, it inclines to a brown colour, becomes dull, and at length dark brown. Blood unites with water in all proportions, dissolves therein very well, communicating a beautiful purple colour. This mixture, when heated, deposits flocks, and the blood coagulates. Mixed with two parts of water, and evaporated, it forms a liquor similar to bile, but not of the same properties.

The metallic oxyds, of whatever description, all thicken blood. Acids immediately coagulate it, and change its colour, which proves that no free acid existed previously in the blood; for, inject an acid into the vein of a living animal, and as soon as the vein is tied up, the animal dies. By filtration, and evaporating of the filtrated liquor to dryness by a gentle fire, and subsequent lixiviation of this residual matter, such neutral salts are obtained, as soda forms with each acid; any of which may be indiscriminately used. Neutral salts prevent the coagulation of the blood.

Blood is dissolved by caustic alkalis; on which principle depends the mode of forming Prussian blue, or Prussiat of iron, as described under our investigation of that metal, p. 300.

Of the Serum.—Hitherto we have spoken of blood in general, or collectively; we must now speak of its constituent parts. The serous part, though susceptible of much variety, is, in general, a liquid thicker than water; so that, in some cases, it resembles the white of an egg, at other times it may take the consistence of a syrup, but most commonly it is like a mucilage, or gum dissolved in water.

According to the experiments of Deyeux, if serum be exposed to a gentle heat, a greyish brown scum is found at the surface of the vessel; this is distinct from another which lies at the bottom, and is thicker. That which occupies the upper part is yellow, transparent, and tremulous; this is the *gelatin*; the lower part is concrete, whiter, and more firm, and is the *albumen*. Hence it appears that the serum contains two distinct parts, which are obtained by evaporation, the *albumen*, and the *gelatin*. If serum be exposed to 60° of heat, the gelatin remains in solution with the albumen, which soon coagulates. By a stronger heat, it dries; the hydrogen is set free, and forms a water with the oxygen of the atmosphere; the water thus produced is reckoned to be one-seventh part of the bulk of the serum. Then a solid mass remains, of a crystalline appearance and hyacinth colour, which affords, 1. Carbonated hydrogen gas. 2. Sulphurated fetid hydrogen gas. 3. Prussiat of ammoniac. The residuary coal contains, carbonats of soda and of lime, muriat of soda, phosphats of soda and lime, but no iron. The serum presently changes its appearance by exposure to the air: it assumes a yellow colour, then red, and afterwards green: it gives out a very disagreeable smell, and then affords ammoniacal carbonat: it inclines, therefore, to putrefaction.

Serum unites with water in all proportions: with aerated water it changes its nature, but not with common water. Mixed with the former, it becomes red, and precipitates white flocks; with the latter, it loses its transparency. Mix ten parts of water with one of serum; a membrane is formed on the surface of the liquor; by evaporation, gelatin is separated. A mixture of two parts of water, with one of serum, becomes solid by the action of heat. If lime-water be poured into water containing a small quantity of serum, calcareous phosphat is precipitated. Serum also undergoes an alteration by being combined with oxygen gas.

Deyeux and Parmentier have proved that serum contains sulphur; by heating albumen in a silver saucepan, they found that the silver lost its metallic brightness. These chemists even succeeded in separating the sulphur; it is only necessary to triturate in a glass mortar some of the albumen, with a few drops of a well-saturated solution of silver; leave the mixture to digest for a time; then warm it, after diluting it a little with water; and some greyish filaments will appear, which become black by degrees, and exhibit at the bottom of the vessel a precipitate from which sulphur may be extracted. Lastly, If pure potash be boiled with the albumen and water, a liquid is obtained, which, strained and mixed with acetic acid, gives out an hepatic odour, capable of changing the colour and brightness of silver.

If serum be mixed with an oxyd which readily parts with its oxygen, as mercury, for instance, it takes up the oxygen, and the serum becomes firm and hard, as if baked; but the mixture must be made in the cold. Acids also give a consistence to serum, by coagulating it. This mixture being filtrated, and the fluid evaporated, the neutral salt, which the acid made use of forms with soda, is obtained; which proves that this last salt existed in a disengaged state, and possessed all its properties in the serum. The very caustic alkalis, uncombined with water, coagulate the albumen; but ammoniac dissolves and decomposes it. If weakened alkalis be then added, they dissolve the thickened albumen. Alkalis in general render the serum more fluid by a kind of solution.

If serum, newly separated from the blood, be mixed with alcohol, the mixture soon becomes turbid, and the albumen is separated. If a very pure alkali be poured over the matter thus separated, it dissolves immediately, and the water with which it may be mixed, will become transparent.

Serum does not decompose the calcareous and albumenous neutral salts; but it decomposes the metallic salts. If a nitric solution of mercury be poured into the serum, there is a rose-coloured precipitate; Fourcroy attributes this to the calcareous phosphat contained in the serum.

Of the Coagulum, or Clot.—Parmentier and Deyeux chemically examined the clot of blood. They remark, that it preserves its smell and consistence for three, four, or five, days, in a vessel not very wide, and set in a cool place; for in warm air it soon softens and putrefies; its smell then changes, and becomes very disagreeable. If the clot be separated from the serum, it may be preserved, and even entirely dried, without alteration, especially if kept in a warm place: its colour, in that case, is of a very deep red, with a kind of semi-transparency at the edges. If the clot, separated from the serum, be left to drain for an hour, by then heating it over a water-bath, it takes a firmer consistence, and the liquor which drops differs in no respect from serum; it contains as much albumen as that from which it was previously separated.

Clot of blood, thrown into a certain quantity of boiling water, gives it a milky appearance; a scum rises at the

the same time to the surface, proceeding from a portion of dissolved albumen; the clot then assumes a brown colour, and firmer consistence. Put in digestion with alcohol, it becomes harder also; but the serosity which is separated no longer contains albumen. The alcohol acquires merely a lemon colour, provided it be perfectly dephlegmated: mixture with water takes nothing from its transparency. Water mixed with clot of blood divides it, becomes red, and remains clear for several days; it becomes turbid by degrees, and exhibits membranous pellicles.

Acids act in various ways upon clot of blood; but they all tend to make it more concrete, because they coagulate the albumen still contained in the serum which adheres. The nitric acid, however, must be excepted, which seems to dissolve it; the phosphoric and sulphuric acids change it to a black colour. After having been mixed with acids, it is not so soluble in water as before; it undergoes division only, and makes the water thick.

Clot of blood is dissolved by the carbonats of potash and ammoniac; and, when deprived of their carbonic acid, they become of a dark red colour. This kind of solution may be preserved a long time without alteration; but the membranous pellicles before mentioned can no longer be separated; it seems as if the alkalis, by combining with them, had given them a degree of solubility. Clot of blood, by distillation in a retort, affords the same products as animal substances; and the coal which remains contains iron, fixed alkali, &c.

Colouring Part of Blood.—The colouring part presents different phenomena from either the albumen, or the fibrin. It is of importance to know why the colouring matter rather unites with the fibrin than with the serum; it is because this is what first tends to coagulate when at rest, and the oxygen fixes with this, rather than with the serum, from which it easily separates. The colouring part seems to be the richest in the constitution of the blood; and it exhibits various phenomena, in its circulation in different regions of the body. Exposed to the contact of air, the colouring matter absorbs oxygen, carbon, and hydrogen. It becomes brown from the action of hydrogen gas. With carbonic acid gas, in a well-corked bottle, the liquor becomes of a very dark blue; with oxygen gas, it takes immediately a beautiful red purple. If the clot of blood be put in contact with oxygen gas, the latter is absorbed, and carbonic acid is formed. This experiment is easily made, by mixing oxyd of mercury with colouring matter: the mercury passes to the metallic state, and the liquor becomes of the colour of vermillion. Exposed to heat at a low temperature, or in balneum mariæ, a thick matter of a dark red colour is soon perceived to float in a liquid, which had hitherto held it in solution. Separate this matter by filtration, and then press it: it crumbles easily between the fingers, and falls to powder; it has neither smell nor taste; by exposure to the air, or to a gentle heat, it becomes black. Parmentier and Deyeux are of opinion, that this substance is the albumen of the serum, combined with the colouring matter.

The colouring matter, distilled to dryness in a retort, leaves a solid mass, whence may be disengaged carbonated hydrogen gas, and sulphurated hydrogen gas. During the operation, the products are, a fetid oil, and Prussiat of ammoniac; the coal contains, carbonats of soda and lime, muriat of soda, phosphats of soda and lime, and iron. Pure colouring matter contains, moreover, albumen, and some soda not free, but in combination with albumen, gelatin, and iron.

Of the Fibrin.—If fresh-drawn blood be agitated, and stirred about with pieces of wood, minute white flocks will be found sticking to them: this is fibrin, or the fibrous part of blood. This fibrous matter may be separated from the clot by washing. Put the clot in a hair sieve; pour water over it in a thin stream; rub and wash till the water has taken away all the colouring matter; what remains is the fibrin, which is white. Or, inclose the clot in a cloth, and work it between the hands in a tub of water; the soluble part separates by degrees; the residue is the fibrin. This substance is of a peculiar texture: by the solar microscope, no red globules are perceptible, only a kind of minute filaments formed into branches. It is insipid, and contains no saline matters.

The action of fire distinguishes its nature from the albumen, which burns and boils up without noise; but fibrin shrinks up and fries like parchment. By distillation in a strong heat, it gives out a thick phlegm, which sticks to the sides of the vessel, catching the flocks which swim about in the liquor; next comes over a thick fetid oil, and at the same time a fetid gas, which adheres very strongly to woollen rags; carbonat of ammoniac is obtained also unsaturated with acid, and several other salts, at present little known. Its coal is dense, of a crystalline form, bright, solid, resembling carbure of iron, difficult to burn, furnishing calcareous phosphat, and pure carbon.

Fibrin, exposed to damp air, swells and puffs up, and has a smell which exhibits the beginning of putrefaction; it is faint and nauseous. In a dry air it dries up. Put into a vessel with a little water, and left for a considerable time, it is converted into a soft pulpy matter like fat. Soaked a long while in a considerable quantity of water, it rots. Boiling water only hardens it, depositing a little gelatin; but it can neither be converted into gelatin, nor into glue. It is not changed by combustible bodies: charcoal, phosphorus, sulphur, &c. have no action upon it. It takes no oxygen from the metallic oxyds.

With weak nitric acid, at 20° of heat, azot is produced; this is then dissolved with effervescence, and nitrous gas is disengaged; the residue furnishes oxalic acid, a little malic acid, and some acetous acid. At the surface of the vessel there is a fatty substance, similar to what floats on the nitric acid. The muriatic, acetous, and acetic, acids, dissolve fibrin; water and alkalis precipitate the fibrous part united with acids, but no longer with the same properties.

The concentrated sulphuric acid acts upon fibrin, by changing its colour to yellow, brown, and at length to black; it thickens it also. The sulphuric acid does not undergo decomposition, unless it was very weak; in that case it passes to the state of sulphureous acid; water is formed with the oxygen which has been separated from the sulphuric acid, and the hydrogen of the fibrin, which is disengaged during the combination of the fibrin with the acid; carbon is precipitated, and the sulphuric acid remains weaker. Acetous acid and ammoniac are likewise produced; which proves that fibrin contains hydrogen, oxygen, carbon, and azot.

Caustic alkalis dissolve fibrin with violence, when mixed with water. By distillation, an ammoniacal substance is obtained, as hydrogen, oxygen, azot, and carbon.

Of MILK.

This is a liquid peculiar to females, whose principal use is to nourish the young animal. The human race, quadrupeds, and cetaceous animals, are the only creatures that furnish milk: all others are destitute of the organs which secrete this fluid. In the changes which milk undergoes, several causes are to be considered: the action of heat, of air, of acids, oxyds, &c. Milk, exposed to the fire, swells up, rises in a mass, and a pellicle is formed on its surface, which is renewed as often as it is removed, till all the caseous or cheesy part is separated; for, according to Parmentier and Deyeux, it is the caseous part which forms these pellicles. Distilled with a very gentle heat, the first product is an insipid inodorous water; after some time, this water grows turbid, and becomes putrid, with a smell of ammoniac; it is usually about a seventh or an eighth part: then the milk thickens, and collects into a viscous mass. When it has boiled, it is always thicker, because it has lost a little water; if it has not been

been quite coagulated, it keeps ſweet the longer; in the contrary caſe it quickly becomes ſour. With a heat ſomewhat ſtronger, on a water-bath, in a matraſs, it becomes like ſolid pap, or thick milk: this, with the addition of ſugar, orange-flower, almonds, and cinamon, forms an extract known by the name of *franchipane*. This extract, expoſed to a naked fire in a retort, affords a fat oil, with a fetid odour, carbonated hydrogen, and carbonic acid gas; the reſiduary coal contains, carbonats of potaſh and ſoda, muriat of potaſh, and calcareous phoſphat.

Milk, expoſed to the air in wide open veſſels, in order to preſent a large ſurface, becomes covered with *cream*, or the *butyrous matter*, from which butter is made: in this caſe the milk riſes, which proves that it abſorbs oxygen from the air. But, if left too long in contact with air, the ſurface grows yellow and oily, the interior part becomes ſour, and little flocks are ſeen to float in it.

Milk is capable of the vinous fermentation. Put it into an open caſk, agitate it frequently, and it will ferment, grow ſour, and increaſe in bulk; there is a diſengagement of carbonic acid gas, and a vinous liquor is produced. This is the mode uſed by the Tartars to prepare wine from mare's milk; but it is ſaid they add a farinaceous matter to aſſiſt the fermentation.

Several gaſes unite with milk, and coagulate it; as ſulphurated hydrogen gas, carbonated hydrogen gas, and carbonic acid gas. Milk, mixed with ten parts of water, cannot afterwards produce cheeſe. Many ſubſtances have the property of coagulating milk, though they be not acid; as, the plant called curdlemilk, artichoke-flowers, Spaniſh thiſtle, ſugar, extracts, gums, the inner part of a fowl's gizzard, animal gelatin, fiſh-glue, hart's-horn, &c. Acids produce the ſame effects on milk; they immediately coagulate it.

According to Scheele, if a little alcohol be mixed with milk, and the mixture be expoſed to heat in cloſe veſſels, care being taken to let out occaſionally the gas which ariſes during the fermentation, in a month's time the whey will be found converted into vinegar.

Rennet, or the curdled milk found in the ſtomachs of calves, is much uſed, eſpecially in the making of cheeſe. By means of this alſo is prepared what is called *whey*. Put a pint of milk into a ſilver or earthen veſſel over hot aſhes, and add two grains by weight of the rennet, diluted in a little water: as the milk heats, it curdles, and the whey or ſerous part ſeparates from the white or caſeous part. When theſe parts appear diſtinct, pour the whole into a cloth: the whey paſſes through into the veſſel beneath, and the curd remains, which is to be left to drain. The whey is always whiter, if it contains a ſmall part of the caſeous matter much divided; but it may be ſeparated, ſo that the whey remains limpid or colourleſs; this is called *clarifying*. Put into a veſſel ſome white of egg, a little of the ſerum, or whey, and a few grains of tartareous acidule in powder; ſtir or whip this mixture with oſier-twigs; then add the reſt of the whey, and place the whole once more on the fire, till it begins to bubble up. The tartareous acidule completes the coagulation of the remaining white part of the milk; the white of egg hardens by boiling, and encloſes the caſeous part. When the whey is clear, filter it through blotting-paper; the ſtrained liquor is perfectly limpid, and of a greeniſh caſt; this is *clarified whey*.

Whey has a mild ſweetiſh taſte; it turns ſyrup of violets green. In a gentle heat, it gives out water in the proportion of about a ſeventh or eighth part. It ſtill retains an animal ſubſtance like little flocks, becoming fetid in time; this is albumen. Whey may be evaporated to the conſiſtence of honey; after which it is put into moulds, and dried in the ſun. This is the *ſugar of milk in cakes*; and is diſſolved in water, clarified with whites of eggs, evaporated to the conſiſtence of ſyrup, and cryſtallized in the cold. By this treatment it affords white cryſtals in rhomboidal parallelipipedons; the mother water depoſits yellow and brown cryſtals, which are purified by ſucceſſive ſolutions. Lichtenſtein has examined and analyzed the different ſugars of milk, which are ſold at various prices in Swiſſerland, and has more particularly diſtinguiſhed, 1 The ſweet ſugar of milk, which is of a white colour, obtained from ſweet and purified whey. 2. The aceſcent ſugar of milk, obtained from ſour whey. 3 The ſugar of milk rendered impure by fat ſubſtances; which ſeparate, according to him, in the firſt cryſtallization. 4. Sugar of milk, mixed with oil and common ſalt, which cryſtallizes the laſt. 5. Sugar of milk, mixed with fat matter, common ſalt and ſal-ammoniac. It is adheſive and moiſt, and affords ammoniac on the addition of fixed alkali. 6. Sugar of milk, mixed with all the before-mentioned ſubſtances, and likewiſe with extractive and caſeous matter. This laſt is of the conſiſtence of honey, become rancid, and is acrid and diſagreeable.

Sugar of milk, when very pure, has a ſlightly ſaccharine, faint, and, as it were, earthy taſte; it always loſes by ſucceſſive ſolutions. It is ſoluble in three or four parts of boiling water; and, according to Scheele, Rouelle, and Vulgamoz, it affords the ſame products as ſugar by diſtillation. Rouelle obtained from a pound of this ſalt, by burning it, twenty-four or thirty grains of aſhes; three-fourths of which were muriat of potaſh, and one-fourth carbonat of potaſh. On a red-hot coal, ſugar of milk melts, boils up, emits an odour of caramel, and burns like ſugar. Theſe properties appear to indicate, that this ſalt is capable of affording the oxalic, like ſugar by the nitric acid; and Scheele has ſhown, by his experiments, that it does: but he obſerved, that four parts of ſpirit of nitre is required for this purpoſe; that four ounces of ſugar of milk affords five grains of oxalic acid; and he has alſo diſcovered, that if the reſidues of ſugar of milk be treated by the nitric acid, and filtrated, in order to cryſtallize the oxalic acid by evaporation, a white powder remains on the filter, which he found to be a peculiar acid, we give it the name of *ſaccholactic*. He obſerved, that it poſſeſſes the following properties. It has the form of a white granulated powder; two drachms of this ſalt, very pure, being heated in a glaſs retort, melted, ſwelled up, and became black; a brown ſalt, of a mixed ſmell of benzoin and amber, ſublimed, weighing thirty-five grains; this ſalt was acid, ſoluble in alcohol, more difficultly in water, and burned on charcoal. The receiver contained a liquor of a brown colour, and not of an oily nature; eleven grains of charcoal remained in the retort. Carbonic acid and hydrogen gas were diſengaged during this diſtillation. The ſaccholactic acid is very ſparingly ſoluble in water, one ounce of boiling water diſſolving only ſix grains; one fourth of which was precipitated by cooling. According to Morveau, this acid effervesces with the hot ſolution of carbonat of potaſh. The ſaccholactat of potaſh was obtained, by cooling, which was ſoluble in eight times its weight of hot water, and cryſtallized again by cooling. The ſalt is formed with the ſoda was cryſtallizable, but required no more than five parts of water for its ſolution. This acid combines likewiſe with ammoniac; the neutral ſalt, thus produced, loſes its alkali by heat. With barytes, alumine, magneſia, and lime, it forms ſalts nearly inſoluble. It acts but very feebly on the metals, and forms with their oxyds ſalts of difficult ſolubility. It precipitates the nitrats of mercury, lead, and ſilver, as well as the muriat of lead. Scheele, when he firſt made this diſcovery, ſuppoſed that the white powder, depoſited by the oxalic acid obtained from ſugar of milk by means of the nitric acid, was merely a portion of the calcareous oxalat formed of the lime, which might be contained in that animal ſalt. But he was ſoon undeceived, by pouring a ſmall quantity of pure oxalic acid into a ſolution of ſugar of milk, as the mixture afforded no precipitate. Nevertheleſs, Hermſtadt, who has publiſhed two memoirs in Crell's Chemical Journal, the ſecond of which treats particularly of this acid earth, thinks, notwithſtanding the experiments of Scheele, that it is a compound of oxalic acid, lime, and

and a fat substance. But Morveau, after examining the experiments of this chemist with his usual accuracy, and comparing them with those of Scheele, has shown in the new *Dictionnaire Encyclopedique*, that Hermstadt has not accomplished his undertaking, and that, even from his own results, the discovery of Scheele is rather confirmed than destroyed. Morveau has likewise made several ingenious experiments which confirm this assertion. To these accounts we may add, that the oxalic and saccholactic acids do not exist ready formed in sugar of milk, and that this salt contains only the bases, which take the oxygen or acidifying principle from the nitric acid. We may likewise observe, that subsequent experiments will probably show, that the saccholactic acid is nothing more than a modification of some other vegetable acid; for every circumstance tends to prove, that the principles of whey are derived from the vegetables on which the animals subsist.

The following appears to be the most convenient process for obtaining saccholactic acid. It is given by Boysson, *Mem. Soc. Med.* 1787-8. 619. One ounce of sugar of milk was dissolved in water, and the solution evaporated to two ounces, which were digested for several days in a gentle heat, with nine drachms of nitric acid. When evaporated to the consistence of honey, the mixture was diluted and filtered, the saccholactic acid, which had been formed, remaining in a white powder on the filtering paper. A fresh quantity of nitric acid was added to the filtered liquor, and the former process repeated, till the whole of the sugar of milk was converted into saccholactic and oxalic acids. By this method, one ounce of saccholactic acid, and nine drachms forty-eight grains of oxalic acid, were procured from four ounces of sugar of milk and seventeen ounces of nitric acid.

Whey, when prepared with new milk, contains a saccharine essential salt, but it soon acquires an acid taste, by the establishment of the fermentation. This change is produced by the alteration of a mucilaginous principle, contained in the milk; and it is the developement of this acid which occasions the spontaneous separation of the whey from the other substances contained in milk. It is therefore necessary to examine the acid, which is formed in milk, and constitutes fermented whey. It is a well-known fact, that milk left exposed in a temperature of seventy or eighty degrees, experiences, in a few days, a fermentation which developes an acid, and separates the butter and cheese. The acid, formed by this fermentation, and which is as strong as it will be at the end of twelve or fifteen days, has been examined by Scheele, and is called the *lactic acid*. The following is the process used by Scheele, to obtain it in a state of purity. After having attempted, in vain, to separate the acid by distillation from sour whey, by which he obtained only a small quantity of vinegar, he evaporated the whey to one-eighth, after having filtrated it, to separate all the caseous matter. From this he precipitated the animal earth, by lime water. He then diluted the fluid with three times its weight of water, and separated the lime by the oxalic acid; at the same time taking care that this last acid should not remain disengaged in the solution, which was easily ascertained and prevented, by the addition of successive small portions of lime-water. After evaporating the liquor to the consistence of honey, the sugar of milk, and several other foreign substances, were then separated, by the addition of alcohol, which easily dissolves the lactic acid. Lastly, The decanted solution being distilled, the alcohol passed over, and the pure lactic acid remained in the retort. Scheele has observed following properties in this acid.

When strongly evaporated, it did not afford crystals, but attracted the humidity of the air: by distillation, it afforded an empyreumatic acid, resembling pyrotararous acid; a small quantity of oil, and a mixture of carbonic acid gas, and of carbonated hydrogen gas. With the three alkalis, and also with barytes and lime, it forms deliquescent salts. Its combination with magnesia crystallizes, but likewise attracts the moisture of the air. The greater part of these salts, or *alkaline* and *earthy lactats*, are solubie in alcohol. It does not at all attack cobalt, bismuth, antimony, mercury, silver or gold, even by the heat of ebullition. It dissolves zink and iron, producing hydrogen gas; the first of these salts, called the lactat of zink, crystallizes; the second, or the lactat of iron, forms a brown deliquescent mass. The lactic acid oxydates, and dissolves copper and lead. The lactic solution of the latter metal deposits a small quantity of sulphat of lead, which indicates the presence of a small quantity of sulphuric acid in this animal acid. Lastly, It decomposes the acetit of potash; a property, which, together with most of those here mentioned, denotes that the lactic acid differs from vinegar. Scheele adds, likewise, that a true vinegar may be obtained from milk, by mixing six spoonfuls of alcohol with three pints of milk, and suffering the mixture to ferment in a well-closed vessel. The gas, which is disengaged during the fermentation, must be suffered to escape from time to time; and at the end of a month the milk is changed into good vinegar, which may be strained through a cloth, and preserved in bottles. This celebrated German chemist likewise adds, that milk, in a bottle whose neck is plunged in a vessel filled with the same liquor, and exposed to a heat somewhat stronger than that of summer, undergoes a fermentation which affords a large quantity of elastic fluid. This last fluid displaces the milk, and almost entirely empties the bottle, at the end of two days. The acid produced in this fermentation, which takes place without the contact of air, appears to receive its oxygen, or acidifying base of the air, from the decomposition of the water.

Earths and alkalis have a sensible action on whey. Lime and barytes afford a plentiful precipitate, which is phosphat of lime; with potash there is also phosphat of lime, whence it might be supposed to be contained in it. With acids, the whey thickens, but heat is requisite; sulphats or other salts are produced according to the acid employed, but neither muriats nor phosphats. The oxalic acid demonstrates the presence of lime in whey; phosphats of lime and of soda are obtained. The metallic salts shew that phosphorus is contained in whey. With nitrat of mercury, a precipitate is obtained composed of the nitrat and phosphat of mercury.

Of Cheese.—We have seen that the solid mass, or cream, which rises to the surface of the milk, contains two other principles, cheese and butter. When cheese is prepared for the table, the butter is not separated; it is sweeter and more pleasant. Whether white and soft, or yellow and firm, cheese is a mixture of several substances, which a chemist distinguishes from what is called merely the caseous part. Cheese dried, and put in a proper place to experience a beginning of putrid fermentation, acquires consistence, taste, and colour. There are various sorts of cheese. For making cream-cheese, curdle the milk quickly with rennet, let all the whey be drained from it, then wash it repeatedly in very pure water. The action of a gentle heat hardens it. Distillation on a water-bath extracts an insipid phlegm, which putrefies.

Dried cheese, distilled in a retort, affords an ammoniacal phlegm, a ponderous oil, and much ammoniacal carbonat. Its coal is dense, very difficultly incinerated, and does not afford fixed alkali. When this coal is treated with nitric acid, it is found to contain lime, and the phosphoric acid.

Cheese putrefies in a hot temperature; it swells, emits a nauseous smell, becomes imperfectly fluid, and is covered with a scum, or froth, arising from the disengagement of a very strong-smelling and mephitic gas, which escapes with difficulty from this viscid matter. Cheese is insoluble in cold water; hot water hardens it. Scheele has observed, that, when it has been precipitated by a foreign acid, boiling water dissolves a part. Treated with potash, ammoniac is produced. Alkalis dissolve it in general.

general. La Grange has some experiments on this subject, printed in the 37th vol. of the Journal de Physique. "That which succeeded best," says he, "was to curdle milk by the electric fluid, and then restore it to its pristine state by means of a pure alkali. This milk was as mild, as white, and as creamy, as when drawn from the animal: but to curdle it again, required six times as much acid, or electric fluid, as at first."

The concentrated acids likewise dissolve cheese; nitric acid disengages azotic gas; but the vegetable acids do not sensibly dissolve it. Its solution in the mineral acids is precipitated by the alkalis, which re-dissolve it if added in too great a quantity. The neutral salts, more particularly muriat of soda, retard its putrefaction. Alcohol coagulates it. From all these facts it appears, that cheese is a substance greatly resembling the albumen of the blood.

Of Butter.—The manner of making butter varies according to the materials employed. For good fresh butter, a certain quantity of the serous and caseous matter should be retained. Butter is of a soft consistence, of a yellow more or less inclining to the colour of gold, and of a mild pleasant taste. If butter inclosed in a glass tube be heated, its three parts will be separated, the butyrous or yellow, the serous, and the caseous.

Butter in melting approaches to the state of fat, not of oil, as has been said: its constituent parts are a proof of it. At the same time the albuminous part is separated, and it becomes yellower. It may be coloured by the juice of winter-cherries, carrots, saffron, orcanet, spinage, tincture of violets, &c. Butter melts by a gentle heat; when congealed, it crystallizes and becomes granulated, having a particular taste and smell. If left long upon the fire, its acid it developed. Distilled with a naked fire, hydrogen is disengaged, which, with the oxygen of the atmospheric air forms water. By keeping up the heat, it furnishes a very strong and pungent acid of a penetrating smell; this is *sebacic acid*; a fluid oil, and afterwards a concrete coloured oil of a strong smell, and some carbonated hydrogen gas. The remaining coal is not abundant; it contains very little saline matter; a little alkaline matter and calcareous phosphat may be extracted from it.

Butter soon becomes sour and rancid in a warm air; by washing and shaking it may be in some measure restored, but never completely. The water will afterwards redden the blue vegetable colours. The carbonic acid turns butter of a brown colour. Alkalis dissolve it; and thus very good soaps might be made. Muriat of soda has the property of keeping butter sweet, by absorbing the water from the atmosphere, and preventing it from combining with the butter.

Properties of different Kinds of Milk.—Woman's milk will not furnish butter. The milk of sheep, cows, goats, and women, has a very thick cream. Cream from the milk of women, mares, and asses, never can be made into butter. The caseous matter is scarcely coagulable in sheep's milk, but very easily in that of cows and goats. The serum is very plentiful in the milk of women, mares, and asses; less so in that of cows and goats, and least of all in sheep. The proportions, according to Hoffman, Parmentier, and Deyeux, are as follow: In sheep, 0·15; goats, 0·20; women, 0·27; mares, 0·30; asses, 0·35.

Haller has given the following proportions of the sugar contained in the milk of different animals:

Four ounces of sheep's milk afforded of

Sugar of milk, - - -	35 or 37 grains.
Goat's milk afforded - -	47 — 49
Cow's milk, - - -	53 — 54
Human milk, - - -	58 — 67
Mare's milk, - - -	69 — 70
Ass's milk, - - -	80 — 82

Rouelle has observed, that the whey of cow's milk, from which the sugar of milk has been extracted, takes the form of jelly by cooling; and he consequently admits it to contain gelatinous matter.

Milk is an agreeable food, of considerable use in a great number of cases; it is even one of the most valuable medicines we possess. It corrects the acrid humours in disorders of the skin, and of the articulations. It cicatrises ulcers of a good kind. It may be charged with the aromatic parts of plants, and is then an excellent remedy in the pulmonary consumption. All stomachs, however, do not digest milk. Such persons as are inclined to acidities in the first passages, are usually incommoded by it; and in general it ought to be administered prudently. Milk, rendered medicinal, by causing the animal which gives it to take different substances, is often used with success in various disorders.

The milk of different animals has certain peculiar virtues. That of the human species is mild, of a saccharine taste, and is greatly serviceable in the marasmus. The milk of the ass is successfully used in the pulmonary consumption and the gout; it usually relaxes. Mare's milk resembles that of the ass. Goat's milk is serous, and lightly astringent. Cow's milk is the thickest, the fattest, and the most nourishing; it is likewise the most difficult of digestion, and often requires to be diluted with water, or with some aromatic infusion, especially if it does not easily pass off, or produces costiveness. Milk is likewise used externally, as a softening and emollient remedy. It mitigates pain, ripens gatherings and abscesses, and hastens suppuration. It is applied hot, and enclosed in a bladder on the diseased parts.

Of BILE.

The bile, or gall, is a fluid separated in that glandulous viscera called the liver. The nearer the bile lies to the stomach, the more the animal eats. The bile, when separated, is collected in the gall-bladder, and thence goes to the duodenum. The horse and stag have no gall-bladder; but it is never wanting in birds and fishes: most animals have it, except insects and worms. The bile is of a green colour inclining to yellow, bitter in taste, and of a glutinous, or almost gelatinous, consistence; it pours out like syrup; and by agitation it lathers like soap-water. It will take out spots of grease.

When distilled in the water-bath, it affords a phlegm, which is neither acid nor alkaline, but after a certain time putrefies. This phlegm often exhibits a singular character; it emits an odoriferous smell, of considerable strength, and greatly resembles that of musk or amber. Fourcroy thinks it might be useful in perfumery. When all the water which bile affords in the water-bath has been distilled off, the residue has the form of an extract, more or less dry, and of a deep and brownish green. This extract of bile attracts the humidity of the air, is very tenacious and pitchy, and is totally soluble in water; by distilling it in a retort, it affords a yellowish and alkaline phlegm, an empyreumatic animal oil, much ammoniacal carbonat, and an elastic fluid, consisting of a mixture of carbonic acid and hydrogen gas; after this operation, a coal remains of considerable bulk, and less difficult to incinerate than those we have hitherto spoken of. According to Cadet, who communicated a very valuable memoir, on the analysis of bile, to the Royal Academy, this coal contains carbonat of soda, an animal earth, and a small portion of iron. By slow distillation, it affords sebacic acid and Prussic acid, much more than other animal substances, carbonat, sebat, and prussiat, of ammoniac. A dense heavy coal remains, difficult of incineration; but, when reduced to ashes, calcareous phosphat and sulphat of soda may be obtained by lixiviation. Exposed to a temperature between fixty-five and eighty-five degrees, it quickly changes, its smell becomes more nauseous, its colour is destroyed, whitish mucilaginous flakes are precipitated, its viscidity disappears, and its smell soon becomes fetid and penetrating. When the putrefaction is in an advanced state, its smell becomes sweet, and resembles amber,

amber. Vauquelin has discovered, that the bile of the ox, heated in the water-bath, and slightly evaporated, may be afterwards preserved for many months without alteration, as is likewise the case with respect to vinegar which has been boiled. He likewise discovered, that the altered bile of the ox, which exhales a fetid smell, and has a brown dirty and turbid colour, becomes of a a beautiful green, and loses its smell when heated, some concrete albuminous flakes are then separated from it.

Bile is much changed by air; none of the animal fluids give so fetid a smell. In uniting with water, it exhibits rays or streaks; the flocks disappear; from dull it passes to yellow, then green, according to the quantity or proportion of water. Mixed with water and heated, it loses its ill smell, and may be preserved unchanged.

All the acids decompose it in the same manner as soap, and produce a coagulum. If this mixture be filtrated, and the fluid evaporated, a neutral salt is obtained, which is found to consist of the acid made use of and soda. This valuable experiment, first made by Cadet, proves the existence of soda in the bile. The matter remaining on the filter, in these experiments, is thick, viscid, very bitter, and very inflammable; its colour and consistence vary, according to the nature and concentration of the acid made use of. The sulphuric acid gives it a deep green colour; the nitric acid, somewhat concentrated, a brilliant yellow; and the muriatic acid, a very beautiful light green colour: these colours, however, vary greatly, according to the state of the bile, and of the acids. This precipitate has been considered as a substance similar to resin, which swells, melts, and takes fire on hot coals, is totally soluble in alcohol, and water precipitates it like the resinous juices. The action of acid on bile, proves, therefore, that it is a true soap, formed by an oil of the nature of resins, combined with soda. They likewise indicate the presence of a certain quantity of the albuminous matter in this animal fluid, which causes it to coagulate by fire, by acids, and by alcohol; it is the same principle likewise which produces its putrefaction. Neutral salts, mixed with bile, prevent its putrefaction.

Metallic solutions, and bile, mutually decompose each other; the soda of this humour unites to the acid of the solution, and the coloured oil of the bile precipitates in combination with the metallic oxyd, forming metallic soaps, useful in painting.

Bile unites readily with oils, and takes them out of cloths in the same manner as soap. This fluid is soluble in alcohol, which separates the albuminous matter. The tincture of bile is not decomposed by water; which shows, that this substance is a true animal soap, equally soluble in aqueous and spirituous menstrua. Ether likewise dissolves it very readily. Vinegar decomposes bile in the same manner as the mineral acids; when the filtrated liquor is evaporated, the acetit of soda is obtained, well crystallized.

From these several experiments, it follows, that bile is a compound of much water, a peculiar aroma, albuminous mucilage, a peculiar concrescible oil, and carbonat of soda. Cadet found it to contain a salt, which he thinks to be of the nature of sugar of milk, and whose existence has been since confirmed by Van Bochaute. But it is probable, that this pretended saline matter, is rather analogous to the lamellated shining and crystalline oily substance, which Poulletier discovered in the human biliary calculi, and of which we are about to treat.

Bile, considered with respect to the animal economy, is a fluid which appears to assist the process of digestion. Its saponaceous quality renders it capable of uniting oily substances with water. Its bitter taste proves, that it stimulates the intestines, and promotes their action on the aliments. Roux, a celebrated physician and chemist of the Faculty of Medicine at Paris, was of opinion, that the bile is likewise principally calculated to evacuate the colouring part of the blood from the body. It appears to be decomposed in the duodenum, by the acids which are almost always disengaged in digestion. It is certain, at least, that it is greatly altered, especially in its colour, when it composes part of the excrements. Judicious physicians may therefore, in many cases, make useful inferences from the inspection of these matters, which indicate the state of the bile, and that of the liver, which separates it.

Dr. Bostock of Liverpool has succeeded in forming a substance extremely similar to the resin of bile, from the crassamentum of blood digested with the nitric acid. Two ounces of crassamentum were boiled with one ounce of nitric acid, till the whole of the crassamentum was dissolved. During the dissolution, a great quantity of azotic gas was disengaged, and a small quantity of nitrous and carbonic acid gas. When the solution cooled, a lamellated substance, consisting chiefly of adipocire was deposited, and the supernatant liquid was of a dark green colour. It was saturated with potash. No precipitation followed, but the crystals of nitrat of potash procured by evaporation were impregnated with a brownish-coloured matter soluble in alcohol. This matter, when separated from the alcohol, had a pitchy consistence, a deep yellow colour, and a bitter taste. When boiling water was poured on the adipo-cire, a similar matter was procured from it. *De Secretione, Edin.* 1798.

The extract of the gall of bullocks, and of many other animals, is used as a very good stomachic medicine. It supplies the defect and inactivity of the bile, restores the tone of the stomach, and establishes the functions of that organ, when debilitated; but great care must be taken in its use, because it is acrid and heating; and it must be administered only in very small doses, especially in irritable subjects.

Of Biliary Calculi.—Whenever the human bile is detained in the gall-bladder by any cause, and especially by spasmodic contractions, as in melancholic or hysteric disorders, long-continued grief, &c. it thickens, and produces brown, light, inflammable concretions, of a very strong bitter taste, which are called *biliary calculi*. These concretions are often very numerous, distending the gall-bladder, and sometimes entirely filling it. They produce violent hepatic cholics, vomiting, jaundice, &c. Fourcroy distinguishes them into three varieties: the first are brown, blackish, irregular, tuberculated, and formed as it were by biceps. The second, which are harder, brown, yellowish, or greenish, exhibit concentric layers, and are often covered with a dry, smooth, and greyish, crust. Their form is commonly angular and polyhedral. The third variety comprehends the white oval concretions, more or less irregular in their form, covered with a whitish and often unequal crust, in layers of a pathose appearance, or in transparent crystalline plates, often radiating from the centre to the circumference.

The biliary calculi, of the second variety, have been examined by Poulletier de la Salle. He has observed, that they are soluble in alcohol. After having digested the stones in strong spirit of wine for a certain time, he observed that the fluid was filled with slender, brilliant, crystalline particles, having all the appearances of a salt; and the experiments made on this saline substance, gave occasion to suspect, that it was an oily salt, similar, in some of its properties, to the acid salt, known by the name of *flowers of benzoin*, but its nature is not at all known. If water be added to the solution of calculi in alcohol, a fat matter will be precipitated, which Fourcroy calls *adipo-cire*.

The discovery of Poulletier de la Salle has thrown light on some facts, collected by the Royal Society of Medicine, respecting the stones of the gall-bladder. This society received from several physicians, biliary calculi of the third variety we have mentioned, which have not hitherto been described. They consist of a mass of crystalline transparent laminæ, similar to mica, or talc, which have absolutely the same form as the salt discovered by Poulletier. It even appears, that the human bile is capable

pable of affording a great quantity of these crystals; for the Society of Medicine is in possession of a gall-bladder entirely filled with this saline transparent concretion. Fourcroy, on examining these crystallized biliary calculi, found them to be of an oily nature, similar to spermaceti. Soap, the mixture of oil of turpentine and ether, &c. have been proposed to dissolve the biliary calculi. It is an important observation, that they are only found in the gall-bladder of oxen after dry seasons and a scarcity of fresh fodder; and that they disappear in the spring and summer, when these animals find abundance of green and succulent vegetables. The butchers are well acquainted with this phenomenon; they know that these stones are found in oxen from the month of November to the month of March, and not afterwards. This phenomenon sufficiently shows the power of the saponaceous juices of plants in dissolving the biliary calculi. Yet it is not to be thought, that medicines, however active and volatile, can be introduced into the gall-bladder in sufficient quantity to dissolve the biliary calculi, with the same energy as in our experiments. The cessation of spasm, and consequently the dilatation of the biliary canal, is probably the true cause of the good effects of the ethereal mixtures that have been proposed by Durande, which we would recommend to be made up without oil of turpentine; besides being very heating, it produces no useful effect but that of diminishing the volatility of the ether; and it has been proved, that the yolks of eggs, and undoubtedly many other substances, will serve the same purpose as well, and without the same inconveniences.

OF FAT.

Fat varies according to the parts it occupies; it is softer and more fluid about the heart, and large vessels; if it becomes solid round the heart, it is a disease.

In examining the nature of fat, we shall take that of quadrupeds, and chiefly that about the kidneys, called *axunge*, or suet. Axunge, properly so called, is a solid mass, enclosed in many vesicles of a cellular texture; it is separated from foreign bodies for the purpose of analysis; this is termed purification. To prepare it for pharmaceutical purposes, or for investigating its chemical properties, it must be cut in pieces, and the membranes and vessels separated; it is afterwards to be washed with much water, and melted in a new earthen vessel, with the addition of a small quantity of water; when this fluid is dissipated, and the ebullition ceases, it must be strained into a glazed earthen vessel, where it fixes, and becomes solid.

The fat of any animal, exposed to a gentle heat, liquefies, and congeals by cooling. If it be strongly heated, with contact of air, it emits a smoke of a penetrating smell, which excites tears and coughing, and takes fire when sufficiently heated to be volatilized: the charcoal it affords is not abundant. If fat be distilled on a water bath, an insipid water, of a slight animal smell, is obtained, which is neither acid nor alkaline, but which soon acquires a putrid smell, and deposits filaments of a mucilaginous nature. This phenomenon, which takes place with the water obtained by distillation on the water-bath, from any animal substance, proves, that this fluid carries up with it a mucilaginous principle, which is the cause of its alteration. Fat, distilled in a retort, affords phlegm, at first aqueous, and afterwards strongly acid; an oil partly liquid, and partly concrete; and a very small quantity of charcoal, exceedingly difficult to incinerate, in which Crell found a small quantity of calcareous phosphat. These products have an acid and penetrating smell, as strong as that of the sulphureous acid. The acid is of a peculiar nature, and has been carefully examined by Crell; but, as it is very difficult to obtain by distillation, this celebrated chemist has used a much more certain and expeditious process. The concrete oil may be rectified, by repeated distillation, so as to become very fluid, volatile, and penetrating; in a word, to present all the characters of a true essential or volatile oil. Twenty-eight ounces of human fat afforded Crell twenty ounces five drachms forty grains of fluid oil, three ounces three drachms and thirty grains of sebacic acid, three ounces one drachm forty grains of a brilliant charcoal, considerably resembling plumbago, or carbure of iron, as Morveau remarks. Five drachms ten grains of matter were lost in this analysis, which may be attributed to the water in vapour, and the elastic fluids, because Crell did not use the pneumatical chemical apparatus.

Fat exposed to a hot air, alters very quickly; the mild and scarcely sensible smell is changed to strong rancidity. This alteration appears to consist of a true fermentation, by which the acid is developed and disengaged. Rancid fat may be corrected by two methods: water alone is capable of carrying off the acid it contains, as Poerner has observed; but alcohol has the same property, according to Machy. This proves, that a part of the rancid fat is put into a saponaceous state by its acid, and by that means rendered soluble in water, and in alcohol: either of these fluids may therefore be used with success to deprive fat of its rancidity. When fat is washed with a great quantity of distilled water, the fluid dissolves a gelatinous matter, which may be exhibited by evaporation; but the fat always retains a certain portion of this matter, with which it is intimately combined, and on which its property of fermenting depends. The action of water on this animal substance has not yet been further inquired into.

Sulphur unites very readily with fat, and forms a combination, which has not yet been accurately examined. In the combinations of fat with the oxyds of metals, it is observed, that the latter assume readily the metallic state when heated: this phenomenon arises from the hydrogen gas, which is disengaged from the fat, and unites with the oxygen of the oxyds. Water is formed by the same means; and the charcoal of the fat is more at liberty, or naked, the more the oxygen has been absorbed from it.

The same effect arises from passing oxygen gas into melted grease; it becomes yellow, and comes to resemble wax; whence it appears that hydrogen is disengaged, which forms water with the oxygen, and the coal is left naked. Fourcroy and Alyon have lately made some experiments upon oxygenated fat, as thinking it might answer all the purposes of what is called yellow ointment.

The following is Fourcroy's method of oxygenating fat. Melt purified axunge in an earthen pot; then add two thirds of its weight of pure nitric acid at 28 or 30°. Stir the mixture in a glass mortar till it is completely cool. Melt the whole mass in thirty times its weight of river or rain water; let the water boil for half an hour, stirring the fat into all the liquor with a porcelain spatula. Let it cool; then separate the fat from the water, and melt it alone with a gentle heat: then pour it into moulds of glass, porcelain, or earth.

Alyon's process is this. Take sixteen parts of purified suet, or axunge, and one part of nitric acid, at 32°. Melt the fat over a slow fire, and then add the acid: stir the mixture with a glass tube, leaving it on the fire till bubbles are formed; then take it off. The action continues, according to this author, till all the nitric acid is decomposed; nothing but azotic gas is decomposed during the effervescence, and the oxygen remains in the fat without making it acid; this principle, by increasing its weight, only makes it of firmer consistence, grained, in short, oxygenated. As Alyon is satisfied that the nitric acid, entirely decomposed, communicates nothing but oxygen to the fat, he does not wash it afterwards. By this method of oxygenating fat, it absorbs much more than by Fourcroy's mode; for he only communicated to it about a thirtieth part of its weight, while Alyon's *oxygenated ointment* contains nearly double.

The yellow ointment of the shops is prepared with three parts of mercury, dissolved in four parts of nitric acid. When the mercury is entirely dissolved, melt thirty-two parts

parts of pure suet in a glazed pan. Let the fat cool a little, and then mix the solution of mercury with it, in a wooden mortar; work the mixture about till it begins to thicken; then pour it quickly into a large paper mould; when the ointment is cold, cut it into squares. This composition is much more consistent than suet itself.

Fat is capable of dissolving certain metals. It unites with mercury in the well-known preparation called *mercurial ointment*; it is called also Neapolitan ointment, unguentum duplicatum, &c. it is the *unguentum hydrargyri fortius*, or stronger ointment of quicksilver, of the New London Pharmacopœia, and is directed to be thus made: Take of purified quicksilver, two pounds; hog's lard, prepared, twenty-three ounces by weight; mutton suet, prepared, one ounce by weight. First rub the quicksilver with the suet and a little of the hog's lard, until the globules disappear; then add what remains of the lard, and make an ointment. It is very difficult to extinguish the mercury entirely: rub a little of the ointment on the back of the hand, and through a magnifier observe whether some globules of mercury are yet visible, in which case the trituration must be continued.

Veau Delaunay, of Tours, has proposed a shorter way of dissolving the mercury in fat: Triturate mercury with old olive-oil in an iron pot, with a long-handled wooden pestle; this pestle is directed to be more than two yards long, and to be confined at top with an iron ring. This is the mode of preparation now used for the military hospitals in France. But a mode still more expeditious and simple, is to make a grey oxyd, by mixing together red oxyd of mercury, and metallic mercury; by triturating this mixture, a grey oxyd of mercury is presently produced. This grey oxyd readily dissolves in fat, and produces an ointment similar to the former.

As the process of combining mercury with hog's-lard, is well known to be tedious, and to require a considerable time, the following method of shortening it, has been announced by Gottling, in his *Taschen-Buch fur Scheidkunstler*, 1798. This process, says he, may be speedily performed, by the addition of a very small quantity of the flowers of sulphur. In a mixture of two ounces of hog's-lard, and six drachms of quicksilver, it will be necessary to employ only six grains of the flowers of sulphur, and the process will be completed in a few minutes. This discovery cannot but prove of great use in pharmacy.

Vauquelin has given a process for taking out of linen such spots as are occasioned by preparations of mercury and lead. Wash the linen in a ley made of fifty parts of water, one of potash, and one and a half of lime; when all the grease is dissolved by the alkali, and nothing remains on the linen but the oxyd of mercury, plunge it into a tub containing a liquor composed of twelve parts of water, and one part of oxygenated muriatic acid as strong as possible, at the temperature of 6°. Let the linen remain till the spot is removed; then wash it in spring-water, and afterwards in soap-water, to take away the smell; then, to make it perfectly white, it may be soaked for a few hours in water containing one thousandth part of sulphuric or sulphureous acid.

Lead, copper, and iron, are the three metals most easily altered by fat. If fat be left upon copper, the fat turns green, and the more so as it becomes more fluid; hence the extreme danger of leaving food of a fat nature in vessels of copper; the danger of leaden vessels is not much less, if the fat has any thing acid in it, or of earthen vessels covered with glass of lead.

Acids do not act upon fats as upon oils; none of them take fire with the nitric acid; the sulphuric acid turns them brown, the nitric yellow. Alkalis dissolve them, forming soaps in the same manner as with oils. If these soaps are treated with a solution of alum, an oil is separated from them, according to Crell, and, by evaporation, sebat of potash. Sulphuric acid distilled over this salt decomposes it, by which means is obtained the sebacic acid.

Guyton has a more simple process for obtaining the sebacic acid:—Suet is melted, and quicklime added; when the mixture is cold, it is boiled in a large quantity of water, which, by filtration and evaporation, affords the sebat of lime, of a brown colour, and acrid taste. This is purified by calcination in a crucible, solution, and filtration; a sufficient quantity of water, impregnated with carbonic acid, being added, to separate the superabundant lime. The fluid being evaporated, affords a white salt, from which, by distillation with the sulphuric acid, the *sebacic acid* is disengaged. To deprive this of the portion of sulphuric acid it may be contaminated with, Crell directs it to be re-distilled from one-fourth of the sebat of potash, which must be reserved for this use. It may be ascertained that it contains no more sulphuric acid by the addition of the acetit of lead; for, if the precipitate be totally soluble in vinegar, it does not contain sulphuric acid.

This acid is formed by heat in the butter of cocoa, spermaceti, and probably in all fixed vegetable oils. The following are its characters: it is liquid, white, and of a very strong smell; it emits white fumes, is decomposed by fire, becomes yellow, and affords carbonic acid. It strongly reddens blue colours; unites, in all proportions, with water; forms a crystallizable salt with lime; and, with potash and soda, salts, which crystallize in needles, and are fixed in the fire. It dissolves gold, when united with the nitric acid; attacks mercury and silver; precipitates the nitrat and acetit of lead; it decomposes tartarit of potash by precipitating tartareous acidule, or cream of tartar, and likewise decomposes the alkaline acetits. When strongly heated on sulphuric salts, it separates the acid in the sulphureous state. It precipitates the nitrats of mercury and of silver; and decomposes the oxygenated muriat of mercury. This acid is composed of hydrogen, carbon, and azot.

Fat combines very readily with the colouring parts of vegetable substances; a proof of which is seen in several pharmaceutical preparations, as the *unguentum populeon*, &c.

These are the chemical properties of fat at present known: they teach us, that this substance greatly resembles butter; that is to say, it is a kind of concrete fixed oil, which owes its solidity to the oxygen which chemists have hitherto attributed to the acid. With regard to its uses in the animal economy, besides that of maintaining the heat of those parts which it surrounds, and the agreeable plumpness and pliancy it produces, together with the whiteness it communicates to the skin; it likewise appears, according to Macquer, to be of use in absorbing the super-abundant acids which may exist in the bodies of living creatures; it is, as it were, the reservoir of those salts. It is likewise known, that too great a quantity of acid, introduced into the body of an animal, dissolves and melts the fat, doubtless by rendering it saponaceous, and consequently more soluble. The excessive abundance, and more especially the alterations of the fat, produce dangerous disorders in the animal economy, whose symptoms and effects have not yet been well examined. Lorry has particularly attended to the nature of fat, and has discovered a striking analogy between this substance and bile. This analogy appears indeed to be founded on the fat nature of bile, on the colour which the fat assumes in bilious diseases, on the melting and disappearance of the fat in long-continued affections of the liver, on the cruel method of increasing and of softening this viscus in some birds, in melting their fat by long inaction, combined with a dry and long-continued heat, &c.

Fat is used in foods, and is nourishing for such persons as have strong digestive powers. It is used externally in medicine, as a softening remedy; and as such it enters into the composition of ointments and plasters. The marrow,

marrow, contained in long bones, exhibits the same properties as fat; but the comparative analysis has not been yet made with sufficient accuracy to describe its characteristic properties.

Of URINE.

Margraaf is the first who made an accurate analysis of urine; this was in 1737. He discovered therein several phosphoric salts. Rouelle the elder has given four excellent papers on the same subject. Scheele discovered the matter which forms calculus. Bertholet discovered naked phosphoric acid.

Urine is a saltish liquor, regarded as an animal lixivium. There are two sorts of urine, the first called *crude urine*, when emitted a short time after meals, is clear, and almost destitute of taste and smell; it contains a much smaller proportion of the principles than the other, which is called urine of the blood, or *urine of concoction*. This last is not emitted till the process of digestion is finished, and it is separated from the blood by the kidneys; while the former appears to be filtrated, in part, from the stomach and intestines immediately to the the bladder, by means of the cellular membrane, or by the absorbent vessels. Many foods are capable of communicating certain peculiar properties to urine. Turpentine produces a smell of violets, and asparagus a very fetid smell, in this fluid. Such persons as have weak stomachs, void urine, which retains the smell of such foods as they have taken.

Urine reddens tincture of turnsole; its heat is from 30 to 32°. In a cold temperature, it sooner grows turbid, and makes a deposit. If the temperature is from sixteen to 18°, the urine, being deprived of 12°, does not grow thick, as in winter. Exposed to 6° below zero, a part freezes; but this is not salt; it is scarcely any thing but water; the other part is more condensed, more easily evaporated, more proper for the extraction of a number of salts. Left to become putrid, it first loses its natural smell for an ammoniacal one, which passes away in its turn; its yellow colour is converted to a green, and then the smell is fetid and nauseous. Putrefied urine exhibits more of the naked alkali than fresh urine.

If urine be evaporated slowly, the first crystals which appear are earthy phosphats, then nitric acid, phosphat of potash, and muriat of soda? If urine be concentrated to the consistence of an extract, or of honey, and then mixed with muriat of lead and charcoal, phosphorus will be obtained. For this purpose, mix muriat of lead (proceeding from the distillation of four parts of minium with two of muriat of ammoniac) with six parts of extract of urine; add one half part of charcoal in powder. Dry the mixture in an iron pot till brought to a black powder: put this powder into a retort, and draw from it the ammoniac, a fetid oil, and the muriat of ammoniac; the residue contains the phosphorus. Try it by throwing a little upon burning coals: if it exhales a smell of garlic and a phosphoric flame, put it into a good stone retort, well luted. Place this in a reverberatory furnace, terminated with a pipe or chimney; adapt to the retort a balloon or receiver half full of water; lute the joinings exactly, and proceed to distillation with a gradual heat. The phosphorus thus obtained may be purified by a second distillation. In this operation, the muriat of lead decomposes the phosphat of soda contained in the extract of urine, forms a phosphat of lead which affords phosphorus, while the phosphat of soda is indecomposable by the charcoal.

The analysis of urine has been made by several chemists, as may be seen in most elementary treatises: but a more extensive and accurate analysis has lately been accomplished by Fourcroy and Vauquelin, not only on urine, but on urinary calculi. Many valuable papers on this subject, have been recently presented to the public both in England and France; and La Grange has given a succinct account of most of their contents, in his *Cours de Chimie*.

Urine, by a gentle heat, is brought to the consistence of honey: this is to be treated with very pure alcohol, which dissolves, 1. A particular substance called urinous matter. 2. Muriat of ammoniac. 3. Muriat of soda. The other salts are not soluble by the alcohol.

To separate this urinous matter, evaporate the alcohol with a gentle heat, or distil in a retort that the product may not be lost; dilute the residue with water, till it is of the consistence of a thin syrup; then pour in nitric acid, and a plentiful precipitate will be deposited, which is the combination of this urinous matter with the nitric acid. The muriats of ammoniac and of soda remain in solution in the liquor, salted by a portion of the urinous matter. To have the urinous matter pure, dissolve in water the precipitate formed by the nitric acid; add potash to saturate the nitric acid it is joined with. Then evaporate to the consistence of honey, and treat afresh with alcohol, which attacks the urinous matter, while the nitrat of potash which is formed remains insoluble. Separate this salt, and distil with a very gentle heat to collect the alcohol. A yellowish substance remains in the retort, hitherto unknown, with new and peculiar characters. This is what these chemists regard as the urinous matter, or that which gives to urine its characteristic properties, as smell, taste, &c. By dissolving this in water, an artificial urine may be formed, of a deeper or lighter colour, according to the quantity of water used. This substance affords crystals with the nitric acid. Distilled over a naked fire, it is almost entirely converted into carbonat of ammoniac; it gives scarcely any oil, and very little coal remains in the retort. It unites with many saline substances, and modifies or inverts their form of crystallization; the muriat of ammoniac passing from the octahedron to the cube, and the muriat of soda from the cube to the octahedron. Fourcroy and Vauquelin propose to examine farther into this matter, as it affords an instance unexampled in its kind.

The salts not soluble in alcohol, are, phosphats of magnesia, lime, and soda, uric and benzoic acids, and albumen. To separate these salts, pour them into hot water, to crystallize such as are susceptible of it, and their crystals will be obtained separately. But the phosphats of lime and of magnesia, and the uric acid, cannot be dissolved by the water. To separate the uric acid from these last salts, add potash, which attacks the uric acid, and decomposes the phosphat of magnesia at the same time. Thus you have an urat of potash, and a phosphat of potash; the magnesia remains with the phosphat of lime. The urat of potash may be decomposed by help of the muriatic acid, which seizes on the potash; dissolve the uric acid in water, and it will crystallize. On the other hand, the phosphoric acid is to be attacked with lime, which forms an insoluble salt. To separate the magnesia from the phosphat of lime of the first experiment, add some acetous acid, which forms a soluble salt with magnesia, and the phosphat of lime remains pure.

These experiments prove, that ten distinct substances may be obtained from urine: 1. Muriat of soda, which in urine that has been evaporated, crystallizes in octahedrons. 2. Muriat of ammoniac, the natural octahedral form of which is changed into the cube, by its combination with the urinary matter, in the same manner as the muriat of soda is changed by this combination from the cube to the octahedron. 3. The acid phosphat of lime, which forms about one-seven hundredth part of the urine. It is precipitated by alkalis, which take from it the excess of acid. 4. Phosphat of magnesia decomposed by alkalis, and giving its earth mixed with the phosphat of lime, which is deposited, becoming a triple salt, its crystals separating by the spontaneous formation of the ammoniac. 5. Phosphat of soda, efflorescing in the air, always united with phosphat of ammoniac. 6. Phosphat of

of ammoniac, which is very scanty in fresh urine, increasing much by its decomposition, and by the formation of ammoniac. It affords phosphorus when the fusible salt of urine is heated with charcoal. 7. The *uric*, formerly called the *lithic*, acid. It crystallizes by the cooling of the urine, and forms the red sand which is deposited at the bottom of the vessels. It is most abundant in sick people, and is readily dissolved by alkalis in their caustic state. 8. The benzoic acid, which is most abundant in infants, is easily obtained from evaporated urine, by mixing it with one-tenth of concentrated sulphuric acid. 9. The gelatin and albumen are very variable in their proportion in different kinds of urine. They appear in the form of clouds in urine in which ammoniac is formed, in that of filaments in urine into which an alkali is poured, and in flakes in evaporated urine; they are precipitated by tannin, which serves to ascertain their proportion; and speedily produce putrefaction in the urine, which contains them in large quantity. They appear to be, by their increase, the primary cause of the formation of calculi, and to afford the gluten which holds the particles of the calculi together. The quantity of these substances in urine is in proportion to the strength or weakness of the digestive organs. 10. The peculiar urinary matter, which gives to urine its characteristic properties. It is the most abundant of the matters contained in urine, forming alone about nineteen-twentieths of these matters. This urinary matter was considered, but improperly, as a saponaceous extract, by Rouelle the younger. It is to this matter that we are to attribute the almost complete crystallization of urine, which has been evaporated to the consistence of a syrup, the solid and crystalline form which it assumes in this state, by the addition of concentrated nitric, and the crystallization of the muriats of soda and ammoniac.

If urine be distilled over a naked fire, an ammoniacal liquid will be found in the receiver, and very little oil. By continuing the operation, there will be sublimed in the neck of the retort some carbonat of ammoniac, then some benzoic acid, and lastly muriat of ammoniac; the uric acid is mostly decomposed. There remains in the retort a saline coaly mass, whence the salts may be extracted by the means already pointed out.

Acids have no action upon fresh urine; but they quickly take away the smell of putrefied urine, by combining with the ammoniac, which is the principal cause of its odour. Fixed alkalis and lime disengage much ammoniac from urine. Lime-water forms a precipitate which at first is soluble, while the phosphoric acid is not entirely saturated with it. In this state, the urine still reddens the blue vegetable colours; the phosphoric acid is at liberty; calcareous phosphat is formed. When the precipitate is no longer soluble, it is a proof that the phosphoric acid is saturated; then it no longer reddens blue colours. Caustic ammoniac also precipitates the calcareous phosphat from urine, by neutralizing the free phosphoric acid. Fixed alkali the same.

Urine decomposes many metallic solutions. Lemery distinguished by the name of the *rose coloured precipitate*, a magma of that colour, which is formed when the nitric solution of mercury is poured into urine. This precipitate is partly formed by the muriatic acid, and partly by the phosphoric acid contained in this fluid. Brongniard has observed, that this preparation sometimes takes fire by friction, and burns rapidly on hot coals; he attributes this effect to a small portion of phosphorus. By treating the precipitate with caustic alkali, the two salts may be decomposed.

Such is the present state of our knowledge respecting the chemical properties of urine. Much remains to be done, before we may esteem ourselves in possession of all that analysis is capable of discovering with regard to this fluid. It is necessary, for this purpose, to examine the different depositions observed in urine, and well described by Hallé, the red or transparent saline concretions which are formed, and which Scheele takes to be the lithic acid, should also be analyzed, and the abundant sediment which urine affords after fits of the gout, in such as are attacked by the stone, &c. Berthollet has observed, that the urine of gouty persons contains less acid than that of persons in perfect health; that, during the fit of the gout, this fluid is much less acid than usual. He conjectures, that in gouty patients, the phosphoric acid is not evacuated by urine, as in healthy persons; that it wanders, as it were, and is carried into the articulations, where it excites irritation and pain. This excess of acid in the urine appears to hold the calcareous phosphat in solution.

Calculus of the Bladder.—It is only since the time of Bergman and Scheele that we have had precise notions of the nature of calculi. Scheele discovered the *lithic acid*, now called *uric acid*. Bergman obtained one two-hundredth part of lime from it, by precipitating its nitric acid with sulphuric acid, and calcining the residue of the same solution: this had escaped the observation of Scheele.

The combination of lime with phosphoric acid, constitutes a kind of calculus, well known by its whiteness, friability, insolubility in water, slow solution in acids, and the sulphat of lime which it furnishes with sulphuric acid. But the late experiments of Fourcroy and Vauquelin, enabled them to discover five other substances in the human calculus. 1. Ammoniacal urat, or a saturated combination of uric acid with ammoniac. This substance is soluble in pure fixed alkalis, with a disengagement of ammoniac.

2. Ammoniaco-magnesian phosphat. This salt, which contains magnesia, (an earth not hitherto found in the human body,) presents some remarkable phenomena. It never of itself forms a human calculus: it is mixed sometimes with calcareous phosphat, sometimes with uric acid, sometimes with both at once: but it always forms the outer crust of the calculi; its surface is uneven, it is white and lamellous in its fracture. It is not soluble in alkalis; they produce from it an ammoniacal smell, and precipitate magnesia, while they seize on the phosphoric acid. Analysis discovers the magnesia and ammoniac united to the phosphoric acid; muriatic acid dissolves them. It is this ammoniaco-magnesian phosphat, which occasions the calculus to acquire such a vast size, as sometimes to render its extraction impossible. These calculi are of the same nature as those found in the colon of a horse, lately analyzed by the same chemists.

3. Oxalat of lime. The discovery of this insoluble salt in the bladder, greatly surprised Fourcroy and Vauquelin. They are black, ponderous, hard, full of prickles or turbercles like a mulberry; and they have been in consequence called *mulberry-stones*. They scroop under the saw, and their divided surfaces take a high polish like agate. These calculi are insoluble in pure alkalis; but alkaline carbonats decompose them, and dissolve their acid. Lime, added to these solutions, precipitates a white salt, which at first sight might be taken for phosphat of lime; but analysis presently shews that it is the oxalat of lime revived. Another exclusive character of these calculi, is the pure or quicklime which they leave in the crucible, when they have been strongly calcined, and which is afforded by no other calculus. These are soluble in the muriatic and nitric acids, &c.

4. Silex. In 150 calculi analyzed by Fourcroy and Vauquelin, this substance was met with but once. It was not alone; but, in a calculus composed of four or five strata, it formed the third, of a yellow horny colour, and very hard under the saw. This having resisted all the modes of analysis used for the other calculi, they at length melted it, having first pulverized it in a silver crucible, with some potash; and, with the help of an acid, they precipitated, from the aqueous solution of these two substances, a transparent powder which rendered water gelatinous, and which these chemists discovered to be silex.

5. A particular animal substance, more or less abundant.

dant. This is constantly found with the greatest part of the before-mentioned substances in calculi. The uric acid alone is almost entirely free from it, because it is of itself a kind of peculiar organic composition. But the earthy phosphats, the oxalat of lime, and the silex itself, never condense into calculous strata, plates, leaves, or crystals, without borrowing from the urine a certain portion of animal matter, which is found in the whitest and most saliniform calculi. This matter is the cause of the fetid smell, of these concretions, and the black colour they obtain by calcination.

These discoveries on the nature of calculi, led Fourcroy and Vauquelin to undertake some experiments for dissolving them in the bladder by means of injections. They found that calculi composed of uric acid and urat of ammoniac, dissolved readily in water, which contained so little caustic alkali as not to cause a disagreeable sensation on the tongue. By very weak nitric and muriatic acids, they found they could dissolve such calculi, as were formed of ammoniaco-magnesian phosphat, calcareous phosphat, and oxalat of lime.

Of Uric Acid.—This acid was formerly called the *lithic acid*. It was discovered by Scheele; but Dr. Pearson, in his Experiments on Calculi, published in the Philosophical Transactions of 1798, having shewn the impropriety of this term, the chemists have, in consequence, affixed to it the name of *uric acid*; its combinations are called *urats*.

We have already said, that some calculi are formed of the pure uric acid alone. This acid is always in the concrete form, and is not easily soluble in water. Distilled in a retort, it is decomposed, and partly sublimed. It decomposes the nitric acid. It is completely decomposed, without smell, in caustic potash weakened with water. If weak muriatic acid be added to the solution, the uric acid will be precipitated in crystals. This acid unites with earths, alkalis, and metallic oxyds: it yields its bases to the weakest vegetable acids, even to the carbonic acid; therefore it is not soluble in alkaline carbonats.

Of the SALIVA, PANCREATIC JUICE, and GASTRIC JUICE.

There is a great analogy between the saliva, and the pancreatic juice. The salivary glands, and the pancreas, have, in fact, a structure entirely of the same kind, and the use of the fluids, secreted by these organs, appears to be the same. Man, and quadrupeds, are the only animals in which the saliva exists; or at least the salivary glands have not been observed in any other animals. No accurate chemical experiments have yet been made with these fluids. This circumstance may be attributed to the difficulty of procuring them, even in very small quantities. It is only known, that the saliva is a very fluid juice, separated by the parotides, and many other glands, which continually flows into the mouth, but most abundantly during mastication. It appears to be of a saponaceous nature, impregnated with air, which renders it frothy; it leaves but a small residue, when evaporated to dryness; but it forms, nevertheless, certain salivary concretions in the passages which convey it into the mouth. It appears to contain an ammoniacal salt, since lime and caustic fixed alkalis disengage from it a penetrating and urinous odour. Pringle, from experiment, concluded, that the saliva is very septic, and that it favours digestion, by exciting a commencement of putridity in the aliments. Spallanzani, and many other modern physicians, think, on the contrary, that it possesses the property of retarding and impeding putrefaction.

The gastric juice is separated by small glands, or the arterial extremities, which open into the internal tunic of the stomach. The œsophagus likewise affords a small quantity, especially in the inferior region. Glands of considerable magnitude are observed in many birds, which open into very sensible excretory ducts. Some modern philosophers have paid great attention to the gastric juice. Spallanzini, Scopoli, Monch, Brugnatelli, Carminati, have, within the last few years, examined the properties of this liquor. They collected it in the stomach of sheep and calves, by opening them, after having suffered them to fast for some time. They obtained it from carnivorous and gallinaceous birds, by causing them to swallow spheres and tubes of metal, pierced with holes, and filled with very fine sponge. Spallanzani examined the gastric juice of his own stomach, by procuring a vomit, or by swallowing wooden tubes, filled with different substances, to judge of the effect of the gastric juice on each of them. The experiments with tubes had been before attempted by Reaumur. Gosse of Geneva had the courage to cause himself to vomit a great number of times, by a process which is peculiar to himself, and consists in swallowing the air. From all the modern observations, the gastric juice appears to possess the following properties.

It is the principal agent of digestion, and changes the aliments into a kind of uniform soft paste: it acts on the stomach itself after the death of animals. Its effects shew, that it is a solvent, but of that peculiar nature, that it dissolves animal and vegetable substances uniformly, and without exhibiting a stronger affinity for the one than for the other. Far from being of the nature of a ferment, it is one of the most powerful antiseptics we are acquainted with: and from the experiments of the philosophers before cited, its nature appears to be essentially different in the several classes of animals. According to Brugnatelli, the gastric juice of birds of prey, and granivorous birds, is very bitter, and composed of a disengaged acid, resin, animal matter, and common salt; that of ruminating quadrupeds is very aqueous, turbid, and salt, containing ammoniac, an animal extract, and common salt. Morveau, having digested portions of the internal tunic of the stomach of the calf in water, found that it has an acid character. Spallanzani thinks, that this character depends on the aliments, as he never found the acid gastric juice in the stomach of carnivorous animals, but always in those which feed on grain. Gosse made the same observation on himself, after having used crude vegetables for a long time. Brugnatelli thinks, that the white matter, in the excrements of carnivorous birds, contains phosphoric acid; but Morveau observes, that his experiments are not conclusive. Scoopuli found muriat of ammoniac, and suspects that the muriatic acid is produced by the vital power of animals; but no decisive fact has been brought in support of this opinion; every circumstance, on the contrary, tends to shew, that this acid comes from the food. Macquart and Vauquelin have found that the gastric juices of the ox, calf, and sheep, are constantly possessed of an acid character; but it appears from their accurate experiments, that it is the disengaged phosphoric acid which gives to them this character. They have also discovered that these juices alter and soon putrefy. The gastric juice of carnivorous animals possesses the antiseptic qualities in the highest degree.

Hence it may be concluded, 1. That the gastric juice is not well known; 2. That it appears to be different in several classes of animals, and in the same animal, according to the diversity of food; 3. That no proof has been brought to shew that it is a peculiar acid, and that we should acknowledge the existence of a gastric juice; 4. That its most remarkable property consists in its great solvent power, which extends even to bony and metallic substances; and it is even said to be capable of attacking siliceous stones; an indifference or equal attraction for the matter it acts on. Its very strong antiseptic quality, which it communicates to all the bodies it is mixed with, and which even puts a stop to putrefaction, in substances which have already begun to be changed by that process, has excited a greater degree of attention than the others. Carminati, Jurine, and Toggai, have applied the gastric juice on wounds. Carminati has even used it internally; and

and they all agree with respect to its antiseptic virtue. But the experiments of Macquart and Vauquelin prove, that this antiputrid quality does not belong to the gastric juice of ruminating animals. Some chemists think that the gastric juice acts upon food rather as a decomposing principle, than as a solvent: but, indeed, its powers are known with as little precision as its chemical composition. It appears from the curious experiments of Mr. Smith, that the subcutaneous parts of living animals, when wounded, or stimulated, pour out a secretion analogous to the gastric liquors in the property of coagulating milk, and in acting as a decomposing principle on animal and vegetable substances.

OF THE HUMOURS, OR ANIMAL MATTERS, NOT YET EXAMINED; SUCH AS SWEAT, THE NASAL MUCUS, CERUMEN, TEARS, GUM OF THE EYES, SEMINAL FLUID, AND EXCREMENTS.

There are many animal fluids and matters, which have not yet been examined. It is therefore not so much with a view to exhibit their properties, as to engage young physicians to make researches, equally new and useful, that we propose to speak cursorily respecting the humour of transpiration, of sweat, of the mucus of the nostrils, the cerumen of the ears, the tears, the gummy matter of the eyes, the seminal fluid, and the excrements.

Physicians have discovered a great analogy between the fluid emitted by cutaneous transpiration, and urine; they have observed, that these excretions mutually answer the same purpose in many circumstances, and are therefore naturally led to consider the vaporous fluid of transpiration as of the same nature as urine. Medical practice has shown, that its qualities are subject to variation; that its smell is faint, aromatic, alkaline, or sour; that its consistence is sometimes glutinous, thick, tenacious, and that it leaves a residue on the skin; that it often tinges linen with various shades of yellow. Berthollet affirms, that sweat reddens blue paper; and that this phenomenon takes place more particularly in parts effected with the gout. He thinks it contains the phosphoric acid. It has been hitherto impossible to collect a sufficiently large quantity of this excrementitial humour, to examine its properties with accuracy. Many inquiries, therefore, remain to be made, which can only be undertaken and pursued by physicians in peculiar circumstances and occasions.

The humour, prepared by the membrane of Schneider, which is thrown out of the nostrils by sneezing, deserves to be carefully attended to by physicians. It is a kind of thick mucilage, white or coloured, more or less fluid, or consistent in certain affections, and more especially in catarrhs. It appears to be a mucus and alkaline substance, which becomes thick, in consequence of absorbing oxygen from the atmosphere.

The yellow, greenish, or brown matter, which is collected, and becomes thick, in the auditory canal, and is known by the name of *cerumen*, because of its consistence, has not been sufficiently examined. It is very bitter, and appears to be of a resinous nature; it sometimes becomes so concrete, as to stop the auditory canal, and prevent the free passage of sound: there seems to be some analogy between this and the inflammable matter of the bile. Cerumen is a compound substance, consisting of a number of whitish particles, connected together by a tenacious matter, which is soluble in warm water. Cerumen differs from bile in being insoluble in alcohol, and not being decomposed by diluted acids.

We are better acquainted with the nature of the tears, which are prepared in a peculiar gland, situated towards the external angle of the orbit, and destined by nature to maintain the humidity and suppleness of the external parts of the eye. This fluid is clear, limpid, and manifestly salt; it sometimes issues out of the eye in large quantities. In the natural state, it gradually flows into the nostrils, and appears to dilute the mucus. Most authors who have spoken of this liquor, and in particular Pierre Petit, a physician of Paris, who published a treatise on Tears about the end of the last century, consider them as water nearly pure. We have found them to contain a peculiar mucilage, which becomes thick by absorbing oxygen, muriat of soda, and soda, in a caustic state; after that, the humour of the tears is similar to the mucus of the nose with which it mixes.

Neither has the chemical nature of the seminal humour been much more inquired into than that of the foregoing matter.—The few observations, which it has been hitherto possible to make on this liquor, have shown, that it resembles animal mucilages, becomes fluid by cold and by heat, and that the action of fire reduces it to a dry and friable substance.

The anatomical and microscopical observations on this subject have been carried much further. They have shown, that the seminal humour is an ocean, in which certain small round bodies swim, which possess a rapid motion, and are by some considered as living animals, destined to reproduce the species, and by others as organic moleculæ, adapted to form a living by being their union. The microscope, in the hands of a modern observer, has likewise shown crystals formed in the seminal liquor by evaporation and cooling. It must be admitted, however, that these fine experiments have not hitherto been attended with consequences which have advanced the sciences, but that they have merely afforded data for the construction of certain ingenious hypotheses. See under ANIMALCULE, in vol. i. p. 727, of this Encyclopædia.

Vauquelin has published, in the *Annales de Chimie*, (April 1791) a memoir on the Human Semen. The following are the only new facts which it contains: 1. This substance has a faint smell, a sharp and slightly astringent taste, its weight is greater than that of water.

2. To ascertain whether the air be the cause of the liquefaction, which this humour undergoes some minutes after it has been emitted, he exposed equal quantities of it in the air, and in close vessels containing no air. The liquefaction having taken place in the same manner, and in the same time, he concluded, that neither the air, nor the substances dissolved in it, produced this effect.

3. By leaving the seminal liquor to liquefy in a small glass ball, terminated by a very narrow tube, its volume was not increased. This was easily observed, by marking the place to which the liquor rose. He seems to doubt whether this effect is to be ascribed to caloric.

4. When the semen is kept for some days exposed to the air, in a small capsule, long transparent crystals are deposited in it, of the shape of a prism with four sides, terminated by pyramids with four faces. According to the experiments of this author, these crystals, which had been announced in the *Journal de Physique*, are very pure phosphat of lime.

5. A very white pellicle, forming on the seminal liquor, some time after it has been exposed to the air, which is set with opaque white points. These points are of the same nature with the succeeding crystals, and differs from them only in not being transparent.

6. If the air in which the seminal matter is exposed be humid, it does not dry completely, but remains soft and ductile. Before arriving at this state, it undergoes many changes, which Vauquelin has carefully described. At first, it assumes a yellow colour, and then becomes acid; Byssi grow on its surface, crystals are deposited in it, and at last it exhales the odour of putrid fish. If, on the contrary, the air be dry and warm, the semen dries, speedily becomes dry and brittle, like horn; it loses, during the desiccation, about nine-tenths of its weight.

7. The seminal liquor exhibits a very marked alkaline character, which is owing to the soda the author discovered in it.

8. Water, at whatever temperature it may be, from zero to the boiling point, does not dissolve semen that has not been previously liquefied; but it combines with the

the femen at every temperature, when once this fluid has become liquid. This, Vauquelin obferves, fhows that fome change takes place, either in the texture, or organization, or intimate nature, of the femen, during its liquefaction.

9. All the acids, excepting the oxygenated muriatic acid, diffolve the feminal liquor very readily. Alkalis cannot difengage it afterwards under a folid form. The oxygenated muriatic acid, inftead of diffolving it, reduces it into white flakes, which become yellow, if a large quantity of this acid be added. Urine, by means of its difengaged acid, likewife diffolves the feminal matter.

10. The feminal liquor when frefh, does not decompofe barytic falts; but it decompofes them after being long expofed to the air. This effect is owing to the carbonic acid of the air, which is abforbed by the foda contained in the femen, and which communicates to it the property of decompofing barytic falts. All the calcareous, magnefian, and aluminous, falts, are decompofed by the femen, becaufe the foda has a ftronger attraction for acids than thefe earthy matters have. The metallic falts are ftill more readily decompofed by this fubftance.

11. By diftillation, the dry femen affords, 1. Some drops of water; 2. An elaftic fluid, confifting of carbonic acid, and of carbonated hydrogen gas; 3. An empyreumatic oil; 4. Carbonat of ammoniac; 5. A very light charcoal remained in the retort.

12. To difcover the proportions of the fubftances which the preceding experiments had difcovered in the femen, Vauquelin took forty grains of it in a dry ftate, which was equal to 400 grains of it when frefh, fince it lofes nine-tenths of its weight by drying, and heated them in a crucible of very pure white clay. This fubftance fwelled, emitted yellowifh ammoniacal fumes, and was converted into charcoal, when a very ftrong heat difengaged no longer any from it; the crucible was taken from the fire, the charcoal which it contained was wafhed, and the lixivium afforded, by evaporation, eight grains of a falt, known by its properties to be carbonat of foda. The lixiviated charcoal was again expofed to the fire, it burned readily, and twelve grains of white afhes remained, which had no tafte, which did not diffolve in water, and which melted with the blow-pipe into an opaque globule, that emitted a phofphoric light, while it continued in fufion. This fubftance diffolved in acids, its folution was precipitated in white flakes by all the alkalis, and by lime-water. A folution of it in muriatic acid evaporated to drynefs, and afterwards treated with highly rectified alcohol, was divided into two portions; one of thefe, diffolved in alcohol, afforded, with the oxalic and fulphuric acids, precipitates of the oxalat and fulphat of lime, and with potafh of pure lime. The other portion, which remained of a thick confiftence, was melted by the blow-pipe into a tranfparent glafs, which was foluble in water, and the folution of which precipitated lime-water, and reddened blue vegetable colours. This analyfis proves, that this laft fubftance is compofed of lime, and of phofphoric acid, like the bafis of bones. It follows, from the preceding experiments, that the human femen is compofed,

1. Of animal mucilage,	-	6 parts.
2. Of foda,	-	1
3. Of phofphat of lime,	-	3
4. Of water,	-	90
		100

The food, by which animals are fupported, contains a large quantity of matter, which is not capable of nourifhing them, and is rejected out of the inteftines in a folid form. The excrements are coloured by a portion of bile, which they carry with them. The fetid odour they exhale, arifes from the commencement of putrefaction in their paffage through the inteftines. Homberg is the only chemift who has examined thefe matters. He obferved, that the phlegm afforded by excrements diftilled on the water-bath, was of a naufeous fmell; by wafhing and evaporation, he obtained a falt, which melted like nitre, and took fire in clofe veffels. The diftillation of this matter, in a retort, afforded the fame products as other animal fubftances. Putrefied excrements afforded an oil without colour or fmell, which did not convert mercury into filver, as he had been led to expect. It muft be obferved, that the fecal matter examined by Homberg, was that of men, fed with coarfe bread and champaign wine; a circumftance which was faid to be effential, in order to fucceed in the alchemical experiments he was directed to make. There can be no doubt, but that the properties of the excrements muft depend on the nature of the food, of which they are merely the refidue. An accurate and careful analyfis of the excrements of different claffes of animals, is one of the moft certain means of difcovering the phenomena of digeftion. Several chemifts are at prefent engaged in it.

Of the SOLIDS of ANIMALS.

The organs of carnivorous animals are divided into three claffes. The firft comprehends the *white* or foft parts, as the fkin, the tendons, the membranes, the integuments, the aponeurofes, the ligaments, &c. The fecond includes the mufcular organs, which are *red* in fome animals, white or grey in others. The third confifts of the *hard* parts, as the hair, the nails, the fcales, or fhells, the cartilages, the bones, &c.

Of the soft and white Parts.

The firft white organ is the fkin, a very elaftic body, fufceptible of changing its dimenfions, and fwelling up in water; which is common to all the white parts, but not to the mufcles. They are all capable of abforbing water with tannin and alum; expofed to the air, they dry up, forming glue, jelly, &c. When fkin has been tanned, it is no longer foluble in water; it is then a combination of gelatin and tannin. It becomes brittle and unchangeable; Fourcroy regards it in this ftate as an antifeptic, more powerful than bark in external diforders.

The texture of the *dermis* is not of the fame nature as that of the *epidermis*, which eafily peels off in tranfparent lamina, while the dermis, lying underneath, is more folid and fixed; it contains fibrin and albumen, which keep it compact even in a ftate of ebullition. Chaptal has made fome recent experiments on the epidermis. He found that the epidermis of the human fkin was perhaps the moft diftinct, and the moft eafily detached. The human fkin becomes tough, like horn, by the heat of water, and furnifhes two diftinct parts, *epidermis* and *leather*, which laft in its confiftence refembles foftened cartilage: but the continued action of hot water diffolves the leather, without affecting the epidermis. Neither will hot alcohol, long kept in digeftion over epidermis, attack it in the leaft. Cauftic alkali diffolves it; lime produces the fame effect, though more flowly. Hence we perceive analogy between the exterior covering of the human body, and the covering or outer part of filk.

From thefe principles Chaptal has drawn confequences which may be ufeful in tanning. 1. If a fkin covered with its epidermis be plunged into an infufion of tan, the tan will act only on the inner or flefhy fide, the outer fide being guarded by the epidermis, which is incapable of any combination with the tan. 2. When, by the action of the cleanfing matter, the epidermis is taken away, the tan penetrates both fides of the fkin. 3. The lime generally ufed for this purpofe feems to act only by diffolving the epidermis; lime-water has more action than quicklime; but its effect ceafes the moment the fmall portion of lime which was held in folution becomes combined; hence the neceffity of renewing the lime-water to finifh the cleanfing.

Of the Jelly, Glue, &c.—The membranes, tendons, aponeuroses, cartilages, ligaments, and skin, contain in general a mucous substance very soluble in warm water, but insoluble in alcohol, known by the name of *jelly*. To form a jelly by way of experiment, take one or more of the animal substances mentioned above, as calf's foot or any other ligament; boil it over a slow fire, strain, and evaporate till it becomes a tremulous mass by cooling; to render the jelly more transparent, it may be clarified with the whites of eggs. A stronger degree of evaporation affords a dry, brittle, transparent substance, known by the name of *glue*.

Glue is prepared with all the white parts of animals; the skin, the cartilages, and the feet of oxen, are used to prepare the strong glue of England, Flanders, Holland, &c. The skins of eels afford the base of gold size, and with old white leather gloves and parchment, a kind of glue used by painters, &c. is made. There are scarcely any animals, whose tendons, cartilages, nerves, and more especially the skin, will not serve to prepare these different kinds of glue. It must be here observed, that glues differ from each other in their consistence, taste, smell, and solubility: there are some which readily become soft in cold water, others are not dissolved but in boiling water. The best glue is transparent, of a yellowish brown colour, without smell and taste, entirely soluble in water, with which it forms a viscid uniform fluid, that preserves an equal degree of tenacity and transparency in all its parts as it dries.

Animal jelly does not differ from glue properly so called, but in its possessing a less degree of consistence and viscidity. The first is more especially obtained from the soft and white parts of young animals; it is likewise found in their flesh, muscles, skin, and bones. Glue is obtained only from animals of a greater age, whose fibres are stronger and drier. These two substances, however, exhibit the same chemical properties; and therefore we shall speak of the jelly afforded by the cartilages or membranes of veal.

In its natural state, jelly has no smell, and but a faint taste: by distillation in the water bath, it affords an insipid and inodorous phlegm, capable of putrefaction; in proportion as it loses its water, it assumes the consistence of glue, and, when entirely dried, it resembles horn; when exposed to a stronger fire, with access of air, it swells, liquifies, and becomes black, emitting an abundant fume, of a fetid smell; it does not take fire without exposure to a violent heat, and even then not readily; by distillation in a retort, it affords an alkaline phlegm, an empyreumatic oil, and a small quantity of ammoniacal carbonat; it leaves a large mass of charcoal, difficult to incinerate, which contains muriat of soda and calcareous phosphat.

Jelly, when exposed to a hot and moist air, becomes first acid, and soon after putrid. Water dissolves in it all proportions; acids, and especially alkalis, dissolve it readily. By dissolving glue or isinglass in warm water, and pouring an infusion of nut-galls into the solution, a precipitate is obtained. Acids readily dissolve jellies and glues. With nitric acid, glue is converted into oxalic acid, and disengages azotic gas. Alkalis dissolve jelly entirely.

Of the Brain.—This substance, whose nature is so little known, merits some attention from the chemist. To preserve it, it should be kept in a vessel with alcohol. In a certain time it becomes saturated, takes a disagreeable smell, and deposits little needles, which seem to be an adipo-ferous substance, similar to the *white of whale*, improperly called spermaceti. Water does not entirely dissolve brain; a whitish matter always remains at the bottom.

Thouret has written at some length upon the substance of the brain. He considers the white of whale to be one of its constituent principles, and one of the most natural elements of the animal economy. He says it is mingled in a certain proportion with the lymphatic juices of all parts of the body; and, being deposited in a membrane or net of a particular texture forms the basis of the brain.

Fourcroy has analysed the brain of several animals: his memoir on that subject is in the 16th vol. of the *Annales de Chimie*. He has demonstrated by experiment, that besides the animal pulp, or basis, it contains phosphats of lime, ammoniac, and soda, in very small proportions; that it contains no uncombined alkali, as some chemists have asserted, and not an atom of potash. As to the formation of the pulp or basis of brain, Fourcroy is of opinion, (quite contrary to Thouret before cited,) that among all animal organs it forms a class, or rather genus, entirely distinct from all other matter. Experiments have now confirmed this assertion beyond dispute; they prove especially, that it has the least analogy with white of whale; and that it differs greatly from the albumen of the blood, though it resembles this perhaps more than it does any other animal substance.

The *vitreous humour* of the eye is perfectly soluble in water; but the *crystalline* coagulates, becomes opake, and hard.

Of the Muscular Organs.—The muscles are red in certain animals, white or grey in others. The fleshy parts are lean in some animals, fat in others. The ancient chemists, as Geoffroy, &c. though they made many experiments on these substances, have left us nothing satisfactory. Fourcroy, whom we have so often quoted in this treatise, has discovered, besides gelatin, albumen, and fibrin, a fourth component, which is fat. Berthollet had the same results.

By washing a muscle in water, from red it becomes white; the colouring part unites with the water; by this means, the gelatin, albumen, and extractive matter, may be separated. The red liquid drawn out by expression, is similar to the clot of blood washed and expressed. It is a very bad method to wash the muscular parts in water, previous to making broth. If the residue of the lixiviation be treated with alcohol, a peach-coloured precipitate will be thrown down; the alcohol retains only some portions of salt, either muriat of soda or of potash, and the extractive matter; which last is separated by evaporation. Boil the flesh which has undergone these two operations in water; by ebullition the gelatinous part is dissolved, and it takes away also the portions of extract and of salt, which escaped the action of the first solvents. By slowly evaporating the water first employed, without heat, the albuminous part coagulates, and is separated by the filter, and the saline matter may be obtained by a succeeding evaporation; the alcohol likewise being evaporated, affords the coloured extractive matter; and lastly, the decoction affords the jelly and the fat oil which swims at the surface, and fixes by cooling. After the extraction of these different substances, nothing remains but the fibrous matter, which is white, insipid, insoluble in water, contracts and curls up by heat, and by distillation in a retort, affords much ammoniac, and a very fetid oil. A large quantity of azotic gas is obtained from this substance by the action of the acid of nitre. In a word, it possesses the characters of the fibrous part of the blood; it therefore appears to be proved, that the muscular organ is the reservoir, in which the action of the vital powers deposites the fibrous matter, which becomes concrete by rest; and which appears to form the basis of that animal property which physiologists call *irritability*.

When flesh is boiled in water, the albumen coagulates and rises to the surface, this is called *scum*; the saline parts, which remain in the water, and the gelatin and fat which coagulate when cold, constitute *broth* or *soup*. For a lighter kind of soup, boil the meat as long as is necessary, and then strain through a cloth; a great deal of the fat will be left behind. Evaporate this well-strained broth over a water-bath, and a solid jelly is produced, called *gravy cakes*, or solid broth. These cakes may be enriched with chickens, aromatics, &c. they are sometimes also made from herbs.

Lime-water forms a precipitate with broth; it is calcareous phosphat. Caustic alkalis and urine have the same effect. Muscles distilled in caustic-alkali become red, though previous washing had rendered them white. With nitric acid, azotic gas is obtained.

Berthollet has lately discovered a new acid by the distillation of muscular flesh. The liquid procured by distillation from animal substances had appeared hitherto to contain only carbonat of ammoniac and an oil; but this chemist found in it an acid, to which he has given the name of the *zoonic acid*. He observed this acid in the liquid obtained from the gluten of wheat, the yeast of beer, bones, and woollen rags, distilled for the preparation of the muriat of ammoniac. He therefore considers it as produced by the distillation of all animal substances.

To separate this acid, mix quicklime with the distilled liquid, after having separated the oil, and then boil or distil the mixture. Carbonat of ammoniac is exhaled; and when the odour ceases to be sharp, filter, and add a little quicklime to the liquid, which boil again, till the smell of the ammoniac goes off entirely. What remains is zoonat of lime, which filter again; then pour on water impregnated with carbonic acid, or blow into the liquid through a tube, in order to precipitate, by the carbonic acid of the respired air, the quicklime which may be held in solution without being combined. Zoonat of lime may therefore be employed to effect combinations by complex affinities; but, to obtain the zoonic acid pure, make use of the following process: Mix the solution of zoonat of lime in water, made pretty strong *(rapprochée)* in a tubulated retort with the phosphoric acid; then distil it. The distillation, as the zoonic acid has very little volatility, requires a degree of heat nearly equal to that of boiling water. The liquor must then be made to boil. If two vessels be adapted, one after the other, nothing will pass into the second. It appears that a part of the acid is destroyed by the action of the heat; for the liquid which is in ebullition becomes brown, and grows black at the end of the operation. It may thence be concluded that this acid contains carbon.

The zoonic acid has an odour like that of meat when frying, and is indeed formed during that process. It has an austere taste. It gives a strong red colour to paper tinged with turnsol, and produces an effervescence with alkaline carbonats. It did not appear to produce with alkaline and earthy bases salts which crystallize. It forms a white precipitate in a solution of acetit of mercury in water, and in that of the nitrat of lead; so that it has more affinity with the oxyd of mercury than the acetous acid, and with the oxyd of lead than the nitric acid. It acts on the nitrat of silver only by complex affinity; and the precipitate it then forms grows brown with time, which shews that this precipitate contains hydrogen. The zoonat of potash calcined, did not form Prussiat of iron with a solution of that metal.

Of the hard or solid Parts.

The hair, the nails, the shells, and the cartilages, hold a middle place between the soft parts and the hard. The hard parts, properly so called, are the bones.

The *hair* is a sort of emunctory; its change of colour, and its sensibility, are proofs of this fact; it is known that in certain diseases it is dangerous to cut the hair. Black hair is most loaded with carbonat of lime; it is harder, and more subject to turn grey, than lighter hair. There are instances of sudden fright turning the hair grey in one night's time. Hair, in distillation with a naked fire, gives out carbonat of ammoniac, a concrete oil, a coal resembling carbure of iron, and some Prussic acid; by the action of caustic alkalis, carbonated hydrogen gas and calcareous phosphat. Oxygenated muriatic acid whitens hair. Nitric acid turns it yellow. The muriatic acid will dissolve it by the assistance of heat, which the acetous acid does not; but which alkalis do completely. If an acid be poured into the solution, there is a precipitate; sulphurated hydrogen gas it disengaged if muriatic acid be used, azotic gas if nitric acid.

Hair undergoes little change by the action of boiling water; a little gelatin is obtained at last. Hair has been regarded as unchangeable; it exists when all the other parts are corrupted and destroyed. Hair may therefore be regarded as the most durable part of the body; a fact which has been frequently evinced by the accidental digging up of human sculls, on which the hair has been found in a state of life and growth.

To turn red or light hair black, rub it with an acetous solution of lead, or oxyd of lead, the nitric solution of silver, or even of mercury: having soaked the hair, put a little oil to it, which makes it blacker. All these operations help to burn up or destroy the hair; and it is not uncommon to see the head break out in tumours, and the salivary glands affected, in persons who thus take measures to change the natural colour of their hair.

Feathers, by fire and re-agents, give nearly the same products as hair. Weakened muriatic acid poured over feathers, makes a black precipitate; the nitric acid only changes them of a yellow colour. Feathers are rather less soluble in potash than hair; they also afford less ammoniacal carbonat.

Bristles have properties somewhat similar. By distillation in a retort, they give out carbonat of ammoniac and phosphat of lime. White bristles are turned yellow by strong nitric acid. Alkalis do not form a simple combination: ammoniac is disengaged, and Prussic acid, which would form a very good Prussian blue with sulphat of iron. They form very good soaps also.

Of Cartilages.—These may be regarded as the beginning of bones; and tendons may be considered nearly in the same light. In boiling water, they melt into a gelatinous matter; they differ from bones only in the greater or less quantity of phosphat of lime which they contain. See Anatomy, vol. i. p. 526-582.

Of Horn.—The shavings of horn, by long boiling in water, may be converted into a jelly; in this manner hartshorn is prepared for pharmaceutical purposes. Take one part of hartshorn shavings, and six parts of water; put them into a tin-kettle, made to shut so close that there may be very little if any evaporation. Boil the mixture over a slow fire for twelve hours: strain the decoction, while warm, through a hair-sieve. In making up this jelly for sick persons, add one half-part of white wine and one part of sugar; clarify with the white of an egg. When the liquor is quite transparent, pour it boiling hot through the filtre, upon which is to be previously put thirty grains of cinamon in gross powder, and 180 grains of spirit of lemon. Acids promote the solution of horn in water, and contribute to its clarification.

Of Bones.—Bones are not entirely an earthy substance, as was formerly supposed, but a combination of phosphoric acid and lime. Bones in their origin are membranous; they are much softer in children than in adults, and in old people are very brittle; hence it is much more difficult to make them knit and grow together after they have been broken; and in very old people they never will become firm after such accidents.

Bones exposed to the air become covered with a yellow unctuous matter. With a gentle fire, they grow black within, white without. Distilled in a retort, they afford a great quantity of fat oil, an ammoniacal liquor, and carbonat of ammoniac; carbonated hydrogen gas is disengaged also. The coal is of difficult incineration; it leaves a white residue, which, by washing in cold water, furnishes a little carbonat of soda; hot water then separates a certain quantity of sulphat of lime, and some calcareous phosphat remains. The animal oil which is obtained, when distilled afresh by a gentle heat, is known by the name of *Dippel's animal oil*.

By continuing the calcination, the coal is burnt; all the gelatinous matter is consumed, nothing remains but the calcareous phosphat, which is friable. If the heat be

be increased and continued upon the calcined bones, they acquire a fusible property. If the fire be maintained to such a degree as to make the fusible matter of the bones red-hot, they recover their solidity, and become like porcelain. The phosphat of lime does not melt, but the molecules are drawn so close together as to be almost vitrefied. The calcined bones no longer contain any alkali; it is by means of this that the fusion takes place, and that the calcareous phosphat passes to the state of glass.

If bones in pieces, or rasped, be boiled in water, the liquor, when cool, becomes gelatinous and transparent. Bones may be reduced to a pulp, by boiling in *Papin's digester*. If entire bones be put into acids, it softens them, reducing them to a kind of membrane; if with a strong and active acid, as the nitric, not only the earthy part will be dissolved, but the membranous part will be attacked also; it grows yellow, and yields, by distillation, the oxalic and Prussic acids.

Calcined bones are soluble in all the mineral acids, and by the acetous and tartareous acids. The phosphoric acid dissolves bones more readily than the others. If a solution of bones in an acid be precipitated by an alkali, you have, according to Scheele, a combination of the alkali with the acid, and the calcareous phosphat is set free. Sulphuric acid has also the property of decomposing bones: sulphat of lime is formed, and the phosphoric acid remains uncombined. This, as we have seen, is the process for obtaining phosphorus.

OF THE PUTREFACTION OF ANIMAL SUBSTANCES.

Organical matters being different from inorganic, must undergo a different process in their changes, the one being vegetable, the other animal: the former ferment, the latter putrefy. Fourcroy divides putrefaction into six parts: its history, causes, phenomena, nature, the art of stopping it, and the means of preventing it.

I. *Putrefaction called by Boerhaave Fermentation.*—In this operation nature exhibits a curious phenomenon to the minute enquirer. Bacon was aware of its importance; and the advice he gave to physicians, though followed, leaves much still to be done. Rouelle has been employed upon this subject; but Pringle has treated it the best. Macbride examined the affinity between fixed air and animal substances; he observed, in putrefaction, 1. That fixed air was disengaged. 2. That, by putting putrefying substances with fixed air, the putrefaction stopped, was even retrograded. 3. That all animal substances which afforded fixed air, were anti-septics.

II. *Causes of Putrefaction.*—There is no putrefaction in animal substances without the presence of water; the best preventive, therefore, is very dry air: hence the burning sands of Libia preserve bodies by depriving them of their water. Below 0, or zero, there is no putrefaction; a little above, it proceeds but slowly; at 15° it is more hastened. Animal substances have in themselves a cause which renders them more or less liable to putrefaction. The albuminous and fibrous parts are called more animalized, as being nearer to the state of fermentation. All these substances pass the acid fermentation before they become putrid.

III. *Process of Putrefaction.*—Every animal substance has its own peculiar mode and time of fermenting, when exposed to a warm moist air. These phenomena may be distinguished into general and particular. The general appearances are always the same. There are six changes: 1. Of consistence. 2. Of colour. 3. Of smell. 4. Of organization. 5. Of bulk and weight. 6. Of nature; it becomes a kind of inorganical earth, in which vegetable substances shoot out and grow.

IV. *Nature of Putrefaction.*—Fourcroy made some interesting experiments in the pits of the ci-devant burial-place of the Innocents at Paris. He observed, that when lime was thrown upon bodies newly put in, the workmen could not remain any time in the pits; they were forced to retreat to avoid an asphixy or apolexy; their eyes were red, and they felt great pain. Fourcroy went down: he found that the effect arose from the disengagement of ammoniac; he discovered, also, that what the workmen called *fat matter*, was only ammoniacal soap.

When putrefaction is complete, many elastic fluids of a dangerous nature are disengaged. Compound substances, by putrefaction, pass to a more simple state: thus, if carbon unite with oxygen, carbonic acid is formed; if it is phosphorus, it will be phosphoric acid; if sulphur, sulphuric acid; if phosphorus or sulphur combine with hydrogen, sulphurated or phosphorated hydrogen gas will be the result, which will burn, if brought in contact with the air: this combination has given support to some superstition among the ignorant. If carbon unites with hydrogen, oil is produced; if azot with hydrogen, it becomes ammoniac; lastly, if the azot is disengaged, it unites with the oxygen of the air, and forms nitric acid. There is also a great difference in the progress of putrefaction. Some substances decay rapidly, others slowly, as in argillaceous or fat earth. All change, according to the substances with which they come in contact: hence it may be discovered why some tend to vitrification, others turn to manure, and how some pass to the mummy or fat state. It has been proposed to bury dead animals in contact with humid sustances, in order to convert them into fat, which may be used for burning in lamps.

V. *Of preserving Bodies from Putrefaction.*—In the fat matter, there is a part which seems to remain unchanged, and still furnishes gluten; it is this which tends to the preservation of mummies.

VI. *To stop the Progress of Putrefaction.*—To prevent putrefaction, we must remove the causes which produce it. Whatever absorbs humidity, is antiseptic; as, alkalis, lime, acids, and sugar; all the neutral salts, especially those with an excess of acid, all aromatics, all the labiated plants, simarouba, pomegranate-peel, dry balsams, gum-resins, &c. may be used with success. To keep infection from cities, burying-places, common sewers, &c. these places should be so disposed, that fecal matter may always be carried off by a stream of running water.

The art of destroying the effects of putrefaction, is to disengage the muriatic acid from the muriat of soda by sulphuric acid; the same effect may be produced by oxygenated muriatic acid, which destroys colours and smells; and, as Fourcroy observes, might be used as an *odorimeter* in anatomical researches: the bodies might also be rubbed with oxygenated muriatic acid. It was proved by Guyton, as far back as 1773, that the fumes of the mineral acids possessed the property of stopping contagion. This chemist, by means of the fumes of muriatic acid, extricated from the muriat of soda (sea salt) by the sulphuric acid, purified the air of the cathedral of Dijon, which had been so much infected by exhumations, that they were obliged to abandon the building. The process was afterwards published under the form of "Instructions for purifying the air in the military hospitals of the French republic;" a copy of which appeared in the Journal de Physique. The process consisted in removing the patients, heating some common salt, previously moistened with water, upon a stove, and then pouring sulphuric acid upon the hot salt. In an instant the sulphuric acid begins to act upon the salt, combines with its soda, and disengages its acid, which rises in the state of vapour. The operator then leaves the room, and shuts the door; and, after twelve hours, returns, and opens the windows, to admit fresh air.

Dr. Carmichael Smith, F. R. S. deserves great praise for his meritorious perseverance in this discovery, till he got the use of acid fumes introduced into the English hospital ships, in 1796; and his substituting nitre for common salt was a happy improvement; for, though acid fumes were known to prevent infection, there was no proof of their having contributed, at the same time, to the recovery of the sick, till these experiments were made according-

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ing to instructions drawn up by him. See the article CONTAGION.

Thus we have given the general phenomena observed in the putrefaction of animal substances; whence may be clearly seen, how much the philosophy of animal substances and the science of medicine may expect from chemistry, when these two sciences are connected together. There is a great difference between the putrefaction of the parts of *living* animals, and that of their *dead* organs. The motion which exists in the former, singularly modifies the phenomena of this alteration; and physicians have frequent opportunities of observing the difference between these two states, with respect to putrefaction. Besides this, every humour, and every solid part, separated from a dead animal, has likewise its peculiar way of putrefying. The muscular, membranous, or parenchymatous, texture of the organs; the oily, mucilaginous, or lymphatic nature of the humours; their consistence, their state with respect to that of the animal which afforded them, all influence the putrefactive motion, and modify it in a thousand manners, perhaps impossible to be estimated. And how greatly will the difficulty of the subject be increased, if we add to this enumeration, the state of the air, its temperature, elasticity, weight, dryness, or moisture; the exposition of the putrefying substance in various places, and even the form of the vessels which contain it; all these circumstances being capable of varying the phenomena? It must therefore be allowed, that the history of animal putrefaction is scarcely begun, and that it demands an immense series of inquiries and experiments.

Such are the phenomena which take place, when animal matters putrefy, and are decomposed; but as the result of this decomposition in different mediums throws great light on the knowledge of the revolutions of the globe, let us consider, for an instant, what happens to these matters, in their various decompositions, in the different parts and situations of the earth.

The bodies of animals plunged into water, first swell up; elastic fluids are disengaged; the water dissolves a great part of their principles, decomposes another part, and disperses the different principles of these bodies among the great masses that constitute rivers and streams; whence several savage nations expose dead bodies in rivers, and commit their destruction to the water.

Different phenomena take place, when the bodies of animals are buried beneath the ground. In these cases putrefaction takes place more or less slowly, the fluids and the solids finish, by being reduced almost entirely into azotic gas, carbonic acid gas, hydrogen gas, and ammoniacal gas. All these elastic fluids being filtered through the earth, are stopped and partly fixed, and render the ground black, greasy, and fetid. They saturate it, as it were, with these products of putrefaction, until the dissolving power of water and air, the vaporization effected by heat, and the absorption by vegetables, deprive the ground of the fluids with which it is impregnated. Thus it is that nature, by slow decompositions, reduces the bodies of animals, deprived of life, to more simple substances, destined to enter into new combinations.

This decomposition, considered on every part of the globe at once, in the earth, in the water, or in the air, produces great changes, which the philosopher ought to appreciate. By observing the vast extent of the seas, and the immense quantity of animals which inhabit them, we perceive those animals perish in enormous masses, and suffer a decomposition, which produces phenomena hitherto not sufficiently examined. What becomes of the immense remains of animal matters? To what successive revolutions are these ruins of living beings exposed? It is known that the waters of the sea contain the muriats and sulphats of soda, of lime, and of magnesia. It cannot be doubted, but the muriatic acid, magnesia, lime, and soda, are continually formed in this vast laboratory. Perhaps the formation of many of these substances may take place during the life of these marine animals; but some others are certainly owing only to the decomposition of the same substances after death. It cannot be denied, that the strata of calcareous matter, which constitute, as it were, the bark or external covering of the globe, in a great part of its extent, are owing to the remains of the skeletons of sea animals, more or less broken down by the waters; that these beds have been deposited at the bottom of the sea; that such is likewise the origin of bitumen, and more especially pit-coal, which is deposited in very thin and extended strata, which likewise occupy a part of the globe. There is, therefore, in the sea, a never-ceasing cause of the decomposition of water: numberless agents continually separate its principles, and are themselves changed. Immense masses of chalk, deposited on its bottom, absorb and fix the water, or convert it into a solid substance, part of the liquid which fills its vast basons.

From these considerations, respecting the decomposition of animal substances in the earth, in the air, and in the water, united to all the data afforded by chemistry, it follows, that the external strata of the globe are no longer what they were at the moment of its formation; that it increases in solidity and extent by the successive and uninterrupted augmentation of these depositions; that the soil we inhabit is modern and factitious; that it does not belong to minerals; that this superficial soil is owing to the slow decomposition of animals and vegetables; that water is continually diminished in quantity, and changes its form; that one part being decomposed, furnishes one of the bases of the bodies of vegetables and animals; that another part is rendered solid in the calcareous strata added to the globe; that the atmosphere must have been modified by all these successive changes; that vegetables continually influence the atmospheric air; and that the solar light is greatly concerned in all these mutual decompositions. Though it seems impossible to determine the times which have successively beheld the decomposition of water, vegetation, fermentations, putrefaction, the formation of saline substances, bitumens, calcareous matters, and the modifications of the atmosphére; yet philosophy and chemistry, enriched by modern discoveries, shew us at least that these phenomena have taken place at different epochs; that they continue to modify the actual state of the planet we inhabit; and that if matter be one and the same thing, with respect to its mass and intimate nature, as great philosophers have thought, yet its form being continually varied by the combinations it experiences, must gradually produce great revolutions, of which modern chemistry may appreciate the cause, and of which, perhaps, it may some day foretel the final effects.

DESCRIPTION OF SEVERAL NEW AND VALUABLE CHEMICAL MACHINES.

Compound distillation is one of the most important operations in chemistry. The substance which is separated in every distillation, comes over into the receiver in the form of gas. Now, if the nature of the gas be such, that by cooling alone it enters with facility into the liquid state, a common receiver, sufficiently cooled, may be made use of for receiving this product; as, for example, in the preparation of alcohol, distilled vinegar, &c. But, if the gaseous fluid cannot, by cooling alone, be condensed so as to become liquid; or, if this change proceed very slowly, there is no other means of obtaining it in the latter form, than to combine it, if possible, with a greater or less quantity of water. Instances of this kind are very frequent, as in the distillation of nitric acid, of oxygenated muriatic acid, caustic ammoniac, &c. The means by which the ancient chemists accomplished this end, consisted in adding, in the retort, to the mixture to be distilled, as much water as was necessary to arrest the gaseous body which had been disengaged. This water, in consequence of the application of heat, being changed into

into vapours, came over in this form into the receiver, together with the other gas, where it condensed, and maintained the gas in solution. This was the mode of proceeding in the operations above-mentioned; but this method is liable to many objections and inconveniencies, the principal of which we will state.

1. Many aeriform acids, ammoniac, &c. are much more volatile than water, and come over, for this reason, in part, much sooner into the receiver than the water. The first portion of those bodies, not being arrested by the water, is, therefore, lost. Chemists endeavoured to obviate this fault, by making use of very large receivers, in which the gas remained included, till it could be dissolved in the water as it came over. But even these were insufficient, and required to be tubulated to procure an issue for the accumulated gas, and prevent the apparatus from breaking. Sometimes, also, the experimenter used to introduce a small quantity of water into the receiver, previous to the operation; but, as the gas only touches the surface of the water, its solution became extremely tedious.

2. It has been proved that gaseous bodies are dissolved much more readily and copiously in cold than in hot water. Now, as the water which comes over during the above process is always hot, it heats the receiver, and, of course, remains hot for a long time; this is consequently a new impediment, and the water cannot, therefore, in this manner, be perfectly saturated with the gas.

3. From what has been observed, it follows, that the loss experienced during these operations can be diminished only by an extremely slow and careful operation, and that the slightest inattention may not only spoil the whole process, but endanger the life of the operator. But, notwithstanding the utmost precaution and attention, the operator remains exposed, in a great measure, to the noxious and disagreeable vapours; even the mere effusion of fuming spirit of nitre, and of concentrated muriatic acid, from the enormous receivers, is attended with great inconvenience.

4. If, especially in operations in the large way, any dirt or impurity adhered to the body made use of, it was taken up by the water, and came over into the distilled liquor, for which reason the fuming and concentrated muriatic acid, for instance, was never obtained clear.

5. Neither the quantity, nor the degree of concentration of the liquor to be obtained, could be optionally determined, since the loss depended upon a great many circumstances, which the operator could not altogether foresee nor prevent.

To obviate these inconveniencies, several chemists proposed new machines, for the purposes of distillation; but none have been more generally approved, than that of Mr. Peter Woulfe, which, with the improvements by Pelletier, we shall describe, as follows:

WOULFE's APPARATUS.

This apparatus, as used in chemical and pharmaceutical operations, is always formed of glass, and, which is the best, of white glass. In large manufactories only, it may, according to circumstances, be partly made of wood, iron, copper, &c. The peculiar vessels and instruments of which it is composed, are delineated in the Chemistry Plate VI. Fig. 1, is the apparatus, with luted junctures, for the reception of gaseous and liquid bodies. Fig. 2, is the apparatus for the distillation of such bodies as come over in the form of gas only, with refrigeratory vessels, and junctures not luted.

Fig. 5, the tubulated receiver, or balloon with two necks. This receiver ought to have a short wide neck, proportioned to the beak of the retort intended to be used. It should also be rather wider towards the mouth, and conical towards the receiver, that it may be joined the closer to the beak of the retort, and be more firmly luted. As most of the common receivers are jars, of which the greatest part of the neck is broken off, they have the fault that their neck is narrow at the mouth, and wider towards the belly. The collateral neck of this receiver should be very round, and sufficiently long, that a cork of some length may exactly fit in it. Moreover, the position of this neck ought to be such, that, when the receiver is connected with a retort moderately inclined, it stands perpendicularly, as shewn at fig. 1. The dimension of these receivers ought to correspond with the extent of the process; in chemical or pharmaceutical experiments, we have seldom occasion for larger ones than such as hold from eight to twenty pints. If the receiver be very small, the collateral neck may be omitted; but, instead of it, we should bore a hole, of about two lines in diameter, to admit the communicating tube.

Fig. 3, and 4, are Woulfe's bottles. These are common cylindrical short-necked bottles, furnished, besides the usual neck in the middle, with one or two collateral necks. At first they made use also of bottles with four necks, but these may be dispensed with in almost all operations, for those with two and three necks, answers all purposes as well. The middle or principal neck of these bottles is generally somewhat wider than the rest; but its diameter should never exceed one inch, for otherwise the junctures become unnecessarily large. Moreover, these necks should be almost cylindrical, very round, and as much as possible perpendicular and parallel. The size of these bottles differs according to the operation; they cannot, however, be much smaller than of half a pint; and, in extensive operations, they do not require to be larger than of twelve pints.

The communicating tubes connect the apparatus together. Of these the experimenter should have several in store, or he should form them, according to necessity, of straight tubes of soft glass, which he may bend over a charcoal fire, or by the blow-pipe. If the operation be moderately great, they are best of one line in diameter; but, in greater operations, they may measure as much as two lines. In general, it is better to have them too wide than too narrow. The intermediate part between the ends should be sufficiently long, that the bottles, with which it communicates, as well as the refrigeratory vessels, may conveniently stand near each other. The corners or angles of the communicating tube should not be too sharp, but somewhat round, otherwise the tube is liable to break. They may be likewise made in the form of a semicircle. They are commonly quite simple, but in some cases they are furnished with a short capillary tube. The tube of safety, is a straight glass tube, rising upwards, of about one line in diameter, and about two feet in length.

Fig. 6, the adopter; which serves to combine a retort with one of Woulfe's bottles, as at fig. 2. We should always be furnished with several of these, of different dimension, according to the sizes of the different retorts. Smaller ones may be made of the beaks of old retorts.

The refrigeratory vessels serve to cool the liquids contained in the bottles, by means of ice, snow, or cold water, continually replenished. For this purpose we may use small wooden tubs, earthen basons, &c. But the most convenient vessels are those made of copper, or tin, painted with oil colours; they have a cock or syphon near the bottom, by which the melted ice, or the water, when it becomes too warm, is drawn off. In these vessels the jars or bottles are placed, as at fig. 2.

As the joinings in all operations where Woulfe's apparatus is employed, should be perfectly closed, lest any aeriform body pass through, the choice of a proper lute is of very great importance. All lutes, it is well known, are divided into two classes, into fat and common lutes. Of the former we make use of two kinds in Woulfe's apparatus, which are prepared in the following manner: 1. Take very dry rich clay, triturate it in an iron mortar, and form it into a thick paste, by successively adding boiled linseed oil, commonly termed linseed varnish.

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Woulfe's Chemical Apparatus.

This lute is not expensive, and is of very great service in the distillation of acids, and of all corrosive bodies; but it cannot be long preserved, and must, therefore, be fresh made every time. 2. Take one pound of pulverized amber, melt it by a gentle fire in an iron vessel with an iron cover, containing one ounce and a half of turpentine. In the mean time boil on a separate fire one pound of linseed oil, and pour it hot, and while stirred with an iron ladle, into the melted amber. In this manner we obtain a liquid of the consistence of honey, which constitutes the basis of common amber-varnish. This liquid is then wrought with good dry clay into a paste, during which operation a small portion of expressed nut-oil may be added by way of dilution, and to prevent drying. This lute is much more expensive than the former, but preferable in all its properties. It keeps for a very long time, and may be used twice or three times.

In the distillation of volatile alkali, ether, &c. there is no necessity for using fat lute, we therefore employ one with much more convenience, which is thus prepared; almonds finely powdered and sifted, or, which is preferable, flour of linseed, is mixed with good starch, properly boiled, and formed into a hard paste, which, in the operation, may be softened by sprinkling water upon it. This lute is very clean, and may be employed to great advantage in all operations where no corrosive bodies are treated; but it can be used only once, nor does it keep. It becomes still better and more firm, if a small portion of common glue be added to the starch.

The application of the lute, in securing the junctures, is another important point; for, with the best kind of lute, we shall not be able to close a joining well, unless it be properly applied. But this operation is best learned by practical instruction and use; and the only rule which we can give in this place is, that the glass is to be perfectly clean and dry, that the lute must be applied in small quantities only, and by degrees; and that the last portion is to be properly combined with the portions applied first, by kneading.

The communicating tubes are inserted in the necks of the bottles, by means of perforated corks. For this purpose a hole is first bored through the cork, and filed with a round file, till the tube may be firmly fixed in it; the outside of the cork is then filed with a coarser file, till it fits exactly the necks of the bottles. The cork should always go quite down into the neck, and not appear above it. Woulfe's bottles and communicating tubes, joined to each other by corks alone, are represented by fig. 2, and those which are luted, by fig. 1. In joining the retort with the balloon, or the adapter, or an adapter with the bottles, lute alone is made use of, some part of which should be always pressed between the joinings of the vessels, for these must never touch each other.

As the junctures, defended either by fat or common lute, may be easily displaced by motion, and as fat lute is very liable to become soft, and to sink, when exposed to heat, it is essential, in nice operations, that the joinings already luted should be further secured by wet bladders, or, which is still better, by strips of linen coated with white of egg and lime; these, by their compactness, do not only tend to connect the joinings more closely, but they contribute very much to render the lute coherent and firm. For this purpose, take strips of linen not too coarse, of an inch wide, cut them into pieces as long as the coating of the lute upon the joinings is broad, dip them into fresh white of egg, take them out one after another, and rub them well in with powdered quicklime; this being done, put them transversely upon the joining, and press them close and even upon the lute. In this manner the lute is covered with one, two, and, in greater operations, with three or four strips, which are then coated once more with white of egg; and, lastly, with quicklime.

If, in a distillation by Woulfe's apparatus, the body, which is separated, either on account of the mutual action of the substances with which it is in contact, or by the action of heat, come over entirely in the form of gas soluble in water, the apparatus, in order to obtain the gas combined with water, in a liquid form, is to be connected in the following manner: The earthen glass or retort, on the sand-bath, water-bath, or the naked fire, is to be joined by means of the adapter, with the central neck of a Woulfe's bottle with three necks. In one of the collateral necks of this bottle the tube of safety is inserted in such a manner that it nearly touches the bottom. The other collateral neck is connected with a Woulfe's bottle by means of a communicating tube with unequal ends, so that the shorter end only reaches into the neck of the bottle with three necks, whilst the other extends almost to the bottom of the bottle with two necks; this second bottle is combined, in the same manner, by means of the usual communicating tube with unequal ends, or, which is preferable, by means of the communicating tube with the small capillary tube, with a third bottle with two necks, as shewn at fig. 2. As much distilled water is introduced into the first, or the bottle with three necks, previous to its being luted, as to allow the tube of safety to be immersed about half an inch. That quantity of water, which from experience we know to be requisite for the absorption of the gas which comes over, is then distributed in equal proportions in the second and third bottles. The tube of safety remains open, but the short capillary tube of the second communicating tube is luted in such a manner, that it may be opened with facility and speed. The second neck of the third bottle is either left open, or slightly stopped by a cork.

If a tubulated retort be made use of, the whole apparatus is luted, and the substances to be treated, or at least those which are to facilitate the developement of the gas, are introduced through the tubulure of the retort. On the contrary, the joinings between the retort, the adapter, and the first bottle, remain open till the last, but are luted the moment the bodies have been introduced through the neck of the retort. Now, if in consequence of the gradual application of heat, the substances contained in the retort begin to act upon each other, and disengage the gas, it mixes at first with the common air confined in the retort, the first bottle, and the first communicating tube, which is thus condensed, and presses upon the whole surface of the water contained in the first bottle, and upon that of the water in the communicating tube of the second bottle. But, as the resistance of the water in the second bottle is equal to the pressure of a column of water whose height equals the sum of the heights of the water in the second and third bottles, and is consequently much greater than the resistance of the water in the first bottle, which at most is equal to that of a column of water of one inch high, it follows, that the surface of the water in the immersed end of the communicating tube in the second bottle remains unaltered, till, by the gradually increased pressure, the water in the tube of safety has risen to a height which equals the sum of the heights of the water in the second and third bottles. If, for instance, the water in the second and third bottles be four inches high, the water in the tube of safety would rise eight inches, before the gas could be forced through the orifice of the immerced end of the first communicating tube.

As soon as the pressure of the water in the second bottle is overcome, the gas penetrates through the water, in the form of bubbles, into the second bottle, and from thence through the second communicating tube into the third bottle. During this transition, the gas is absorbed by the water, and the circumstances which promote the absorption are, 1. the state of compressure both of the gas and water; 2. the minute division of the gas which passes through the water; 3. the cool temperature which is to be maintained in the refrigeratory vessels, in the manner represented by the plate; for the caloric, which is disengaged from the gas, frequently raises the water to ebullition.

When

When the operation is once commenced, the water in the tube preserves constantly the same altitude, which is only altered in the five following cases: 1. When the developement of the gas, by imprudently increasing the heat, or from other causes, takes place with such rapidity, that the gas cannot pass with sufficient speed through the communicating tube, and consequently accumulates in the first bottle. In this case the water rises, and, if the mass be great, and the tube of safety not long enough, all the water in the first bottle is forced through the tube of safety, and the apparatus is spontaneously opened. The tube of safety, in this case, therefore, prevents the apparatus from breaking. 2. When the density of the water, in the second and third bottles, is increased by the gas which it has already imbibed. For this reason we should never pour too much water into one bottle, but rather distribute it in several; or the ends of the communicating tubes should not be immersed so low, because in most operations the density of the liquid is at last considerably increased, and of course the resistance becomes greater. 3. As soon as the developement of the gas begins to decrease, the water in the tube of safety descends. This happens either towards the end of the operation, or when the heat is imprudently diminished. If the apparatus be then perfectly cooled, the air in the first bottle is condensed to such a degree, that the atmospheric air enters the tube of safety. If this tube were wanting, the water contained in the second bottle would necessarily come over into the first. It would be the same with the third bottle, if we were not to open the capillary tube of the second communicating tube, and thus cause the atmospheric air to enter. If the communicating tube be without a capillary tube, the luting of the third bottle must be instantly opened, and the bottle itself removed. 4. The height of the water in the tube of safety decreases also at last, in consequence of the second and third bottle becoming cooler, or when from any other cause the absorption of the gas is more rapid than its developement. 5. Not unfrequently also it happens in the midst of the operation, that the gas, instead of being developed, is absorbed for a short time by the mass contained in the retort, or that the volume of this mass is otherwise suddenly diminished, which, in like manner, causes the water in the tube of safety to fall. The tube of safety, therefore, not only defends the apparatus from breaking, but also prevents the fluids in the bottles from mixing. It serves moreover as a mean by which we may judge of the progress of the operation.

If, during the process, we should observe a small quantity of gas unabsorbed pass through the open neck of the third bottle, a fourth bottle is immediately to be joined with the third bottle, by means of a communicating tube, in the same manner as the third bottle is connected with the second. But on this occasion we should not forget that the pressure is increased in the first bottle, and consult the tube of safety. When the operation is finished, and the apparatus cooled, we find the water contained in the bottles impregnated with the developed gas, and more so in the first bottle than in the last. The liquor contained in the first bottle is frequently not quite pure, because the small quantity of the body which comes over in the liquid form carries along with it the impurities of the distilled substances; the other liquors, are, however, perfectly pure. If the weight of the water poured into each bottle has been accurately determined, we shall be able, after the operation is finished, to point out in the most precise manner, from the increase of weight, not only the whole weight of the gas obtained, but also the degree of concentration of the fluids in each bottle. By way of example, we will state the result of an operation for a preparation of spirit of caustic ammoniac. One pound and a half of dry sal-ammoniac, and four pounds and a half of quicklime, were introduced into a glass retort in this manner: half a pound of lime was put at the bottom by itself, upon this was thrown a mixture of three pounds and a half of lime, and one pound and a half of sal-ammoniac, and the whole lastly covered with the remaining half pound of lime. The retort was placed on a sand-bath, and connected with an apparatus of the nature before described. Distillation was now commenced, and continued, by a heat gradually increased to the ignition of the retort, till the gas ceased to come over. To immerse the tube of safety, three ounces of distilled water were poured into the first bottle, and half a pound into each of the second and third. The apparatus being opened, the first bottle was found to contain four ounces, two drams, forty grains, of a foul weak spirit of sal-ammoniac; the second bottle, one ounce and a half, twenty-eight grains, of the strongest and purest spirit of sal-ammoniac; and, in the third bottle, nine ounces and a half, three drams, sixteen grains, of an equally pure but weaker spirit.

Bottle.	Water.	Increase of Gas.		
No. 1	3 ounces	1 ounce	2 drams	40 grains
2	8 ounces	4 ounces	———	28 grains
3	8 ounces	1 ounce	7 drams	16 grains
	19 ounces	7 ounces	2 drams	24 grains

From this computation it appears, that one pound and a half of sal-ammoniac affords seven ounces, two drams, twenty-four grains, of pure gaseous ammoniac, which, dissolved in nineteen ounces of water, form twenty-nine ounces, two drams, twenty-four grains, of spirit of sal-ammoniac, of which the small portion contained in the first bottle is weak and impure, and cannot therefore be computed; that contained in the second bottle is very strong, since two parts water contain one part gas; that the third portion is also pure, but less strong, the proportion of the gas to the water being about 1 : 5.

If the products which come over in any distillation whatever, appear partly in a liquid form, and partly in that of gas, three different cases may occur. 1. That the gas which comes over is soluble in water, and may thus combined with it be received separately from the body which comes over it in the liquid state. 2. The gas which comes over, whether it be soluble in water or not, may be collected in this state, and at the same time the liquid body may be separated without any loss. 3. If the gas which comes over be two-fold, and partly soluble in water and partly not, the soluble part combined with water, the insoluble part in the form of gas, and the body in the liquid form, all three may be obtained separately, and without any loss.

In the first case, the apparatus is to be disposed as represented by fig. 1, that is, the beak of the retort is inserted in the tubulated balloon, which is connected by means of a communicating tube, of which the ends are equal, with a Woulfe's bottle with three necks, in such a manner that the ends of the communicating tube only reach into the neck of the balloon and of the bottle. In one of the collateral necks of this bottle we insert the tube of safety; and the third neck is combined with a second bottle, by means of a communicating tube with unequal ends, so that the shorter end only extends into the neck of the first bottle, and the longer end almost to the bottom of the second bottle. In some cases, this second bottle may be linked in a similar manner with a third. The balloon is left empty; in the first bottle introduce the water which is required for the immersion of the tube of safety, but in the second and third bottles pour the water which is to absorb the gas.

The body which in the distillation comes over in the liquid form, collects immediately in the empty balloon, and remains at its bottom; but the gaseous fluids, after having forced the common air out of the apparatus, rise through the first communicating tube into the first bottle, where, having produced the necessary pressure in the tube of safety, they pass on through the second communicating tube into the second bottle, to combine with the water which it contains. After the operation is finished, the balloon

balloon is found to contain the liquid body which has come over, and the ſecond bottle the gas abſorbed by the water.

Though, in caſe of neceſſity, the balloon might be connected directly with the ſecond bottle, in the ſame manner as this bottle is connected with the firſt; yet the intermediate bottle, with the tube of ſafety, is of great uſe, as it enables us to judge of the progreſs of the operation, and prevents the water, in caſe of an abſorption of air in the retort, from paſſing into the balloon, where it would not only mix with the fluid, but might frequently, on account of the great heat excited, produce an exploſion of the balloon, and thus endanger the operator. With reſpect to the other circumſtances and cautions, the ſame obſervations are here applicable which we mentioned before.

This compoſition of Woulfe's apparatus is made uſe of in the diſtillation of ethers, and of edulcorated acids, but eſpecially in the preparation of nitric acid, which, by way of example, we will proceed to deſcribe.

Four pounds of nitre, deprived by fuſion of its water of cryſtallization, were pulverized, and introduced into a glaſs retort; the apparatus was compoſed in the manner deſcribed, and all the joinings, except that between the retort and the balloon, were luted with fat lute and ſtrips of linen. Two pounds of the beſt oil of vitriol (that of Nordhauſen) were then poured through the neck of the retort upon the nitre; the joining was immediately ſecured, and diſtillation commenced on the ſand-bath by a heat at firſt gentle, but gradually increaſed till the retort became red-hot. The firſt bottle contained three ounces of water for the immerſion of the tube of ſafety, and the ſecond bottle one pint of water. The operation being finiſhed, the balloon was found to contain twenty-ſeven ounces and two drams of the moſt concentrated fuming nitric acid; in the firſt bottle, five ounces ſix drams of green fuming nitric acid; and, in the ſecond bottle, twenty-ſix ounces of ſtrong blue nitric acid.

Bottle.	Water.	Increaſe.
Balloon		27 ounces 2 drams
No. 1	3 ounces	2 ounces 6 drams
2	16 ounces	10 ounces

It thus appears that there was obtained in this operation, beſides the twenty-ſeven ounces two drams of fuming ſpirit of nitre, in which the acid is bound by the water contained in the ſulphuric acid made uſe of, twelve ounces ſix drams of nitrous-acid gas, combined with the nineteen ounces of the water employed.

Second caſe. If, in a diſtillation, where the bodies come over partly in the form of gas, and partly in the liquid ſtate, we wiſh to obtain the gas ſeparately from the liquid over water or mercury, the retort is joined, as in the former caſe, with the tubulated balloon, the collateral neck of which is connected by means of a recurved tubulated communicating tube with a bell glaſs in the pneumatic apparatus. The ſubſtance which comes over in the liquid form, is here, as in the former caſe, collected in the balloon; but the gaſeous body paſſes through the communicating tube into the pneumatic apparatus, and riſes into the bell-glaſs filled with water or mercury. By opening the ſhort capillary tube of the communicating tube, we ſhall at all events prevent the tranſition of the water or mercury from the bell into the balloon. This compoſition of Woulfe's apparatus is frequently made uſe of in the analyſis of organized ſubſtances by dry diſtillation.

Third caſe. If we know before-hand that the gaſes to be obtained in a diſtillation, beſides the body in the liquid form, are two-fold, and that one is ſoluble in water, the other not, the two gaſes may be obtained ſeparately. To this end the apparatus is compoſed exactly in the ſame manner as in the firſt caſe; and a ſecond bottle is moreover connected by means of the recurved communicating tube with the pneumatic veſſel. The liquid body, in this caſe, as in the two former, comes over directly into the balloon, but the gaſeous bodies riſe through the communicating tube into the firſt receiver, and from thence into the ſecond. The ſoluble gas is here abſorbed by the water, and the inſoluble gas paſſes through the bent communicating tube into the bell of the tube. The tube of ſafety in the firſt bottle indicates the progreſs of the operation, and prevents the tranſition of the water into the balloon, but the capillary tube of the third communicating tube is of great uſe in caſe the water of the tub ſhould come over into the ſecond bottle. If of the two the ſoluble gas be carbonic acid gas, we uſually apply a ſolution of cauſtic pot-aſh in the ſecond bottle inſtead of pure water, becauſe it abſorbs this gas, more perfectly, and with greater ſpeed.

This conſtruction of Woulfe's apparatus is principally made uſe of in the examination of organized ſubſtances by fire. Wood, for inſtance, affords by dry diſtillation, an acidulous phlegm, an empyreumatic oil, inflammable and carbonic acid gas. To obtain theſe products ſeparately, the wood is diſtilled in the apparatus as above-mentioned, when the water and oil remain in the balloon, the carbonic acid is abſorbed by the cauſtic alkali, and the hydrogen gas or inflammable air paſſes over into the bell. Now, if the weight of all theſe bodies be aſcertained, we find that the ſum of the weight of the liquid body, of the gaſes, and of the reſidual carbon, is, ſave a very ſmall loſs, equal to the weight of the wood made uſe of.

Woulfe's apparatus is likewiſe calculated for the impregnation of water with carbonic acid. For this purpoſe, a bottle with two necks is connected with a ſecond bottle alſo with two necks, by means of a communicating tube with unequal ends, in ſuch a manner, that the longer end enters the ſecond bottle. After an optional quantity of pure water has been introduced into this ſecond bottle, it is connected in a ſimilar manner with a third bottle, and this with a fourth. All the joinings having been ſecured by lute of almonds, powdered chalk, and highly diluted ſulphuric acid, is alternately introduced through the ſecond neck of the firſt bottle, which is cloſed immediately after by means of a cork. The carbonic acid gas, generated during the ſolution of the chalk in the ſulphuric acid, comes over into the ſecond bottle, and what is here not entirely abſorbed by the water, paſſes on to the third bottle, &c. After the operation has been continued for ſome time, the water in the bottles is found to be highly ſaturated with the carbonic acid. The ſolution of the chalk ſhould be carried on very ſlowly, leſt the violent efferveſcence, and the great degree of heat, cauſe the ſulphuric acid to go over and mix with the water.

In this manner a ſolution of potaſh or ſoda may be completely ſaturated with carbonic acid, and changed into a perfect mild ſtate. With a diluted ſolution of potaſh is prepared alſo the acidulous water for diſſolving the ſtone; if the ley be concentrated, very beautiful cryſtals of the neutral carbonic acid ſalt will be formed during the operation. For this reaſon the communicating tubes ſhould be always ſomewhat wider in this operation, that they may not be ſo eaſily obſtructed by the cryſtals.

From this apparatus of Woulfe, ſeveral of thoſe exhibited in the preceding plates have been in part conſtructed, and adapted to particular experiments.

VAN MARUM's GAZOMETER.

This is an improved apparatus, conſtructed by D. Van Marum, of Haarlem, for the purpoſe of producing water by the combuſtion of hydrogen in oxygen gas; and is delineated in the Chemiſtry Plate VII. The veſſel, eleven inches in diameter, containing the air or gas to be employed, is repreſented at A. The mouth of it is cloſed by a braſs cover ſcrewed upon it, and furniſhed with three cocks, B, C, D. On the cock B, is ſcrewed a copper ſyphon E F, having its end F ſcrewed upon another braſs tube open at the bottom, repreſented by the dotted lines G G, and which deſcends within the braſs cylinder H, which is open at the top. To the lower

lower part of the cock B is cemented a glaſs tube I I, which is open at the lower end near the bottom of the glaſs. When the cock B is opened, the tubes G G, F E, I I, make only one ſyphon; from which, when it is completely full, and the water in both veſſels does not ſtand on the ſame horizontal line, the water will be conveyed from that veſſel where it has the greateſt height into the other, until the water in both be of the ſame height. For example, when the water in the cylinder H ſtands at K, and in the glaſs A at L, (in which caſe we muſt ſuppoſe the cock D open that the air may eſcape,) the water will continue to flow from H into A, till it ſtands at the ſame horizontal line.

The higher the water K is raiſed in H, the greater is the weight of the column, and the quicker the eſcape of the air. By theſe means M. Van Marum obtains what Meſſieurs Lavoiſier and Meuſnier call preſſure in the gazometer, merely by the higher level of the ſurface K over L. That the height of the water in H may be obſerved, a glaſs tube M M, about 1½ inch in diameter, and connected with it, is placed between H and A, in which the water will always have the ſame altitude as in H. An ivory ſcale, divided into inches and lines, faſtened to a cork ball, floats upon this water, and ſerves to ſhew the difference of the altitudes of the water at L and K.

The cock N, fitted to the top of the open cylinder O, ſerves, together with the cock P, to preſerve the preſſure perfectly uniform. Suppoſe, for example, that a conſtant preſſure of water of two inches high was required; as much water muſt be ſuffered to flow continually into H, as is equal in bulk to the quantity of water that this preſſure of two inches forces from H into A. For this purpoſe, fill the cylinder O, with water to the height of four inches, and turn the cock N, until the preſſure of the four inches of water, which is maintained by the cock P, forces through N into H a quantity of water exactly equal to the quantity that the preſſure of two inches forces from H into A. The index Q, of the cock N, and the ſcale R S, ſerve to give to the cock N the exact opening required; this having been determined before-hand, and the ſcale divided accordingly. The cock N begins to open when the index R is turned towards S; and, for this reaſon, the gradation of the ſcale begins at R. When the index is in a vertical poſition, the cock is completely open.

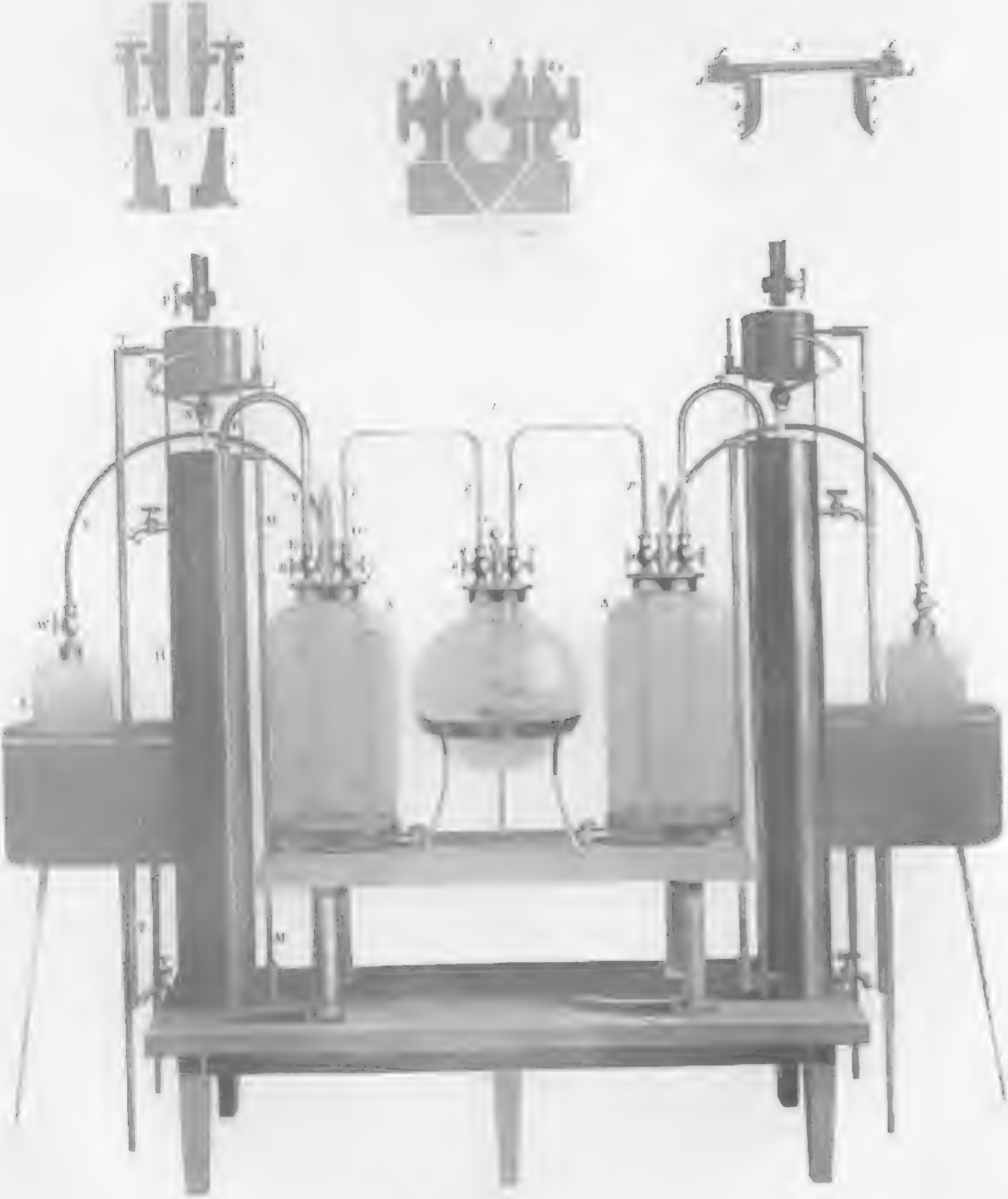
As it might perhaps be difficult to give to the cock P, which is connected with a ciſtern of water, ſuch an opening as not to permit more water to flow through it than neceſſary for preſerving a height of four inches in the cylinder O, a waſte-pipe T T is applied at this height, which ſuffers all the ſuperfluous water of the cock P to run off. In order that it may be more conveniently obſerved, whether the cock P has a ſufficient opening for maintaining a four-inch column of water, a glaſs tube U, marked at the required height, is applied on the outſide, connected with the cylinder O.

To fil this gazometer, nothing more is neceſſary than to let water run out from the cylinder H. For this purpoſe, the cock V muſt be opened, until the water in H ſtands lower than that in A. The cock D, and the cock W, ſtanding over the bell-glaſs X, are then opened. The air contained in X riſes through the pliable tube Y Y into A. This filling may be continued, by leaving the cock V open, that the water which proceeds through the ſyphon from A to H may run out, and the ſurface of the water in H ſtand always a few inches lower than that in A. At the ſame time the bell-glaſs X is to be ſupplied with new gas in the uſual manner. When the operation of filling is completed, the cock V is to be ſhut, and that at Z opened; the lower part of the opening of the key of which is in the ſame horizontal line with zero of the ſcale, which ſhews in cubic inches the altitude of the water in A. By theſe means the water falls no lower in A, than to the above-mentioned line; and A is conſequently filled with air to the beginning of the ſcale *a b*. Before the cock D is ſhut, care muſt be taken that the water in the bell-glaſs X do not ſtand higher than the water that ſurrounds it in its tub, which may be effected, if the bell-glaſs be depreſſed in the tub, till the internal and external altitude of the water be perfectly equal; and the air in A will then be of the ſame denſity as that of the atmoſphere.

The gazometer is furniſhed with a thermometer *f g*, which is ſo cemented with ſealing-wax into a piece of copper *e*, that the bulb of it is within the gazometer. By theſe means the temperature of the air uſed may be known, and its weight accurately aſcertained. The tripod on which the gazometer ſtands, facilitates the adjuſtment of the apparatus, and a braſs bottom ſcrewed upon the tripod is furniſhed with a braſs rim or lip, to receive the glaſs A, and keep it faſt in its place. Exactly at the upper level of this rim the ſcale *a b* commences. The ſcale is of ivory, faſtened on a ſlip of braſs, and at the ends are two ſquare pieces of braſs, by which it is made faſt, by means of two ſcrews, to the cover at the top, and to the before-mentioned lip. The ſcale is divided in the common method, by pouring equal meaſures of water (ſuppoſe two cubic inches) into the glaſs, and marking the height of each on the ſcale, or, as the glaſſes are nearly cylindrical except at the neck, it may be ſufficient to uſe at once thirty-two cubic inches, and divide the height into ſixteen equal parts; the neck of the veſſel muſt be divided, as above, by two cubic inches at a time.

To explain the uſe of this gazometer, it is only neceſſary to ſhew how the ſyphon G F E I, is filled at the commencement of the experiment. This is done almoſt in the ſame manner in which M. Lavoiſier filled the ſyphon, which he employed in order to fill the lamp uſed in the experiment reſpecting the combuſtion of oil. The method is as follows: The two cocks N and P are to be opened at the ſame time, and to be kept ſo until the cylinder H is completely filled with water. The tube G G, which is open both above and below, as the crooked tube F E is not yet joined to it at F, will be filled at the ſame time with the cylinder. The tube G G is then to be ſhut below by the cock *h*. This cock is fixed into a piece of braſs, which is faſtened in the cylinder H by four ſcrews, the heads of which may be ſeen at *i, i, i, i*. To this piece of metal, made hollow in a perpendicular direction, is ſoldered the tube G G, which touches the inſide of the cylinder H, and is made faſt at the top by a piece of braſs, which is ſcrewed to the interior edge of the cylinder by two ſcrews, the heads of which are ſeen at K. As ſoon, therefore, as *h* is ſhut, the crooked tube F E is to be ſcrewed to G G and the cock B. The cock B is ſhut, the ſcrew *j* is to be unſcrewed to open the tube at that place, and water poured by means of a funnel into the orifice thus opened. As ſoon as the tube E F is full, the orifice is again ſhut. The cock *h* being then opened, and afterwards B, ſo much water runs from H, through the ſyphon G F E I, that A will be completely filled, if care be taken, by opening the cocks N and P, that the water in H ſtand always higher than that in A. To haſten the the filling of the glaſs A, it will be convenient to fill the cylinder H almoſt entirely.

In order that the bent tube E F may be faſtened air-tight to the cock B, and the tube G G, without turning it round, each end of E F is ground to fit conically the places intended to receive them, and is preſſed home by the following contrivance: Fig. 2. repreſents a ſection paſſing through the axis of this part of the apparatus. The part *a a*, which is furniſhed with a ſhoulder, is ſlipped into the hollow *c* of the cock B; and the female ſcrew *d d*, by means of its ſhoulder *f f*, when turned upon the ſcrew *e e*, preſſes the conical part *a a* into *c*. The conical piece of the other end F of the tube E F, is adjuſted in the ſame manner into a piece of copper ſoldered to the tube G G. All the tubes of this apparatus are adjuſted to their reſpective cocks in the ſame manner. It will be ſufficient to greaſe ſlightly the ſurface of any of theſe



these conical pieces, before it is put in its place, to prevent all communication with the air of the atmosphere.

The balloon, for the composition of water, placed upon its tripod between the gazometers, differs from that of Lavoisier, principally in the manner of shutting it, in order to prevent the entrance of air. For this purpose there is a rim of copper *a a*, fig. 3. fixed on the neck of the balloon, by means of plaster of Paris, which, that it may afford no passage to the atmospheric air, is coated over with common cement or lute, above the edge of the band *a a*, as may be seen at *b b*; and this cement is covered with a strip of linen *c c*, a quarter of an inch in breadth, dipped in the white of an egg mixed with lime. The rim of copper *a a*, has a copper ring *d d*, soldered to it at right angles; and on which the plate of copper *e e* is ground, in such a manner that it is sufficient to grease slightly the upper surface of the ring *d d*, when a vacuum is to be made, taking care to apply so little grease that it may not penetrate into the balloon. To exhaust the balloon there is a cock, which communicates by a bent tube with an air-pump placed behind the balloon; and to prevent the working of the air-pump from shaking the balloon, this bent tube is made in part of elastic gum. The plate of copper *e e*, is kept down upon the ring *d d*, by six screws; two of which may be seen at *f f*, placed at equal distances round the neck of the balloon, and by means of which the plate *e e* may be made to press very strongly on the ring *d d*, on turning these screws by the help of a key. Both of the gazometers are made to shut in the same manner.

The inferior surface of the plate *e e* is covered, as far as it covers the opening of the balloon, by a thin plate of pure silver, in order that the vapours formed during the experiment may not touch the copper. For the same reason the bent tube *l m*, in the balloon, is also made of pure silver. At the extremity of this tube, is a piece of platina, having a very small aperture, scarcely sufficient to afford a passage to a very fine needle. The part *n*, which serves as a conductor to kindle the hydrogen gas by an electric spark, is also made of platina, as far as it is not inclosed in the glass tube, *o o*, by which it is insulated. Platina is preferred for these two parts, in order to prevent the oxydation of the metal, which the heat, produced by the combustion of the hydrogen gas in oxygen, might occasion. The tubes *p p p p*, which serve to conduct the gases into the balloon, are made of glass, and cemented into the copper tubes *q q*, which have conical extremities, like those above described, to fix them on the cocks. These glass tubes are raised a little above the edge of the cylinder H, to prevent the water from passing into the balloon, should we happen to fill one of the glasses A, and neglect to shut well the cock C.

It will be proper to make the glasses A, pretty large, if they can be procured so, in order that the gazometers may contain the more air. It will however be best to make them rather high (twenty-eight or thirty inches) than wide, in order that the exactness of the scale *a b* may not be diminished. M. Van Marum answers an objection, which he says may possibly be urged against this apparatus, namely, that the combustion is obliged to be suspended every time that the gazometers need to be replenished with either oxygen or hydrogen. He says this is no solid objection, as he finds that, since he used platina for conveying the electric spark, he never fails to kindle the hydrogen the first moment it enters the balloon; and that, besides, the combustion of a cubic foot of hydrogen gas, in order that the water produced may not contain acid, ought to take six hours. Those who wish to make experiments of longer duration, have only to attach two other gazometers; by which means, while the one set is emptying, the other may be replenished.

For this purpose it will be necessary to have, instead of the cock *u*, two cocks Z 1, Z 2, fig. 4, screwed to a piece of copper fixed to the cover of the balloon; and by which each of these cocks has a communication with the bent tube *l m*, by means of two holes *x*, *x*, which proceed obliquely through this piece, and end in the tube *l*. The first gazometer, which communicates with the balloon by the cock Z 1, being almost emptied, the cock Z 2, of the second gazometer, may be opened, after having made the pressure in the second gazometer equal to that in the first. It is evident that the pressures of these two gazometers being equal, the velocity with which the hydrogen gas enters the balloon will not experience the least change. When the first gazometer is entirely empty, the cock Z 1 is shut and the first gazometer is filled; and the cock Z 1 is not opened till a little before the second gazometer is totally emptied. The second gazometer is then to be filled again; and in this manner the combustion of hydrogen gas may be continued by these gazometers to any length of time, without interruption. To introduce the oxygen gas without interruption into the balloon by means of two gazometers, it will be sufficient that the two cocks, which form a communication between the gazometers and the balloon, be immediately fixed in the covering of the latter.

Both halves of the apparatus being similar, the letters of reference are only marked on one side of the plate.

VAN MARUM'S APPARATUS FOR THE COMBUSTION OF PHOSPHORUS.

This able chemist having made several fruitless attempts to render a balloon, for the combustion of phosphorus in hydrogen gas, perfectly air-tight, according to the method described by Lavoisier in his Elements of Chemistry, he constructed another similar to that employed in his gazometer, above described, for the composition of water; and secured it against the entrance of air in the like manner. This apparatus is represented at fig. 1, in the Chemistry Plate VIII. where the balloon A, has two cocks B C, with conical stoppers, and united to the tubes by the same means as those in the gazometer above-mentioned. Within the balloon is a small crucible of platina, *d*, suspended by two wires of the same metal, from the plate of copper by which the balloon is shut. The cock B serves to connect the tube with an air-pump, and by these means to empty the balloon of atmospheric air. By the cock C, the oxygen gas, contained in the gazometer G, is introduced; but, as this gas ought to be as dry as possible before it is admitted into the balloon, there is applied, between it and the gazometer, a glass cylinder H, filled with a salt which strongly attracts the moisture of the gas. The salt found most effectual in this experiment, was that used and recommended by Saussure for drying atmospheric air. It is the alkali which remains after the decrepitation of a mixture of equal parts of nitre and crude tartar, which has been kept at a red heat for an hour.

The salt in the tube H must not be pulverised, but divided into small fragments, in order that the gas may penetrate through it, and come in contact with a greater portion of its surface. The tubes *i*, *n*, *k*, by which the cylinder H is connected with the gazometer and the balloon, must be pliable, because it would be too difficult to place the cylinder H in such a position, as to be united with the balloon and gazometer by means of tubes not capable of being bent. Pliable tubes of elastic gum are best for this purpose, the ends of which are fastened to the copper pipes screwed into the cocks.

Lavoisier kindled the phosphorus in his balloon by a burning lens; but Van Marum observed that phosphorus wrapt up in a particular manner inflames spontaneously when the air is rarefied to a certain degree; and he employed the result of this observation to inflame the phosphorus in his balloon. This chemist describes the utility of the present apparatus, as follows: "I have several times, both in the course of my lectures and on other occasions, shewn the production of the phosphoric acid by the combustion of phosphorus in oxygen gas, as described by Lavoisier in the Memoirs of the Academy of Sciences

Sciences for 1777. In my experiments I have generally burnt sixty grains of phosphorus. They have shewn that the weight of the phosphoric acid produced, is always nearly equal to that of the phosphorus burnt, and of the oxygen gas employed. I calculated the results by the method described by Lavoisier in his Treatise of Chemistry (vol. ii); but it is not necessary they should be inserted here, as the composition of the phosphoric acid has been sufficiently established by the accurate experiments of Lavoisier. My object, in describing the apparatus I employed, was merely to enable those who wish to repeat the experiments, to do so by an easier method, and with more certainty than according to that proposed by him. It must here be observed, that as the phosphorus by my process, inflames in rarefied air, there is no danger that the sudden expansion of the air, produced by the intense heat of the inflamed phosphorus, will burst the glass, to prevent which, in Lavoisier's method, requires great caution, as he himself has remarked. That the balloon during the combustion may be as little heated as possible, I suffer the air, after the inflammation, to pass gradually, and in small quantity, into the glass globe, and for that reason do not open the cock until the flame begins to be extinguished. In this manner the experiment may be performed without any danger.

"In the year 1794, I made known, in the thirteenth number of the *Chemischen Oeffeningen* of the celebrated Kastellyn, my experiments on the combustion of phosphorus in the so-called vacuum of an air-pump. Had professor Gottling, and other German chemists, who have observed phosphorus to shine in azotic gas, paid more attention to what these experiments clearly establish, they would not have made so much noise respecting a phenomenon which is so like the shining of phosphorus before it inflames in air highly rarefied. This shining of phosphorus in an imperfect vacuum, shews, that the small quantity of oxygen gas contained in atmospheric air so highly rarefied, is still sufficient to occasion that luminous appearance; and, as it is well known that it is absolutely impossible to produce azotic gas which does not contain some oxygen gas, they might have seen by these experiments, that the small quantity of oxygen which must have been contained in their azotic gas, was sufficient to produce that light which they observed.

"I shall here only add, that phosphorus will not shine at all in azotic gas which contains no oxygen gas. This I shewed, on the 18th of January 1794, in my lectures at the Teylerian Institute. I introduced azotic gas over mercury, and freed it totally from oxygen gas, by introducing phosphorus into it on the point of a bent iron wire, which I passed up through the mercury, so as to bring the phosphorus in contact with a piece of ignited iron previously introduced into the receiver. All the oxygen gas united itself in a moment with the volatilized phosphorus; and another bit of phosphorus, which after the cooling of the apparatus I made to rise through the quicksilver into the azotic gas, which in that manner was freed from all oxygen, did not shine. A small bubble of atmospheric air was sufficient to reproduce the shining. It was then seen diffused throughout the whole gas, in the same manner as when atmospheric air is admitted into an exhausted receiver, in which phosphorus has ceased to be luminous. I shewed, in the course of the same lecture, that phosphorus does not shine in a perfect vacuum. For this purpose I caused the phosphorus to ascend through the quicksilver of a barometer, and it exhibited no light. In order that this experiment may completely succeed, you must employ a barometer, the tube of which has been well freed from atmospheric air, by boiling the quicksilver in the tube. If you use a barometer the quicksilver of which has not been boiled, the small quantity of air contained in it will be sufficient to make the phosphorus luminous; but this appearance will be of short duration, because the exhausted space of such a barometer can contain only a very small quantity of oxygen gas."

The Mercurial Gazometer of W. H. Pepys, Jun.

The difficulty which has attended the exhibition of acid and alkaline gases, was the first inducement to Priestley, Lavoisier, and others, to use mercury for such experiments; but the great expence and enormous weight of this fluid, obliged many accurate and experienced chemists to relinquish them almost entirely, as there appeared no other likely means of succeeding but by its means, and that of the exhausted receiver. A contrivance to lessen the quantity of mercury necessary for such experiments, is therefore a desirable object; and Mr. Pepys seems to have succeeded in constructing an apparatus, in which the above-mentioned requisites are obtained at a comparatively small expence. As it is hardly possible to japan tin or copper so perfectly as to prevent their being attacked by mercury when brought in contact with them, the cylinders are turned in lignum vitæ, on which the mercury has no action; the conducting tube is of glass; and the cocks are coated on the inside with varnish. The usefulness of an apparatus so constructed will appear sufficiently obvious, when it is recollected, that all gases passed through any other fluid than mercury, as water for instance, take up a quantity of moisture, which adds considerably to their gravity, and makes it impossible to determine their real weight.

For weighing the gases, a glass globe and stop-cock of a smaller size than is commonly employed, is here to be used, as greater accuracy can be obtained by using a proportionally delicate beam, than by employing a larger globe, which must be suspended to a beam of such strength as greatly to increase the friction on its axis. It is of great importance in the analysis of bodies, or in other chemical experiments, to be able to ascertain with accuracy the weight of any gas obtained by the process. The weight of two or more quantities of gas should however be always tried, and the mean be taken, to prevent any error.

Fig. 2, in the Chemistry Plate VIII. is a representation of the bell-glass of the gazometer, furnished with a cock at top, and able to contain thirty-four ounces troy of distilled water. The divisions of capacity, determined by actual measurement, are marked on the glass with a diamond. B B, section of two cylinders of lignum vitæ, the outward one screwed upon the solid internal one, which is made to project at its lower extremity, and furnished with a male screw, to work into a female screw with which the lower end of the external cylinder is furnished. The space between these is so adjusted, as to be almost filled up by the substance of the bell-glass A, when dropped into it, so that the quantity of mercury necessary to fill up that space is proportionally small. The internal cylinder has a conducting tube through its axis, the lower end of which is furnished with a female screw answering to the male screw of the cock of the small receiver C. The receiver C is made of glass, and open at the bottom. When this receiver is used, it is screwed into its place, and rests upon a small cup or cistern of mercury D, in which the beak of a retort, furnished with a bent glass tube, may be introduced under the receiver. E, E, section of a wooden stand, upon which the cylinders of lignum vitæ are supported, having an opening through the top, to permit the cock of the receiver C to be joined to the conducting tube of the internal cylinder B. The cistern D is adjusted to its height by means of a rising cylinder in the pedestal F. Fig. 3. is a transfer glass for mixing alkaline gases in vacuo, or other purposes; and, when used, is joined to the top of the bell-glass A. Fig. 4. a glass globe and stop-cock, capable of holding 14 ounces troy of distilled water for weighing gases: it receives its gas by being inverted, and

Machine for the Combustion of Phosphorus, &c. the Mercurial Gazometer, & Guyton's Eudiometer.

and ſcrewed into the bell-glaſs A. Fig. 5. an elaſtic-gum bottle, capable of containing thirty ounces of diſtilled water, for holding the acid gaſes: when uſed, it is ſcrewed into the top of the transfer glaſs at fig. 3. the bottom cock of the latter being at the ſame time joined to the bell-glaſs A, previouſly charged with the alkaline gas: the cocks being turned, the gaſes ruſh together in vacuo. Fig. 6. a ſmall portable air-pump, for exhauſting the glaſs globe at fig. 4.

One of the principal objections to the uſe of mercury in ſuch experiments as this apparatus is intended for, has been, the great force neceſſary to overcome the reſiſtance of a column of mercury when gaſes are to be received over that denſe fluid; a reſiſtance in the proportion of one inch of mercury to fourteen inches of water, and which very few lutes are able to withſtand. This reſiſtance however may be overcome by a bent tube fitted into the beak of the retort, (if one be employed,) or into a Woulfe's bottle, and paſſing into the upper part of the ſmall receiver, expreſſed in the plate at C. By employing mercury for ſuch experiments, another advantage is gained by the uſe of this apparatus, namely, a power of exhauſtion in the retort, or Woulfe's bottle, equal to a column of two inches of mercury, or twenty-eight inches of water. This will be eaſily conceived, when it is recollected that, by drawing up the large receiver A, the ſmall one C is raiſed in its ciſtern, bearing up with it the contained mercury, which is kept in its place by the preſſure of the atmoſphere on the ſurface of the mercury in the ciſtern. The cock of the ſmall receiver C is then to be turned off, and that of the large one A to be turned on. The air, of which the retort, or Woulfe's bottle, is thus exhauſted, may then be let out, by plunging A into the mercury between the cylinders B B, and turning off the cock. When a ſufficient quantity of gas paſſes from the retort, or bottle, through the bent tube into C, to level the mercury in it and the ciſtern, the communication may again be opened, and the ſame ſteps followed as before deſcribed. By this means Mr. Pepys was enabled to obtain more gas, from the ſame materials, than if he had received it through a fluid of the weight of water; a circumſtance of ſome importance where nice and accurate reſults are to be made.

GUYTON's EUDIOMETER.

Chemiſts have long wiſhed for an eudiometer capable of ſhewing exactly the quantity of oxygen gas mixed in any other gas. Berthollet has proved, in his Lectures at the Normal School, that the eudiometer of Scheele, which he juſtly conſidered as the beſt, has ſtill great defects, as the abſorption requires ſeveral hours, and as towards the end there is a decompoſition of water, and conſequently a diſengagement of hydrogen gas, which occaſions uncertainty reſpecting the quantity abſorbed. This induced Guyton to ſeek for ſome ſubſtance, which, in a convenient manner, might immediately give a more accurate reſult than nitrous gas, hydrogen gas, phoſphorus, and a mixture of ſulphur and iron, the only ſubſtances hitherto employed for that purpoſe. Sulphure (ſulphuret) of potaſh, appeared to him fit to be tried under this point of view. He was well aware that at the ordinary temperature, it is ſuſceptible only of a combuſtion ſtill ſlower, and more inſenſible, than a moiſtened mixture of ſulphur and iron; but he preſumed that, if the temperature were raiſed by applying a ſmall taper, it would be ſufficient to put in action the affinity, and to determine rapidly an abſorption which would not then be affected by any foreign cauſe. The effect fully anſwered expectation; ſo that the queſtion then only was, to determine the apparatus neceſſary to form this new eudiometric inſtrument. He thought that an inverſed retort would unite ſimplicity, convenience, and every advantage that could be deſired. This inſtrument, thus completed, is exhibited in the Chemiſtry Plate VIII. at fig. 7. A B is a glaſs retort with a long neck, and capable of containing from twelve to fifteen centilitres, which is about eight cubic inches. One muſt be choſen ſo much bent that, when the neck is placed vertically, the bulb may form in its lower part a cavity containing the matters introduced into it. The extremity of the neck is ground with emery, to fit air-tight at C into the glaſs tube C D, open at both ends, and twenty or twenty-five centimetres in length, (a centimetre is about four lines or tenths of an inch,) F is a cylindric veſſel, or common glaſs jar, into which the tube of the glaſs C D may be entirely immerſed below the ſurface of the water.

When you wiſh to try any aeriform fluid, in order to ſeparate its parts, and diſcover the quantity of reſpirable air it contains, put into the retort two or three bits of ſulphure of potaſh of the ſize of a pea; fill it with water, taking care to incline it to make all the air which might remain in the bulb paſs into the neck; ſtop with the finger the orifice of the retort, and place it in the pneumatic ciſtern, that the gas to be tried may be introduced in the uſual manner. By inclining it again, alternately in different directions, all the water may be eaſily diſplaced, and the ſulphure left remaining in the bulb. Then place the retort vertically, and introduce the end of it into the glaſs tube CD, which muſt ſtill be under water; and place below the bulb a ſmall lighted taper. To preſerve the retort in its poſition, a cover of wood, with an aperture for its neck to paſs through, ſhould be fitted to the jar.

The firſt impreſſion of the heat dilates the gaſeous fluid, ſo that it deſcends almoſt to the bottom of the tube, which has been diſpoſed on purpoſe to receive it, and to hinder any part of it from eſcaping, which would be the caſe if the tube were not ſufficiently long, and which would prevent the diminution from being accurately determined. As ſoon, however, as the ſulphure begins to boil, the water aſcends with rapidity, not only in the lower tube, but alſo in the neck of the retort, notwithſtanding the application or even augmentation of the heat. If it be vital air, abſolutely pure, the abſorption is total. In that caſe, to prevent the veſſel from burſting, which might happen were it cooled too ſuddenly, the aſcent of the water muſt be retarded, either by removing the taper, or inclining the retort, which will not hinder the abſorption to continue, while there remains gas proper for maintaining combuſtion.

If it be common air or vital air mixed with any other gas, you muſt, after cooling, meaſure the quantity of water which has entered the retort, and which will exactly repreſent the bulk abſorbed. You muſt not neglect to confine the remaining gas under the ſame preſſure, by immerſing the retort in the pneumatic ciſtern, till the internal and external water be on the ſame level, before you cloſe the orifice by a ſtopper. This operation, very eaſy when you have graduated veſſels, may be made in common practice by means of a piece of paper cemented along the neck of the retort, and having traced out on it diviſions determined by experiment, and which may be covered with varniſh, to defend it from the action of the water.

C. Chauſſier has conſtructed, for eudiometric experiments by phoſphorus, an apparatus ſomewhat different, compoſed of a long tube all of one piece, one end of which is bent and blown into a bulb, and having, as at *e*, a tubulure ſhut with a ſtopper after the water has been made to aſcend in the inſide of the tube to two-thirds of its height. This inſtrument would ſerve alſo for experiments with the ſulphure of potaſh; but we muſt obſerve, that the execution of it is not ſo eaſy as on the firſt view might appear. Beſides, if the tubulure renders it very convenient for trying atmoſpheric air, the caſe is not the ſame in regard to other gaſes which cannot be introduced but by tranſmiſſion.

New GAZOMETER of the PHILOSOPHICAL SOCIETY of LONDON.

This improved apparatus, recently constructed for the production or formation of water, by the combustion of hydrogen gas in oxygen gas is accurately delineated in the Chemistry Plate IX. fig. 1, where A B represents a light globular vessel of flint glass, about twelve inches in diameter, in the manner of an adopter, having the narrow necks A and B opposite to each other. The lower part of this vessel is drawn out at C, to form the tube C D, which is provided with a stop cock at its lower extremity D. The square mahogany frame F G stands parallel with the horizon. Near the end K of a mahogany board, the brass rod M N is screwed so as to stand upright; it is provided with a shoulder, in order that it may be firmly fixed into the plate M O, fastened at each angle to the board with screws. In the same manner the rod P Q is fastened at the other end of the board K, which fastening cannot be seen in this view of the apparatus. These rods pass through the square frame F G at H and I, so that it may be slidden upwards or downwards on the rods. At each hole in this frame, through which the rod passes, a brass socket H a, is screwed to the lower side of the frame, so that the rod may pass freely through it; and that it may be fixed at any elevation, the socket is provided with a screw H, by which the rod may be pressed against the opposite side of the socket, and thus kept in the position required. The opposite side of the frame near I, is in the same manner provided with a socket and screw.

The vessel Q, containing water, has a tube fixed in the centre of its bottom, which receives the rod, and slides on it, so that the vessel may be sustained at any required height. By means of a stop cock b the water may be made to trickle more or less quickly from the vessel Q, upon a piece of muslin c, by which it is distributed over the whole surface of the adopter A B, and descends by C D into the square trough D, after having served to cool the adopter; d is a glass funnel, cemented into a brass cap at m, from which the transverse tube B e, provided with a stop cock, may deliver the hydrogen gas of the funnel d into the adopter, through the slender extremity e, made of iron, lest it should be melted by the flame of the hydrogen gas.

Under the other neck of the adopter stands the funnel g, furnished with a stop cock at f, intended to receive and deliver oxygen gas by the course g g A into the adopter, in order to maintain the combustion of the hydrogen gas. Through a collar of leather, fixed in the tube between i and A, an iron wire passes, bent in the direction A e: the end of this wire at e is at the distance of one-eighth of an inch from the end of the tube which supplies the hydrogen gas, when the wire stands in this position to deliver the electrical spark, and inflame the hydrogen gas as it issues. The end of the wire at i, is screwed into a small brass ball, by which it receives sparks from the larger ball k of the electrical conductor. The funnel containing oxygen gas enters water to the depth of three or four inches in the vessel R S, the size of which admits a pint bottle of gas to be introduced under the funnel and delivered into it. The vessel T U serves in like manner for the supply of hydrogen gas to the funnel d.

When it is intended to accelerate the combustion of the gases, the hydrogen funnel must be kept constantly full, so that it may be pressed upwards by a column of three or four inches of water: at the same time the oxygen funnel must be supplied so slowly, that the water may rise in it five or six inches above the common level. In the contrary circumstances the combustion may be retarded at pleasure; but care must be taken that the hydrogen gas issue in a continued stream, and the flame be maintained.

As it is necessary that the adopter should be firmly screwed to the square frame, and yet easily separable from it, the following provision is made: *a b* is the neck of the adopter through which the gas is to be introduced. The lip at *b* strengthens the mouth of the adopter. *d* is the external projecting part of the glass stopper, which is accurately ground to fit. This stopper being ground to a smaller diameter between *d* and *g* is there cemented into a brass cap *g f*. The slender wire which is to deliver the electric spark is continued through the glass stopper *d* to i. The oxygen funnel g communicates by a narrow passage with the cavity of the adopter round the wire i e. The neck of the adopter is imbedded in the mahogany frame, the brass clip *b* shuts upon this neck, and presses it to the frame by the screws *i i*. To keep the stopper *d* firm in the neck of the adopter, a semicircular clip embraces the brass cap *g f*, and meets the shoulder of the stopper *d*. From this clip two brass pins enter the piece *k*, which being drawn to the frame by the screws *l l*, forces the clip against the glass stopper *d*, and thus fastens it firmly in the neck of the adopter. By the like mechanism the other neck of the adopter is made fast to the frame.

The wire i e, being moveable in a well-greased collar of leather, the brass ball i is turned round, when the hydrogen gas has been inflamed; and the wire A e turning with this ball, the end e is removed to one side from the flame of the hydrogen gas: the screw *m* serves to keep the wire in the position required.

Previous to the use of this instrument the funnels are to be screwed off: the oxygen funnel at f; the hydrogen funnel at the neck B, of the adopter. The hydrogen stopper being removed, the adopter is to be rinsed with distilled water, and, being again put in its position on the frame F G, is to be left to drain, the tube C D being left open. After this the adopter with its stoppers and included air is to be weighed: the hydrogen stopper being then removed, the adopter is to be filled with distilled water of a known temperature, and the stopper to be again replaced. By the weight of the water in the adopter its capacity in cubic inches is ascertained.

The same stopper is now to be taken out and dried, and oxygen gas, under a pressure of a two-inch column of water, to be introduced till all the water is excluded from the adopter: its orifice, being still under the water, is then covered with the finger, and another person stands ready to introduce the stopper, which has to expel its bulk of gas, so that no air can enter against this current of the gas. The adopter is now fastened to its frame, and the funnels are screwed on. To prevent the hydrogen tube from introducing the atmospheric air which it otherwise would hold, oxygen gas is sucked through it from the small extremity.

The funnels, the capacities of which are determined by measurement, and marked at the different heights, now contain atmospheric air confined by water, which is to be sucked out by means of a slender syphon: when the oxygen funnel is thus emptied of its air, in order that none may remain in the neck, oxygen gas is to be introduced and sucked out repeatedly. Then it is to be charged with the same gas, and the stop cock to be opened to allow a free communication between the gas in the funnel and that in the adopter, which is now left to drain for twenty-four hours, at the end of which time the water which has gathered in the tube C D, is to be passed off by opening the cock D, which must just touch the surface of the water in D, that the oxygen gas in the adopter and funnel may accommodate itself to the present temperature and pressure of the external air, which is to be noted, and then the cock to be stopped. The water on the outside of this funnel is to be kept two or three inches lower than in the inside. The hydrogen funnel d is to be freed of its contained atmospheric air by the same means employed for freeing the other funnel, and

1. New Gazometer of the Philosophical Society of London. 2 to 4. De Cagne's Apparatus for saturating Water with Gas. 5 and 6. Apparatus for freezing Mercury.

and hydrogen gas is to be repeatedly introduced and sucked out. At last it is to be filled with measured quantities of this gas to the lip, which is to be compressed by a column of about four inches of water.

The apparatus is now ready. The ball k of the electrical conductor, charged by a good machine, is to be brought near to the ball i; and while the sparks pass in quick succession from the wire A e to the point of the tube B e, the cock at f is to be opened quickly, so that the first portion of hydrogen gas issuing at e may be instantly inflamed; the wire is then to be turned away from the flame. The combustion may be accelerated by increasing the column of water which presses the hydrogen gas, and lessening the pressure on the oxygen gas. The adopter is now to be kept cool by water, allowed to trickle down over it from the vessel Q. During the combustion, measured quantities of the gases are to be introduced into the proper funnels; and, when it is wished to interrupt the process, the cock which admits the hydrogen gas is to be quickly stopped. As the vessels cool, the oxygen gas and aqueous vapour in the adopter will contract in bulk, and the water in the oxygen funnel will rise towards the brass cap f. At this moment the cock must be shut, to prevent the water from rising higher.

When the process is to be renewed, the oxygen funnel is to be charged with gas, and the cock to be opened. The hydrogen funnel is next to be charged; the wire A e to be turned to its first position, and the electric spark to be applied as before. Thus the combustion may be carried on from day to day. That the electric sparks may strike quickly and vigorously, a communication should be made with a wire between the cushion of the machine and the brass cap m.

As the gases employed are not to be considered as wholly free from azotic gas, its presence will at last reduce the gas in the adopter to the standard of atmospheric air. The flame will then become weaker, and must be watched, that the cock of the hydrogen funnel may be stopped before the flame is extinguished; otherwise some of the hydrogen gas will pass unaltered into the adopter, and be confounded with the azotic gas, from which it is not easily separable.

When the process is terminated, the quantity of hydrogen gas remaining in its funnel, is to be noted from the gradations marked on the vessel, and to be deducted from the sum of the measures of the hydrogen gas employed. This funnel is then to be screwed off. The oxygen funnel is to be treated in the same manner, proper attention being paid to the level of the water, and to the temperature and pressure of the air at the time. The adopter and stoppers, being now in the state in which they were first weighed, are now to be weighed again, with the contained water, to determine its present weight. To weigh the water thus formed more accurately, and to examine its quality, it must be drawn off from the adopter. For this purpose the adopter, after it has stood to drain for twenty-four hours, is to be warmed by wrapping the upper part of it in a hot cloth: a bottle of a proper size is to receive the extremity of the tube CD, and, the stop cock being opened, the expanded gas in the adopter will press all the water into the bottle. During the passage of the water, the bottle is to be held at such a height that the orifice of the stop cock may dip only one-eighth of an inch in the water; and when a single bubble of gas from the adopter has issued through the water, the stop cock is to be instantly closed.

The gas remaining in the adopter is now to be transferred into another vessel, in which it may be exposed first to lime-water, that any carbonic acid gas contained in it may be measured; and afterwards to sulphure of lime, which will imbibe all the oxygen gas, and leave the azotic gas in a state fit for mensuration. The quantity of heterogeneous matter introduced with the gases during the combustion, being thus discovered, a proportionate deduction is to be made from the calculated weight of the hydrogen and oxygen gas employed. The difference of weight of the azotic gas remaining, and the common air at first weighed with the instrument, may thus be easily determined.

The Society, from whose minutes this extract was made, carried on the combustion in the manner above described, for about two hours at a time on different days, till the column of water in the tube CD was eight inches and a half in length. At each of these times the temperature of the gases and the height of the barometer were carefully noted. In the manner described by Lavoisier, the volume of each gas at 29·85 inches of the barometer, and 54·50 of the thermometer, was ascertained; and the weight of the oxygen gas consumed was found to be 416·5 grains, and that of the hydrogen gas 72·5 grains; the weight of both being 489 gr. = 1 oz. 11 dwt. 9 gr. The water produced weighed 1 oz. 11 dwt. 7 gr.; and, contrary to all expectation, had no sensible acidity.

M. Des Vignes's Apparatus, for preparing Aerated, Acidulated, or Mineral Waters.

Although we have, in page 210 of this volume, given a description of Dr. Nooth's apparatus for this purpose; and also of the improved one constructed by M. La Grange, both of which are delineated in the Chemistry Plate III. yet the acknowledged utility of these waters, and an ardent desire of simplifying the means of obtaining them, and of procuring, at pleasure, by artificial means, all the most valuable mineral waters, will sufficiently justify our recurring to the subject in this place.]

Water impregnated with carbonic acid gas, acquires the properties of simple mineral waters, and possesses all their medical qualities. The natural acidulous mineral waters do not differ from these except in holding other principles in solution; and they may be perfectly imitated, when their analysis is known. It is absurd to think that art is incapable of imitating nature in the composition of mineral waters. The operation is purely mechanical, consisting of the solution of certain known principles in water; we can and ought therefore to perform it still better, as we have the power of varying the materials, and proportioning the strength of any mineral water, to the purposes for which it is intended to be applied. When properly made, the liquor should have a brisk acidulous taste, most resembling Seltzer water. In an alkaline solution, if it be not perfectly saturated with carbonic acid gas, it is apt, not only to be disagreeable to the taste and stomach, but also to prove irritating to the urinary passages, which it rarely does when properly prepared. White powder of marble may be used for the production of carbonic acid gas, in preference to chalk.

Des Vignes's apparatus for preparing these waters, is delineated in the Chemistry Plate IX. fig. 7. and the following is the description that chemist gives of it: A, the bottle or vessel in which marble, chalk, or any other proper substance, is to be put, with a little water. B a bottle containing sulphuric acid, and having its neck ground to fit in the first bottle at C, and a cock *a*, by which any quantity of the acid can be introduced to the chalk, or other substance. As the gas is extricated, it passes through the tube D, into the vessel E, which contains the liquid to be saturated: the gas, by its elasticity, presses the liquor, and forces it through the tube F into G. At H, is a small hollow glass ball I, with a stem ground to fit the mouth of the vessel G, which it shuts as a valve by the pressure of the liquor, assisted with a spiral spring, until the water or other liquid, which has been forced through the tube F into G, presses down by its weight the ball I, and returns back into E. When it accumulates to a certain point in E, the valve is again shut, and it rises through the tube F, as before. At *b* is a stopper, to which hangs a small weight, about half an ounce, which acts as a safety valve to prevent the pressure from reaching that point which would endanger the bursting of

of the vessels. The advantage which this apparatus possesses, is, that it not only gives the same pressure of the gas upon the surface of the liquor to be impregnated, which the common machines do, but, by the constant agitation which is kept up, by the ascent and descent of the fluid, continually exposes a fresh surface of it to its action: by which means water or other liquors may be as fully saturated in two hours as they can in twelve by any apparatus in common use.

Fig. 3, is a section of the valve ball I, the spiral spring K, and the cork L, to which the two former are fastened. At *c* is a piece of lead, which serves at the same time to adjust the weight of the ball, and to keep it in an upright position.

Fig. 4, is a plan of the cork, shewing the apertures through which the liquor descends. The tubes D and F are each in two parts, joined by pieces of elastic gum, by which means the apparatus admits of being moved without danger of breaking. There is also a glass rod *e* in the vessel A for the purpose of stirring the materials. This rod passes tight through a piece of elastic gum (the mouth end of one of the common bottles made of that substance), the other end of which is fitted close to the mouth of the vessel A, by means of wire or catgut wound round it, to prevent the escape of the gas.

Dr. Fierlinger has proposed the following very simple method for impregnating water with carbonic acid gas. He fills common round bottles with water, inverts them carefully under water, in order to prevent any air from entering, and charges them in the usual method with carbonic acid gas. He then corks the bottles, thus filled, under the water, with a ventilated stopper, immerses them under water in a proper cylindrical, almost tubular shaped, vessel, two feet high, and of a proportionate width to the diameter of the bottle, in order to apply, by means of hydrostatic laws, a great pressure with a small quantity of water. The bottles thus filled with the gas, and entirely immersed, imbibe water by means of the affinity the carbonic acid gas has for it, in such a manner that they are nearly filled; and water is thereby obtained, impregnated with an equal volume of gas, the water having lodged itself in the interstices of the gas. It is pretty strong, and can be made still more so. This method has, besides its conveniency and cheapness, still other advantages; the degree of impregnation may be regulated by the height of the column of water under which the bottle is immersed, and the water is prepared in those vessels out of which it is to be drunk, and this prevents that escape of gas which always takes place when poured from one vessel to another, especially if the water be strongly impregnated. The above-mentioned ventilated stoppers are only corks, fitted exactly to the bottles, perforated lengthways, by holes drilled through them, the uppermost orifices of which are covered with a small plate of pewter, fastened to the cork by means of a string passed through a hole in the centre, and drawn through the cork. If this small plate be furnished with a little cavity, in which iron filings are put, the water becomes chalybeate.

APPARATUS FOR FREEZING MERCURY.

The freezing or fixing of mercury, has been the means of proving it to be a metal, possessing the principal properties and characteristics of other metals, as splendour, malleability, and a crystallized structure when reduced to a solid form. Gmelin was the first who observed mercury at such a low temperature as leads to a belief that a partial congelation had taken place, though he did not then suspect the fact; but De L'Isle was probably the first person upon earth who saw quicksilver reduced to a solid form by cold, and ventured to credit the testimony of his senses. This happened at Yakutsk in Siberia, in 1736, where the natural temperature was so low as to produce the effect without the aid of artificial means.

Since that period, the production of artificial cold, by means of various mixtures, sufficiently intense to freeze mercury, has employed the abilities of the most experienced chemists and philosophers. The materials employed by Seguin, for frigorific mixtures, are however the best that have yet been proposed, or perhaps can possibly be devised. Considering the muriats as a class of salts best suited for the purpose, and having tried them all, he gave the decided preference to muriat of lime in crystals. His method was to mix the crystals, previously pulverised, with an equal weight of uncompressed snow. Messrs. Pepys, Allen, and Lawson, seem to have been the first, who in this country tried that method: this was in December 1798; and they succeeded perfectly in freezing the mercury. We shall give the account of it as communicated by Mr. Pepys himself, in the Philosophical Magazine.

"Determining to make the experiment with accuracy in respect to the weight of the materials employed, and on such a scale that it might be repeated by any one, on the 30th of January 1799, we collected a quantity of snow for the purpose. The temperature of the laboratory at the same time was 40°. It may not be improper to mention here, that the thermometer employed in this and the other experiments which followed, was filled with tinged alcohol, and accurately divided according to Fahrenheit's scale, as mercurial thermometers cannot be resorted to for determining degrees of temperature at or under the freezing point of that metal. Having put into an earthen pan equal parts of muriat of lime of the temperature of 40°, and snow at 32° above 0°, we found that the temperature of the mixture, as soon as liquefaction took place, was 32° below 0°. Into this mixture we immersed, each in separate vessels, eight ounces troy of muriat of lime, and the same weight of snow, by which means, and with very little trouble, they were cooled down to 5° above 0°, the mixture gaining a proportionate increase of temperature by the heat which had passed into it from the immersed snow and muriat.

We now placed a half-pint Wedgewood's cup within a white stone-ware jar, insulating it with three corks placed at equal distances round the vessel, and one at the bottom for the cup to rest upon. This prevented the cup from coming in contact with the jar, which we now placed, with the cup in it, in the mixture that had served for cooling the materials down to 5° above zero, adding to the mixture a little more muriat of lime at 40° and snow at 32°. By this means we secured the advantage of having a cold atmosphere, within the jar, all round the insulated cup.

Upon mixing the cooled ingredients, which were now put into the cup, the thermometer, being immersed in the mixture, sunk to 50° below zero. Four ounces of pure mercury at 40° above 0, in a small thin glass retort, were then introduced into the mixture, which in fifteen minutes became perfectly fixed. We observed that it congealed from the circumference towards the centre, in the same way as wax or resin fixes in cooling. We now broke the retort, and gave the mercury several blows with the beak of a hammer, which indented, and at last fractured it: the fracture was similar to that of zink, but with facets more cubical. Inadvertently taking up a piece of the solid mercury, I experienced a sensation as if I had received a wound from a rough-edged instrument. I threw it from me as I would have done a piece of red-hot iron, and was not a little alarmed when I found that the part of my hand which had been in contact with the metal, immediately after lost all sensation, and became white and dead to the view.

The mercury in the mean time had become fluid. The time that had passed from taking it out of the mixture might have been about two minutes; but the accident that happened to my hand prevented me from noting it exactly. On trying the temperature of the mixture, I now found it 42° below 0; the addition of some snow, which had been cooled for the purpose while the preceding

ing experiment was going on, reducing it again to 50° below o.

We now put into the mixture a glass tube containing some mercury. In two minutes it was completely fixed. We broke the tube, and bent the cylindrical piece of mercury into an acute angle, by means of pincers: we attempted to straiten it again, but it became fluid during the operation. Several substances in proper vessels were now tried in the cold mixture. Sulphuric ether exhibited no signs of congelation: rectified spirit of turpentine became thick and nearly consistent at 50° below o; pure concentrated sulphuric acid was fixed: acetic acid likewise was fixed: nitric acid became thick and ropy; but on muriatic acid the cold had no effect.

Encouraged by the success of this experiment, we resolved to attempt one of greater magnitude. Accordingly we weighed fifty-six pounds avoirdupoise, of mercury, and prepared every thing necessary for fixing this quantity. The mercury was put into a strong bladder, and well secured at the mouth, the temperature of the laboratory at the time being 33°. A mixture consisting of muriat of lime 2 lbs. at 33° and the same weight of snow at 32°, gave 42° below o. The mercury was put as gently as possible into this mixture (to prevent a rupture of the bladder), by means of a cloth held at the four corners. When the cold mixture had robbed the mercury of so much of its heat as to have its own temperature thereby raised from 42° below to 5° above o, another mixture, the same in every respect as the last, was made, which gave, on trial with the thermometer, 43° below o. The mercury was now received into the cloth, and put gently into this new mixture, where it was left to be cooled still lower than before.

In the mean time five pounds of muriat of lime, in a large pail made of tinned-iron japanned inside and outside, was placed in a cooling mixture in an earthen-ware pan. The mixture in the pan, which consisted of four lbs. of muriat of lime and a like quantity of snow, of the same temperature as the former, in one hour reduced the five lbs. of muriat in the pail to 15° below o. The mixture was then emptied out of the earthen pan, and four large corks, at proper distances, placed on its bottom, to serve as rests for the japanned pail, which was now put into the pan. The corks answered the purpose already mentioned, that of insulating the inner vessel, while the exterior one kept off the surrounding atmosphere, and preserved the air between the two at a low temperature.

To the five pounds of muriat of lime, which had been cooled as already noticed, and which still remained in the metallic vessel, was now added snow, uncompressed and free from moisture, at the usual temperature of 32°. In less than three minutes the mixture gave a temperature of 62° below o; a degree of cold never before supposed to have been produced in this country, being 94° below the freezing point of water.

The mercury, which, by immersion in the second cooling-mixture to which it was exposed, we found by this time reduced to 30° below o, was now, by the means employed before, cautiously put into the last-made mixture of the temperature of 62° below o. A hoop, with net-work fastened to its upper edge, and of such a breadth in the rim that the net-work, when loaded with the bladder of mercury, could not reach its lower edge, was at the bottom of the mixture, to prevent the bladder from coming in contact with the vessel; by which means the mercury was suspended in the middle of the mixture. As soon as the bladder was safely deposited on the net-work, the vessels were carefully covered over with a cloth, to impede the passage of heat from the surrounding atmosphere into the materials. The condensation of moisture from the atmosphere, by the agency of so low a temperature, was greater than could have been expected: it floated like steam over the vessels, and, but for the interposed covering, would have given the mixture more temperature than was desirable. After one hour and forty minutes we found, by means of a searcher introduced for the purpose, that the mercury was solid and fixed. The temperature of the mixture at this time was 46° below o; that is, 16° higher than when the mercury was first put in.

We now regretted that we had not slung the hoop and net-work in the same way as the shell of a beam is suspended, which would have enabled us to lift it out of the mixture at once with the bladder and its contents; but, having overlooked this provision, we were obliged to turn out the whole contents of the pail into a large evaporating capsule made of iron, which was not effected without the mercury striking against its bottom, and at the same time receiving a considerable increase of temperature. The bladder was now cut. The eagerness of our friends, of whom several were present, to be in possession of pieces of the solid mercury, which had fractured by the fall it had received, was past description. Forgetting, and perhaps not being aware of the consequence, some rushed their hands into the frigorific mixture, while some seized on pieces which others, having selected with their eyes as their prize, also laid hold of at the same moment, and consequently each grasped them harder than otherwise they would have done. The acute pain that instantly followed, quickly recalled their recollection, and, but for the sufferings of the individuals, the scene would have excited no small degree of mirth: some clapt their hands into their mouths, others shook them, blew on them, or rubbed them against their clothes; and all were more or less alarmed at the dead appearance of the parts that had been so suddenly robbed of heat by the frozen metal. It was a considerable time before sensation and the natural colour was restored to the parts, which however returned without any other means being employed than such as have been mentioned. It is easy to conceive that the injury was little more than skin deep, like what takes place from touching a hot metal, without allowing it to remain long enough in contact with the skin to produce a wound; but what is very singular, almost every individual compared the sudden pain he experienced to that produced by a *burn or scald!* One gentleman, who called accidentally while we were preparing for our experiment, but who had no acquaintance with the subject, not being able to conceive how the effect proposed could be produced by the mixture, was desired to take a little snow in one hand and muriat of lime in the other: "they were neither of them colder than he expected to find them:" then to put the snow into the hand that held the muriat. The ingredients had hardly come in contact when he threw them from him, exclaiming, "Cold!—'Tis a red-hot coal!"

The larger pieces were kept for some minutes before fusion took place, while others were twisted and bent into various forms, to the no small gratification and surprise of those who had never witnessed or expected to see such an effect produced on so fusible a metal.

Though mercury in the state in which we had it, exhibited a considerable degree of ductility and malleability, we cannot thence infer the degree in which they would be found to belong to it, could it be reduced to a temperature much more considerably under its freezing point, which seems to be at about 39° or 40° below o. At the time that we bent and twisted it, it may be considered as having been in a proportionate temperature to iron near its point of fusion, when, as is well known, it will hardly bear the smallest blow of a hammer.

The apparatus employed in these experiments is represented in the Chemistry Plate IX. Fig. 5, represents that employed in the first experiments; and only viewing the figure will convey to any one a complete idea of the arrangement, as it exhibits the retort containing the mercury, surrounded by the cooling-mixture in the half-pint cup, which is insulated by means of the corks, and prevented from coming in contact with the stone-ware jar the space between the latter being occupied only with cold

cold air, preserved in that state by means of the frigorific mixture in the exterior vessel, and which surrounds the jar. Fig. 6, in the same plate, represents the apparatus employed in the large experiment, which is similar in its arrangement to the former; only that the cold atmosphere round the japanned pail had no exterior cold mixture to defend it; which, however, was the less necessary, as the earthen-pan was of considerable thickness, and had acquired the temperature of the mixture that had been employed in cooling the five pounds of muriat of lime.

In experiments of this kind, all the exterior vessels should be of earthen-ware or wood, which, being bad conductors of heat, prevent the ingredients from receiving heat from the atmosphere and surrounding objects with the same facility that they would through metals; and, for a similar reason, the interior vessels are best of metal, that they may allow the heat to pass more readily from the substance to be cooled into the frigorific mixture employed for that purpose.

Muriat of lime is certainly the most powerful, and at the same time the most economical substance, that can be employed for producing artificial cold; for its first cost is a mere trifle, being a residuum from many chemical processes, as the distillation of pure ammonia, &c. and often thrown away: besides it may be repeatedly used for similar experiments, nothing being necessary for this purpose but filtration and evaporation to bring it to its first state. The evaporation should be carried on till the solution becomes as thick as a strong syrup, and, upon cooling, the whole will become crystallized: it must then be powdered, put up in dry bottles, well corked, and covered with bladder or cement, to prevent liquefaction; which otherwise would soon take place, owing to the great affinity the muriat has for moisture.

The powerful effects produced by the frigorific mixture of muriat of lime and snow, presents a wide field for experiments, to determine the possibility of fixing some of the gases by intense cold.

NEW STEEL-YARD FOR WEIGHING GASES, &c.

This ingenious apparatus is the invention of C. Paul, public inspector of weights and measures in the city of Geneva. Erected on a large scale, it may serve for weighing in the usual manner, and according to any system of weights, all ponderable bodies, to the precision of half a grain in the weight of a hundred ounces; or, in other words, of a ten thousandth part. It is employed, besides, for ascertaining the specific gravity of solids, of liquids, and even of the air itself, by processes extremely simple, and which do not require many sub-divisions in the weights. This complete apparatus is represented in the Chemistry Plate X. fig. 1.

The beam A B, is constructed on the same principles as the commercial steel-yard, but of much smaller dimension. The shears are suspended by a screw to a cross bar of wood supported by two pillars, which rest on the two extremities of a small wooden box furnished with three drawers, and which serves as the stand of the apparatus. This beam is divided into 200 parts, beginning at its centre of motion. The division is differently marked on the two faces: on the anterior face the numbers follow each other from ten to 200, proceeding towards the extremity; and on the other face, represented apart at F, the numbers are marked in the opposite direction.

The small frame G, is destined to prevent the oscillation of the beam, and it is placed at the proper height, by means of the nut and screw by which it is suspended. Above the beam is a small cross bar of brass, suspended by its two extremities from the cross bar of wood. Different weights are hooked to it, each having its particular value marked on it. And, in the last place, a small mercurial thermometer, having the two most usual divisions, and destined to point out the temperature of the air and the water during the experiments. The axis of suspension of the steel-yard rests upon two beds of very hard well-polished steel. The case is the same, but in a reversed situation, with the axis which supports the hook C, that serves for suspending different parts of the apparatus according to the purpose to which it is to be applied.

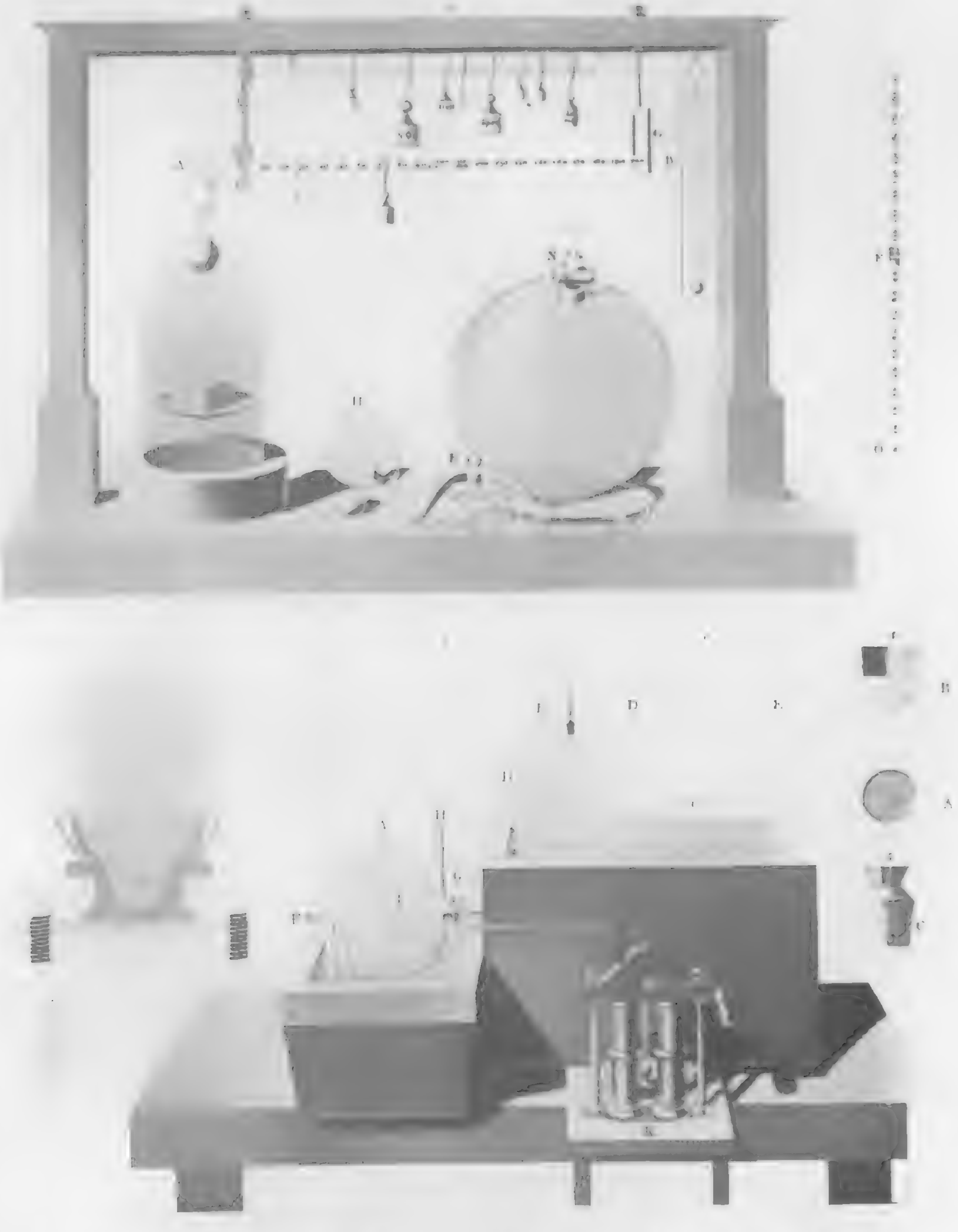
When you wish to employ it as a common steel-yard, you suspend from it the brass shell E, which is an exact counterbalance for the weight of the beam when unloaded. The latter then assumes of itself a horizontal situation. You then search for the equilibrium of the substance put into this shell, by fixing at the proper place, on the beam, the weight and its fractions corresponding with the system of weights adopted; and when you have found the equilibrium, you observe the weight indicated by the divisions on which each of the weights employed is found, exactly in the same manner as is done in regard to the common steel-yard.

There is a glass shell suspended in a jar, filled to a certain height with water. This shell is destined for experiments in regard to the specific gravity of solids. It is in equilibrium, if, when immersed in water at 12° of Reaumer, as far as the junction of the three silver wires by which it is supported, it exactly balances the weight of the beam unloaded. When you wish to try the specific gravity of a solid, you first weigh it in air; but by putting it into the brass shell, and then substituting the glass one, you weigh it in water. It is well-known that the difference of these weights, employed as a divisor of the total weight in air, gives for quotient the specific gravity. Care must be taken, as in all experiments of the kind, that no bubble of air adheres to that part of the apparatus immersed in the water, or to the substance, the weight of which is required, and which is immersed also.

The solid glass ball H, is destined for the purpose of ascertaining the specific gravity of liquids, in the following manner: This piece is furnished with a hook of fine gold, that it may be immersed without inconvenience in acids. When it is suspended to the hook of the steel-yard, and in the air, it is in equilibrium with the beam loaded at its extremity (either at the division marked O, on the side of the beam seen at F) with weights entitled *specific*, and $\frac{1}{100}$ of specific hooked on at the other.

This ball, immersed in distilled water at 12° of Reaumer, as far as the end of the straight metal wire which suspends it, is still in equilibrium with these two weights placed in the following manner, viz. the large one at the division in the middle of the beam marked *water* on the side F of the beam, and the small one at the division O, that is to say, the extremity. When the apparatus is thus prepared, you fill a jar with the liquid, the specific gravity of which you wish to ascertain; suspend the *ball* H to the hook of the steel-yard, and immerse it into the liquid till it rise exactly above the ring from which the ball hangs, observing the temperature, and disengaging carefully all the air bubbles that may adhere to the ball; then remove the small weight to the division O, at the end of the beam, and convey the large one as far as that division, preceding that where the weight of the ball would raise the beam; and afterwards move the small weight as far as the division where the equilibrium will be restored, the beam being horizontal. Mark the division at which the large weight is found, and add two cyphers; to this number add the indication immediately resulting from the position of the small weight, and the sum of these two numbers gives the specific gravity of the liquid, or its ratio, with the weight of distilled water to a ten thousandth part.

The balloon N, is destined for trying the weight of any given kind of gas, compared with that of atmospheric air, in the following manner: The weight entitled *air tare*, is arranged in such a manner that when placed in the notch, seen at the extremity of the beam beyond the divisions towards B, it forms an equilibrium with the balloon exhausted by the air-pump and suspended from the hook of the steel-yard. If the steel-yard is not then in equilibrium, it is a sign that the instrument is deranged,



[illegible] Apparatus for weighing of Gases. [illegible] combustion of the Diamond

deranged, or that the vacuum is not perfect. The air, the relative weight of which in regard to atmospheric air you wish to ascertain, is to be introduced into the balloon, and the weight marked *air*, is to be moved along the beam. The division at which it stands when an equilibrium is produced, will indicate, in hundredth parts of the weight of the volume of atmospheric air that could be contained in the balloon, the weight of the gas actually inclosed in it. This indication is read on the anterior part of the beam, where the words *atmospheric air* are marked.

Not satisfied with having procured to philosophers, and those fond of accurate experiments, an instrument extremely convenient for the closet, and of very extensive use, C. Paul has endeavoured to render this apparatus portable, and has constructed various pocket steel-yards, with which the nicest experiments may be made, and the quality of gold coin be ascertained by the trial of its specific gravity. They are constructed exactly on the same principles as the Roman steel-yard, but are necessarily less extensive in their use. They cannot be employed, for example, in determining the specific gravity of an aeriform fluid, and do not extend beyond 100 deniers of weight; but as they possess all the advantages of a balance, besides those peculiar to themselves, they are extremely convenient for philosophers who are obliged to travel.

APPARATUS FOR THE COMBUSTION OF THE DIAMOND.

That the diamond is combustible, is a fact which Newton, in some measure, conjectured; which experience has fully confirmed; and respecting which it is no longer possible to entertain the least doubt. The experiments for establishing this truth, have been recently made by C. Guyton, and in whose words we shall give the detail. "My first experiments, published in 1785, on the entire combustion in nitre in fusion, seemed to announce that the diamond burnt in it after the manner of coal, since it left an effervescent alkali; and this suspicion acquired more reality, after the examination made by Lavoisier of the gas remaining in the vessels in which it had burnt, and which he found charged with carbonic acid. Mr. Tennant has since furnished us with a new proof of this important fact, by repeating the combustion of the diamond by nitre in a gold crucible, as I had proposed, in order to obtain a residuum absolutely free from all foreign matter. There were, however, still sufficient reasons to induce us to disbelieve that the diamond and carbon, or that the diamond and the carbon extracted from the carbonic acid by the noble experiment of Mr. Tennant, were the same substance. Independently of their external characters, so completely different, several observations, which I have already communicated, prove that their chemical characters no less excluded this identity. Indeed if the diamond was pure carbon, why had it not the same affinities? Why does it not, like it, serve to make the oxygenated muriat of potash detonate; to deoxygenate sulphur, arsenic, and phosphorus; to deoxydate metals, which are sufficiently fixed to undergo the degree of fire which determines its combination with oxygen? Why does it not form also carbures? Why does it not, like it, conduct the electric fluid? We know that the aggregation conceals sometimes the affinities by counterbalancing their power, but not in operations where the bodies are sufficiently fixed, and the temperature sufficiently high, to render effectual the weakest attractions. Something remained, then, to be discovered to harmonize and make us comprehend facts in appearance so contrary. I imagined that it was by attentive observation of what took place during the act of the combustion of the diamond, that we should attempt to penetrate this secret of nature. The experiments I am about to describe will, I hope, prove that my attempt has not been vain; that the explanation of phenomena, which have appeared to us the most incoherent, may hereafter be deduced from some circumstances which were not observed nor even suspected, and which have enabled us to make an important step in the knowledge of the nature of the diamond, since we can indicate substances which approach much nearer to it than carbon.

These experiments occupied a part of two successive years. Various accidents, which may be readily conceived, and the fewness of the days when the rays of the sun are not interrupted by clouds, or weakened by vapours, were the principal causes of this delay. I shall suppress the details of those essays which did not lead to conclusive results; but I shall not neglect those which furnished us with an opportunity of observing several times the same facts, and sometimes in a more distinct manner; though, by the effect of some unforeseen circumstance, it was not possible to keep an account of them in regard to the correspondence of the ingredients and the products. I must not omit to remark, that I had, as co-operators in these experiments, C. Clouet, and Hachette. The journal of them was correctly kept by C. Desormes, formerly a pupil of the Polytechnic School. The most important phenomena were seen, at different sittings, by several men of letters.

The council of the administration of the Polytechnic School, approving the object of the experiments, authorised me to use some of the diamonds in its cabinet. The first experiment was made on the 9th of Fructidor, in 1797, or fifth year of the republic. We placed upon the table of a mercurial pneumatic cistern, C, a bell of flint-glass, as at D. Near the cistern was placed, on one side, a pneumatic machine, to exhaust the common air from the bell by means of a bent tube, which rose as far as the knob, A. On the other side was a water pneumatic cistern, bearing a large receiver, having at its tubulure a cock, E, which communicated with the inside of the bell by a tube of bent glass, and rising, in the like manner, to the hollow knob of the bell. On one of the edges of the mercurial cistern was fixed a slide, F, bearing a kind of mandril, destined to receive a cylinder of hard wood, G, moveable in every direction, terminated by a handle of iron, H, and serving to support the cup, I, made of the crucible earth of Valogne; so that this cup could be conveyed to every point of the interior part of the bell-glass, to represent the diamond to the focus. This apparatus is represented in the Chemistry Plate X. fig. 2. Every thing being disposed in this manner, we put into the cup an incomplete octahedral diamond, having the edges a little rounded, of a dirty water inclining to yellowish-grey. On the cup, the edge of which was ground flat, a cover was applied, attached to a thread tied round the lower part of the support.

A small air-pump, K, was made to act, till the mercury in the bell-glass rose to near the orifice of the tubes of communication. The cock of the receiver of the mercurial pneumatic cistern, which had been previously filled with oxygen gas obtained from the oxygenated muriat of potash, was then opened; and the first portion of this gas which had passed into the bell, was extracted by the pump, in order to exhaust, as much as possible, the remainder of common air. After this it was filled with the same gas to within sixty-nine millimeters of its internal edge, and fifty-one of the external. It may readily be conceived that still a little air remained in the cup in which the diamond was placed, and which, during these experiments, had been shut by its cover; but its content not being all together three cubic centimeters, this inconvenience was thought the smallest of those which were to be apprehended.

The diamond having been uncovered, we began, at ten minutes after one, to throw upon it the solar rays, through the focus of the large lens belonging to the cabinet of the Polytechnic school. We are well aware of the necessity of heating the bell-glass by degrees, to prevent its cracking. For this purpose we interposed, at first, green and blue coloured glass; but whether they acquired

acquired more heat, or resisted dilatation more, these glasses all speedily broke; and we were not able to accomplish our object but by covering with paper, for some moments, the part of the bell which received the luminous disk. When the paper was withdrawn, the mercury fell rapidly in the inside. The diamond, exposed to the focus for twenty minutes, did not inflame. It appeared at first mealy, but sensibly blackened at the surface when observed through the coloured glass. The focus having been intercepted by an opaque body, to examine more closely the state of the diamond, no alteration was remarked in it, except that it had assumed a yellowish shade, perfectly like that of transparent amber. The atmosphere beginning to become charged with vapours, the experiment was discontinued, in order that we might resume it at a more favourable moment. This moment occurred the next day, the 10th, and was announced by a rising of the thermometers; one of which, exposed to the sun in the open air, rose to forty degrees; and the other, exposed to the sun also under a bell-glass to compare the interior temperature, rose to forty-four degrees. The focus was thrown upon the diamond at twenty-eight minutes after eleven. At forty-two minutes after eleven the cone of light was intercepted, and we saw the diamond red, transparent, and surrounded with a faint radiation. When cooled, its edges appeared blunted: we observed in it a black point; but it had become white, and had lost the yellow colour acquired the day before.

The experiment could not be resumed till the 15th. We began, by noting the height of the interior column of the mercury, to calculate, according to the temperature and pressure, the volume of the aeriform fluid remaining under the bell; and we judged that it had decreased about 173 cubic centimeters. The rays of the sun were bright and strong; but the air so much agitated, that while the thermometer under the bell-glass was at 44·5, that exposed to the sun in the open air did not rise higher than 31°. There was a moment, however, when the luminous cone produced a slight scintillation on the surface of the diamond. An opaque body, immediately interposed, made it appear red; but more obscure than on the 10th. It was also found white after cooling.

Being astonished that the diamond, when inflamed, as on the 10th, did not maintain of itself the temperature necessary for its combustion, especially in oxygen gas, as happens to metallic combustibles, we imagined it might result from its being too much in a mass, or, perhaps, also too much insulated from every other combustible which might contribute to this temperature: and, that we might make an attempt to remove this obstacle, we introduced into the same porcelain cup, and without deranging the apparatus, a small cut diamond; but there was no appearance that the combustion was in the least augmented; and this small brilliant, instead of being more rapidly attacked by the heat, after having been two days exposed to the action of the solar fire, capable of igniting obscurely the large diamond placed close to it, gave no signs of inflammation, and was taken from the apparatus without having experienced the slightest alteration, either in the polish of its surface, or the vivacity of its edges.

On the 23d of the same month we took the diamonds from the saucer, to examine, with care, that which had given manifest signs of a commencement of combustion. It weighed no more than eighty-eight milligrammes; it had therefore lost fifty-four, about 0·38 of its weight. It still retained its original octahedral form; but the angles were blunted, and the edges rounded. The surface was tarnished, and full of small inequalities; which, observed with a magnifying-glass, presented cavities, salient points, and sometimes parallel sections of the laminæ. In several of the cavities we could plainly perceive a sort of specks inclining to grey; but what appeared worthy of most attention was, a pretty large hollow almost at the extremity of one of the quadrangular pyramids, which seemed to indicate the place where the solar focus had exercised, at the end of the operation, its greatest intensity; and where we distinguished a blackish stripe, not terminated like a stroke formed by a foreign body, but on the contrary softening itself off, and penetrating into the interior part of the mass by degrading its colour.

I thought it might be of some importance to preserve the subject of these observations, and that it would not disgrace the collection of the cabinet of the school, with an inscription allusive to the experiment to which it had been subjected. Another diamond was therefore destined to be put into the apparatus, in order that it might be there subjected to entire combustion. This diamond was also a pretty regular octahedron, of a much more beautiful water than the preceding, and weighing 200·1 milligrammes, 3·77 grains.

As the season was already so far advanced that it left us no hope of a solar focus as strong as that from which we had obtained so little effect with the lenses we had employed, I was desirous of terminating the experiment with the great lens of Tschirhausen; and the class granted me permission to take it from their cabinet. This lens, as is well known, is 86·6 centimeters (thirty-two inches) in diameter, and 211·076 (seventy-three inches) focus. We augmented its power still more by catching the luminous cone with the small lens of the cabinet of the Institute.

A first sitting gave scarcely any signs of a commencement of combustion. Next morning, the luminous disk having fallen on one of the parts of the bell-glass which was thickest, it occasioned it to crack. It was therefore no longer possible to compare the volume of the gas before and after the operation, nor to distinguish and ascertain the quantities of the products. We confined ourselves to making lime-water pass through the interior of the bell, before the fissure had suffered a sensible quantity of common air to enter, and we observed that it was much troubled.

The diamond which had been last exposed was no ways changed at its surface: it had, however, lost two decimilligrammes of its weight; which was verified by the same balance with which it had been weighed, and which is capable of marking, in a very sensible manner, these fractions of the milligramme. Thus we were obliged to adjourn the experiment till the next summer, in order to find a more favourable sun, and to have time to provide a new apparatus.

After examining what means were most proper for preventing the vessels from cracking by the inequality of their dilatation, it was found that there were none more certain than to employ, instead of a bell-glass, a well-chosen balloon or globe of a moderate thickness, and of such a size that its surface might be at a sufficient distance from the point of the luminous cone. This globe, or balloon, is represented in the plate at fig. 3. The globe which we judged best for answering these conditions was 28·63 centimeters in diameter: its content was 123·25 deciliters, or 12,325 cubic centimeters, comprehending that portion of the neck which it was thought proper to retain, and which was 159 millimeters. That we might the more easily observe the rising and falling of the mercury in the inside, and thence determine the volumes of gas, we cemented on the outside slips of paper, on which we traced, by means of measured vessels, scales indicating deciliters, or 100 cubic centimeters.

It may be readily conceived, that it was not possible to fill so frail a vessel with mercury in order to displace it afterwards by oxygen gas. In transferring the gas by means of water, we should have been obliged to leave a portion of that liquid on the interior side of the vessel. We determined, therefore, to convey the gas, at the moment when it was disengaged from the oxygenated muriat of potash, by means of a tube adapted to the distilling apparatus, and made to descend to the bottom of the globe in such a manner that the common air should be forced

forced to issue from the globe by another pipe fixed in the stopper of the orifice, and communicating with the pneumatic cistern, as at A, fig. 3.

This process is exactly the inverse of that which I proposed in my work on aerostation, to fill a balloon of inflexible matter with hydrogen gas. It was founded on the same principle, the difference of the specific gravity of the two fluids. Here it had the advantage of leaving the vessel perfectly clean; an important condition, and which it is so difficult to obtain when air is expelled by mercury.

It was readily foreseen that the first portions of the oxygen gas would become mixed with the atmospheric air, and that it would be necessary to displace this mixture several times by new quantities of oxygen gas, that no more azotic gas might remain in it, or, at least, that the remaining quantity should be so small as to be incapable of having a sensible effect on the results of the experiment. We had even contrived means to determine it, by receiving under the pneumatic jar the last portions displaced, that we might subject them to a eudiometric proof. With this view we employed eighteen decagrammes (about six ounces) of the oxygenated muriat of potash, which were put into a retort, at once to furnish, at one operation, the whole quantity of the gas necessary for this renewal. Those who have not tried this method of substituting one aeriform fluid for another, might entertain some doubt respecting the purity of that employed in our experiment; but it will be easy for me to remove it. This was an article of so much importance that we could not neglect attempting to collect proofs of it.

We know with what success M. Humboldt applied to the improvement of eudiometry. The interest which he took in our experiment induced me to invite him to come and determine himself with those instruments, and by those processes, which were familiar to him, the purity of the oxygen gas in which the combustion was to take place. He readily accepted my invitation, as I had reason to expect, from his well-known zeal for the progress of science; and this article of our report is the production of his pen. I had likewise the satisfaction of seeing him apply eudiometric instruments to the examination of the residuum of the gas after the combustion. The following is the result of the proofs to which he subjected that introduced into the apparatus to serve for the combustion:

Nitrous gas, disengaged, by means of copper, from weak nitric acid, was tried with sulphat of iron and oxygenated muriatic acid, which shewed in it from 0·09 to 0·10 of azot. One hundred parts of oxygen gas received, towards the middle of the operation, as it issued from the globe, in which we had proposed to displace, in succession, common air by oxygen gas, were mixed with 300 parts of this nitrous gas: there was an aeriform residuum of 0·66: making allowance for 0·27 or 0·30 of azot, preexisting in the nitrous gas, we judged that, in 100 parts of gas tried, there were still thirty-six of azotic gas. We then continued to introduce into the globe fresh oxygen gas. We collected towards the end a portion which was subjected to the same proof, in the same proportions, with the same nitrous gas. The residuum this time was only thirty parts; and as the 300 of nitrous gas employed contained nine or ten parts for $\frac{9}{8}$ of azot, we concluded that this oxygen gas was quite pure. These are the words of M. Humboldt.

When this first condition was fulfilled, the question then was to place, in the center of this globe, the diamond destined for the experiment. We had previously formed a small cup of the lower portion of a furnace-pipe, the tube of which, five centimeters in length, was fixed to an iron stalk, and this stalk was stuck into a cylinder of cork destined to be inserted in the neck of the balloon. This cork was dipped in mastic to shut its pores, and a small glass tube passed through it to establish a communication between the inside of the balloon and the mercurial cistern, as shewn at fig. 3. We then placed the diamond on the cup, where we left it, having put it there by means of a ribbon, which we drew from under it in an instant, as soon as the balloon, or globe, had been inverted, and its neck immersed in the mercury. The balloon, in this position, was made fast in a kind of collet, which rested on the edges of an iron mortar that served as a mercurial pneumatic cistern. We then exhausted, by suction, a portion of the oxygen gas, sufficient to make the mercury rise to twelve centimeters above the orifice of the balloon. The diamond was the same that had been already exposed to the action of the solar fire towards the end of the experiment of the preceding year, and which had lost only two decimilligrammes, and consequently weighed 199·9 milligrammes, 3766 grains.

On the 5th Fructidor last year, at one in the afternoon, we began to throw upon the diamond the focus of the large lens of the National Institute. The thermometer, exposed to the sun under a bell-glass, indicated 39·75: the mercury in the barometer stood at 75·89 centimeters, twenty-eight inches 0·5 lines. The volume of air, inclosed by means of the mercury in the tub, brought to the pressure of 757·7 millimeters (twenty-eight inches,) and to the mean temperature of 12·5 degrees of the decimal thermometer, according to the experiments of Pncier, and the tables of Prony, was then found to be 11,470 cubic centimeters.

Having taken the necessary precautions to heat gradually the balloon, the point of the luminous cone being almost in the center, we were obliged to cover with a glass-plate the wooden supporter, which was already on fire. The diamond first exhibited a black point at the angle immediately struck by the sun. We afterwards saw it entirely black, and, as it were, charred: we distinctly perceived, a moment after, brilliant points in a state of ebullition, as it were, on the black ground. The solar rays, having been for a moment intercepted, it appeared transparently red. The sun becoming obscured by a cloud, we saw it of a much purer white than it had been at the commencement of the operation. The sun having now emerged from the cloud, the surface of the diamond assumed the appearance of metallic splendour: it was then sensibly diminished, and there remained no more than a quarter, of a lengthened form, without angles or perceptible edges, but still very white, and of a beautiful transparency. We observed a slight fissure at the bottom of the pipe which supported it, but without any separation of the parts. I must not forget, that at the commencement of the combustion, we thought we observed a purpurescent cone arising from the support in the pencil of the solar rays; but this phenomenon was only an optical effect, which depended on the position of the observer.

The whole apparatus was left in the same state, only defended by an inverted box placed over it, until the 7th, when we again began, at one hour twenty minutes, to present the diamond to the focus. We soon observed the same phenomena as on the 5th, the black surface, the brilliant points in ebullition, which vanished and re-appeared according to the intensity of the focus: we saw also a brilliant metallic appearance, or rather leaden-colour. This is the expression which the assistants employed to characterise this phenomenon. At one hour forty minutes the diamond was entirely consumed. We at first suspected that there still remained a brilliant particle; but we soon judged that it was a vitrified point of the support, which was confirmed on inspecting the pipe when drawn from the globe. The question now was to collect the products of the combustion. No means seemed likely to be attended with more certainty, than to introduce water of barytes into the apparatus, taking care to adhere, as nearly as possible, to the proportions indicated for the saturation of the carbonic acid, which we supposed must have been formed, to prevent the uncertainty which the excess of this re-agent might occasion in the results.

The whole apparatus being removed into the shade, we began on the 9th to draw out the pipe which served as a support, and observed on it two slight fissures occasioned by the contraction, and a spot of four or five millimeters in diameter, the center of which had a vitreous appearance, and its edges a reddish hue. On examining it with a magnifying-glass, we observed at the lowest point a space of two or three millimeters diameter, the surface of which was really vitrified, but of a tarnished and unequal colour. We distinguished a particle of white glass, pure and brilliant, formed into a globule, with some smaller portions of the same nature, and two small globules of a vitreous substance, which had a greenish red colour.

On one side we observed on the edges several other very small globules interspersed in a yellowish ground, and on the opposite a slight tinge of very bright red with very small reddish points. A particle of white earthy matter was at first taken for a fragment detached from the edges of the pipe, but it was found friable, and ascertained, by the stain it left on gold, to be oxyd of mercury. This examination being finished, we introduced into the globe five measures of saturated water of barytes, each of 46·5 cubic centimeters. The liquor immediately assumed a milky appearance, and there was a diminution in the volume of gas, which, calculated by means of the attached paper scale, amounted nearly to 300 cubic centimeters. Thus we might stop here, and consider the experiment as terminated, and, by making some allowance for the errors unavoidable in such manipulations, make the result tally with the amount, determined before by the noble experiment of Lavoisier and La Place, of the respective quantities of carbon and oxygen which form the carbonic acid. Mr. Tennant seems to have done the same thing lately after the combustion of the diamond by nitre. But we should only have confirmed what was before known, or supposed to be known. Our object was not only to observe, with more attention, what took place during the act of combustion, but to ascertain, as accurately as possible, the nature and quantity of the product, and the reader will find that the labour undertaken on this subject has not been fruitless.

The liquor was agitated in the globe to mix the white matter which had been deposited. We drew out four measures three quarters of the five we had introduced, by making use of the same inverted bottle filled with mercury, and which we raised on the inside by means of an iron stalk composed of several pieces, which could be adjusted by screws, as shewn at fig. 7, in the plate. We introduced into the balloon three new measures, each containing the same quantity of distilled water, which was shaken in the inside to detach and collect what adhered to the sides. These united liquors, being immediately filtered in an open filter, left 192 centigrammes (36·142) of carbonat of barytes dried in the heat of boiling water.

It may be readily judged what was our astonishment, when proceeding to examine the liquor, instead of finding in it a slight excess of uncombined barytes, we observed that it changed neither the colour of turmeric, nor that of logwood; and that, on the contrary, it acted on an infusion of turnsole as water charged with the carbonic acid. The presence of this acid unequivocally manifested itself, when we poured upon it a few drops more of barytes water, which immediately rendered it turbid. It was necessary to add even 4·65 centimeters of this water to saturate and precipitate the remaining acid gas. Being informed by this phenomenon that the production of the gas had been more considerable than we expected, and that some of it still remained mixed in the aeriform fluid in the balloon, we took every measure necessary to determine the quantity. This we were luckily enabled to do by the divisions which had been marked on the scales, the orifice of the globe having never been yet taken out of the mercury.

When the barytes water was taken out, the apparent volume was found to be exactly 122 deciliters, the internal column of the mercury above the level of the cistern was forty-seven millimeters; the barometer being at 759·96 millimeters (Fructidor 19, an. 6, of the republic, or 1798,) the centegrade thermometer at 21·25, the real volume, at a mean pressure and temperature, was 112,426 deciliters, or 11242·66 cubic centimeters.

I still invited M. Humboldt to co-operate with us in examining the nature of this residuum of gas. It was transferred in his presence into a pneumatic cistern prepared on purpose with distilled water, and received into four large flasks. The trial was made by the same instruments, and with the same nitrous gas, which had served for the oxygen gas before the combustion, and consequently containing from 0·09 to 0·10 of azotic gas. The trials made on portions extracted from different flasks varied from thirty-one to thirty-four in the quantity of the residuum of gas, in a mixture of 100 parts of gas examined with 300 parts of nitrous gas. I shall not even take the mean term; I shall stop at the weakest, which indicates four hundredth parts of carbonic acid gas, which, I think, I can assert to be rather below than above the truth; since a portion of this gas, brought into contact with ammonia, under a receiver, experienced a diminution of 4·5 per cent.

Let us now estimate the carbonic acid gas which entered into the composition of the 192 centigrammes of carbonat of barytes. According to Pelletier, whose accuracy is well known in researches of this kind, 100 of this earthy salt contain twenty-two of acid gas, which gives 42·24 for 192; and as the cubic centimeter of gas weighs 1·847 milligrammes, it follows that the 42·24 centigrammes represent 228·621 cubic centimeters. If we now add, on the one hand, the 449 cubic centimeters, found in the residuum of the gas after combustion, and which, as we saw, formed the four hundreth parts; and deduct, on the other, the same quantity from the aeriform fluid in which the combustion was effected, it results, that, in 11470 cubic centimeters of oxygen gas contained in the balloon, there remained, after the combustion, only 10793; that 677 were consumed; that these 677 cubic centimeters of oxygen gas, in the ratio of 1·3577 milligrammes each, produced, with the 199·9 milligrammes of the diamond, 1117·96 milligrammes of carbonic acid. In the last place, that, instead of the proportions 0·28 of combustible substance, and 0·72 of acidifying principle, observed in the combustion of carbon, the proportion was, for the combustion of the diamond - 17·88 of carbon.

82·12 of oxygen.

100·00

Though it was not possible for me to doubt facts deduced from calculation, I at first hesitated to admit differences so considerable in the manner in which the same combustible united itself to oxygen in the quantities it could take up, and the products of its combustion; in a word, a carbonaceous combustible more abundant in real combustible matter than charcoal itself, and which at the same time differed so much from it in the degree of temperature necessary to determine the action of its affinity. But I soon began to reflect, 1st. That this would not be the only instance of the first degree of the oxydation of an acidifiable base having been operated with great difficulty, while the acidification was afterwards completed with the utmost facility. 2d. That several substances of the same kind presented to us also these two characters; a greater abundance in real carbon, and greater resistance to inflammation; so that they naturally placed themselves in an intermediary rank between the diamond and charcoal. These two considerations, still strengthened by the similarity of the phenomena observed during the course of our two experiments in the passage of the diamond to the state of carbonic acid, appeared to me to throw a ray of light on this subject hitherto so obscure.

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In regard to the first consideration, it will be sufficient for me to call to mind with what difficulty the commencement of a composition of azot and oxygen is formed by the direct way, and the high degree of temperature which it requires, while nitrous gas cannot be in contact with oxygen without passing immediately to the acid state. Charcoal will then be to the carbonic acid, what nitrous gas is to the nitric; and the diamond will be to charcoal, what azot is to nitrous gas. There will, therefore, be no longer occasion of wonder that more oxygen is necessary to that substance, which as yet has none of it, than to that which has already been united with the quantity necessary for arriving at the first point of saturation.

The second consideration rests on facts no less conclusive. Plumbago is a carbonaceous combustible, which does not burn but at a very high temperature, or in nitre in fusion; which produces by its combustion carbonic acid; which, as well as the diamond, is more abundant in combustible matter than carbon itself. We are indebted to the illustrious Scheele for the first observation of this fact. One part of carbon alcalizes only five parts of nitre; one part of plumbago can alcalize ten. The operation performed in a retort on eighty centigrammes of plumbago, gave him 357 cubic centimeters of carbonic acid gas. This agreement will not be contested by those who, having been witnesses of our experiment, so unanimously declared, that the surface of the diamond assumed instantaneously a leaden colour.

This mineral is not the only body which presents these striking characters of a substance almost incombustible, and yet very abundant, in combustible matter. I described, sixteen years ago, in the Memoirs of the Academy of Dijon, a fossil found in a mass in the coal-pits of the Rive-de-Gier, which was sent to me under the name of *incombustible coal*, and which I then considered as real coal which had passed to the state of plumbago. I characterized it in that manner. Dolomieu has described a fossil of the same kind, which he calls *carbure of alumine*, which is the anthracolite of Werner. I had already suspected that it was neither the presence of four or five centiemes of alumine, nor that of a still smaller quantity of iron, that rendered it incombustible, but the little advanced state of the oxydation of the carbon. I subjected it to two experiments, by which this was fully confirmed. The object of the first was to determine if the alumine present was in a state of combination sufficiently intimate to resist the action of potash by the humid way: 100 parts, put in digestion in that solvent, left it in 4·6 of alumine. The second was, to ascertain whether this combustible, which possessed so little inflammability, had also the power to alcalize more nitre than carbon, consequently to take up more oxygen. Three successive trials gave for a mean result the alcalization of 7·87 parts of nitre by one part of that mineral; and the same coally matter, digested for four or five days in oxygenated muriatic acid, burnt completely with 6·5 of nitre.

M. Klaproth, the celebrated chemist of Berlin, had before submitted to trials of the same kind a fossil described by M. Widenmann, under the name of *incombustible coal*, and found that 100 parts left, after combustion at a very strong heat, only seven of a cineritious residuum; that treated in a crucible with eight parts of nitre, and the mass dissolved in water, acids occasioned no precipitate. Kirwan, in his experiments on coal, remarks, that that which he calls *Kilkenny coal*, having a metallic brilliancy, which does not burn but when carried to incandescence, and which then consumes slowly without emitting flame, can decompose 9·6 of nitre. After this, I do not see how there can remain any doubt, that these supposed incombustible substances are real oxyds of carbon, which, like coal or charcoal, have the property of conducting the electric fluid; of cementing iron; of taking the oxygen from some acidifiable bases; but which are not at that degree of oxydation necessary for exercising this separating affinity at a weak temperature.

I must not omit this opportunity of making some application of this principle, which may become useful to the arts. It has not yet been sufficiently explained, why some animal and vegetable matters produce carbon so difficult to be incinerated; why charred pit-coal, known under the name of coke, or cinders, and which has been half burnt in the preparation, is, however, so powerful a combustible; why peat, or turf, the weakest of combustibles, acquires, by being charred, the property of welding large pieces of iron better than charcoal; and why, in the last place, charcoal, when exposed to a very strong heat in vessels impenetrable to air, becomes there, in a certain degree, incombustible, as is proved in experiments made by Mr. Tennant.

The answer to all these questions may be found in the theory I have laid down: they are charcoals in the first degree of oxydation. Thus some of them have not yet acquired that which constitutes charcoal properly so called; others, after possessing all the qualities of vegetable and mineral carbon, have returned to the first degree by a real unburning (*débrulement*) of the remaining carbon; so that, by losing their inflammability, they become capable of fixing a greater quantity of oxygen, and consequently of setting at liberty a greater quantity of caloric, when they find themselves at a temperature sufficiently high to determine and complete their acidification.

Some practical consequences will doubtless hence be deduced, in regard to processes for the reduction of metals; for the cementation of steel, which it is probable takes up only oxyd of carbon, since it is separated from it in that state; for the incineration of the carbonaceous residuums of our analysis; for the carbonization of wood, pit-coal, and turf: in a word, we may, perhaps, thence conclude the possibility of rendering useful those masses of pit-coal, said to be incombustible, found at Rive-de-Gier, by mixing it with more inflammable matters, to maintain the temperature which determines its combustion. Its position, texture, and all its exterior characters, announce, as already said, that it consists of beds of coal changed by a subterranean fire; and this is confirmed by tradition, which preserved to that mountain, for three centuries, the name of the *Mountain of Fire*, (*Montagne de Feu*.) We can now pronounce, that it is coke too far advanced, but so much the more susceptible of producing a great heat, under favourable circumstances.

RACAPITULATION.—I shall here enumerate the consequences, or rather the facts, which result from the phenomena observed in the two combustions of the diamond by the solar fire, and the experiments which followed. 1. It is not only by the colour, weight, hardness, transparency, and other sensible characters, that the diamond differs from charcoal, as seems hitherto to have been believed; 2. Nor is it by the state alone of the aggregation of the matter, that constitutes diamond: 3. Neither is it on account of the two hundredth part of the cineritious residuum left by carbon, or the small quantity of hydrogen which it contains. 4. It is more essentially by its chemical properties that it differs. 5. The diamond is the pure combustible substance of this genus. 6. The product of its combustion, or of its combination with oxygen to saturation, is carbonic acid without residue. 7. Carbon burns at a temperature estimated at 188° of the centigrade thermometer; the diamond does not inflame but at about thirty pyrometric degrees, which, according to Wedgwood's scale, makes a difference of 188 to 2765. 8. Charcoal, when kindled, maintains of itself, in oxygen gas, the temperature necessary for its combustion. The combustion of the diamond stops when you cease to maintain it by a furnace-heat, or the union of the solar rays. 9. The diamond, for its complete combustion, requires a much greater quantity of oxygen than charcoal does, and produces also more carbonic acid. One part of charcoal absorbs, in this operation, 2·527 of oxygen, and produces 3·575 of carbonic acid. One of diamond absorbs a little more than four of oxygen, and really produces

five

five of carbonic acid. 10. There are substances which are in a state of intermediary composition between the diamond and charcoal. These are plumbago, or native carbure of iron; incombustible fossil coal; the carbure of alumine of Dolomieu; the anthracolite of Werner; the black matter united to iron in the state of cast-iron and steel; carbonaceous residuums difficult to be incinerated; and carbon itself unburnt (*débrulé*,) by the action of a strong heat without the contact of air. 11. These substances mixed, or weakly combined with three or four hundredths of their weight of iron, or alumine, give by their combustion carbonic acid, like charcoal and the diamond. They approach to carbon by their colour, their lightness, their opacity; by their serving, like it, to decompose water, to cement iron, to deoxydate metals, to deoxygenate sulphur, phosphorus, and arsenic; and, by conducting, like it, the electric fluid. They approach the diamond by containing more combustible matter than charcoal; by absorbing also more oxygen, and producing more carbonic acid; by decomposing more nitrous acid; by burning only at a much higher temperature, even in nitre in fusion; and by their combustion being stopped when this temperature is lowered. They seem to differ from each other by the property of producing with zinc galvanic irritation, as well as silver does: which can be effected neither by the diamond nor charcoal.

12. Thus the diamond is pure carbon, the pure acidifiable base of the carbonic acid. Its combustion is effected in three periods, which require three different temperatures. At the first, which is the highest, the diamond assumes a black leaden colour. It is an oxydation in the first degree, the state of plumbago and anthracolite. At the second temperature, which may be estimated at eighteen or twenty pyrometric degrees, there is a second slow and successive combination of oxygen. It is a progress of oxydation which constitutes the habitual state of charcoal, or rather that in which it is found after the action of a strong heat in close vessels has disengaged a part of its oxygen. Thus plumbago is an oxyd of the first degree, charcoal an oxyd in the second, and the carbonic acid the product of the complete oxygenation of the carbon. Supposing, then, that we operate with sufficient precision to take away from the surface of the diamond the black matter in proportion as it is formed, by suddenly withdrawing from it each time the action of the solar fire, we should doubtless be able to convert it into charcoal, or at least plumbago, if the too rapid passage of the last degree of oxydation to oxygenation did not prevent us from surprising it in that state. 13. In the last place, several consequences, of importance to chemistry and the arts, arise from these principles. It will be asked, no doubt, how it happens that the simple matter, pure carbon, the diamond, is so rare, while its compounds in different states are so abundantly diffused? To put an end to the astonishment of those who might entertain any mistrust, I shall observe, that aluminous earth is also one of the most common matters, and that adamantine spar, as rare as the diamond, is, however, only alumine; that iron every where exists, under all forms, except in the state of purity: the existence of native iron is still doubtful. The wonder exists only in the opposition of facts to our opinions, and will disappear in proportion as we discover, and appropriate to ourselves, the means employed by nature in producing the same effects.

The singularity and importance of these two experiments, suggested the idea of searching for a confirmation of a new kind, by trying to make soft iron pass to the state of steel, by cementation with the diamond.

It has hitherto been considered as certain, that iron does not melt but by passing to the state of steel or cast-iron. But in what state does the carbon enter into that combination? It might be conjectured, that it is in the state of plumbago, or oxyd of the first degree; since that which is separated by acids, exhibits the brilliant blackness and incombustibility which form its principal characters. Hence some were inclined to conclude, that the carbon entered into this union in the state of an oxydule; that consequently the carbon employed in the cementation of steel began by deoxydating itself to a certain degree. This was even, in some measure, proved; as the carbon employed for this operation was indeed found to have a more brilliant aspect, and nearly resisted incineration, like carbon in a mass burnt in close vessels. But, if carbon really burns in the cementation of iron, it ought to disengage from it oxygen gas. This is a question which I have endeavoured to resolve by experiment.

I cemented small bits of iron in a porcelain retort, which, in the preceding operation, had received a vitreous coating, and which consequently was no longer permeable to air. These fragments were all surrounded, on every side, by charcoal of beech pulverized, and very dry. The retort was put into the reverberating furnace, and a tube connected to it and carried under a receiver filled with mercury. There was disengaged a quantity of elastic fluid, composed of carbonated hydrogen gas, and carbonic acid gas, the last of which was at first only 0·11 in bulk; towards the middle of the experiment, 0·13; and at the end, 0·15.

The conversion of iron into steel being found only little advanced, after three hours and a half exposure to the fire, we put the same iron and the same carbon again into the retort, and exposed it to the heat of a three-blast furnace. This time there was only a very small quantity of gas; but it was still carbonated hydrogenous gas mixed with carbonic acid gas, and always with the same progression of the latter; which made at first only 0·07 of volume, while the last portions contained 0·12. The iron, on this occasion, was converted into steel, and even the fragments had united by a commencement of fusion.

It was very probable that a part of the carbonic acid, collected in this operation, might have been formed at the expence of the remaining carbon and with disengaged oxygen; but the constant presence of the hydrogen only served to indicate the difficulty of freeing the carbon entirely from the last portion of water it contained. I shall here take occasion to observe, that this experiment seems not at all reconcileable with the opinion of some chemists, that hydrogen has more affinity than carbon for oxygen: an opinion which they found on this circumstance, that carbon is precipitated, in Volta's eudiometer, when a mixture of oxygen gas and carbonated hydrogen gas is made to detonate, if a quantity of oxygen sufficient to acidify the two bases has not been employed. I say, that this affinity was not exerted in my experiment: for it cannot be doubted that the temperature was high enough to reproduce water by the union of the oxygen and hydrogen; and we can here see nothing which could decide a preference of the oxygen for the carbon.

These considerations seemed to me sufficient to create a new interest in regard to this experiment, proposed by C. Clouet. I did not hesitate, therefore, to employ in it one of the diamonds preserved in the cabinet of the Polytechnic School, according to the leave granted by the council; being persuaded that if it disappeared in the operation, merely by exposure to a high temperature, in contact with iron, without the accession of the air, or any other oxygenating substance, the fact thereby established would leave no room to regret having sacrificed it. Clouet had himself prepared a small crucible of soft iron, forged on purpose out of picked heads of nails. Its form was a solid of eight planes, as shewn at fig. 4. It was shut by a stopper of the same iron well adjusted, as at fig. 5.

This crucible was to be placed in a Hessian crucible, furnished with a cover well luted. This was all the apparatus for the experiment. I cannot give a better idea of the result, than by the report drawn up by C. Clouet, Welter, and Hachette.

The diamond employed weighed 907 milligrammes. As it did not entirely occupy the crucible, we filled it with filings of the same iron as that of which it was formed.

The

The crucible was ſhut by its iron ſtopper, which was forcibly thruſt home, that as little air as poſſible might remain in the inſide.

	Grammes.
The crucible and ſtopper weighed together -	55·8
The iron filings which covered the diamond	2
Total weight of the iron ſurrounding the diamond	57·8

After having cut off the exceſs of the ſtopper, the crucible was placed alone, and without the addition of any ſurrounding matter, in a very ſmall Heſſian crucible, and the latter in a ſecond crucible of the ſame earth; but the ſpace between the two latter crucibles was filled with filiceous ſand free from all ferruginous particles. In the laſt place, the large crucible was luted with earth ariſing from pounded crucibles and unbaked clay, and the whole was expoſed about an hour to a three-blaſt forge fire. The whole being cooled, we found, in the interior Heſſian crucible, the iron converted into an ingot of caſt ſteel, as ſhewn at fig. 6. It formed, with the ſtopper and filings, but one round maſs well terminated, ſome few globules excepted, which were detached, and which weighed only 884 milligrammes.

	Grammes.
The ingot of caſt ſteel weighed - -	55·500
The detached globules - - -	0·884
Total weight of the ſteel obtained - -	56·384

The iron and the diamond weighed, before the operation, 58 707 grammes; from which it follows that there was a loſs of iron about 2·423 grammes. This iron had given to the Heſſian crucible the colour of plumbago.

The fuſion of the iron being ſo far perfect as to ſhew on its ſurface the rudiments of the moſt beautiful cryſtallization, it is not poſſible to think that any part of the diamond could have remained in the inſide untouched, or that it was not in the moſt intimate ſtate of combination. The difference of the ſpecific gravity oppoſes ſuch an idea.

Some perſons having expreſſed a deſire to ſee the inſide of the ingot, it was broken on the anvil, which was not effected without ſeveral blows from a very large hammer. It divided itſelf into two fragments, which were exhibited at the next ſitting. The fracture appeared perfectly uniform, and of the moſt beautiful grain.

Thus the diamond diſappeared by the affinity which iron exerciſed on it by the help of the high temperature to which they were both expoſed, in the ſame manner as a metal diſappears in the alloy of another metal. The diamond, therefore, has furniſhed here the ſame principle as carbon, ſince the product of the union has the ſame properties.

The whole of the apparatus for this experiment, which is very ſimple, is ſhewn in the plate, as follows: A, fig. 4, is the plan of the iron crucible. B, a ſection of this crucible. C, fig. 5, the ſtopper of the crucibles D, E, fig. 6, ingot of caſt ſteel ſeen in perſpective. The ſpot formed by the nitric acid on the poliſhed part is repreſented at *a*.

Thoſe who have never turned their attention to the phyſical ſciences, to eſtimate at leaſt their influence on public felicity, are diſpoſed to treat as vain curioſity labours which are not immediately directed towards a near object of new enjoyment. What would have been their aſtoniſhment had they been told, that reſearches on the nature of the diamond would one day produce truths, which might give riſe to happy changes in the practice of the moſt familiar arts; in the preparation, and in the employment of the coarſeſt combuſtibles! Such, however, are the conſequences that may ariſe from the beſt known properties of the eſſential principle carbon in its different ſtates. For an account of the new meaſures and weights lately adopted in France, and occaſionally mentioned in the foregoing treatiſe, ſee the article MEASURE.

THE CALORIMETER OF LAVOISIER AND LA PLACE.

Caloric, or the matter of heat, conſidered as accumulating in a greater or leſs quantity in ſubſtances of different natures, but of equal maſſes, and in which it acquires the ſame expanſive force, is often termed ſpecific caloric: it is the relation of the quantities of heat neceſſary to raiſe different ſubſtances of equal maſſes to the ſame temperature.

To diſcover the quantity of caloric contained in different bodies, Meſſrs. Lavoiſier and La Place have invented a ſimple but admirable inſtrument, to which they gave the name of *calorimeter*, or apparatus for meaſuring the relative quantities of caloric, contained in bodies, or what they term *latent heat*, as amply deſcribed under the head CALORIC, p. 181, &c. of this treatiſe. The inſtrument is founded upon the following principles: I. That if any body be cooled to the freezing point, and then expoſed to an atmoſphere of 88·25, it will be heated gradually from the ſurface inwards, till at laſt it acquires the ſame temperature with the ſurrounding air. 2. That, if a piece of ice be placed in the ſame ſituation, the circumſtances are quite different; it does not approach in the ſmalleſt degree towards the temperature of the circumambient air, but remains conſtantly at 32°, or the temperature of melting ice, till the laſt portion of ice be completely melted: in other words, that ice abſorbs all the heat communicated to it, without communicating it to other bodies, until the whole be melted; and, conſequently, that we may calculate the degrees of heat communicated, by the quantity of ice which is melted.

This phenomenon is thus explained: To melt ice, or reduce it into water, it muſt be combined with a certain portion of caloric: the whole quantity firſt communicated, is fixed at the ſurface of the external layer of ice; this it diſſolves, combining with it to form water; the next quantity combines with the ſecond layer, and forms it into water; and ſo on ſucceſſively, till the whole is diſſolved and converted into water by being combined with heat; the laſt atom ſtill remaining at its former temperature, becauſe the heat never penetrates ſo far, as long as any intermediate ice remains to be melted.

Upon theſe principles, if you imagine a hollow ſphere of ice at 32°, placed in an atmoſphere of 54 or 55°, and containing a ſubſtance at any degree of temperature above freezing, it will follow, 1. That the heat of the external atmoſphere cannot penetrate into the internal cavity of the ſphere of ice. 2. That the heat of the ſubſtance placed cannot penetrate outwards beyond it, but will be ſtopped at the internal ſurface, and continually employed in melting ſucceſſive layers of ice, until its temperature is reduced to 32°, by having all the heat above that temperature carried off by the ice. 3. If the quantity of water within the ſphere of ice during the experiment be carefully collected, the weight of the water will be exactly proportional to the quantity of caloric loſt by the body in paſſing from its original temperature to that of melting ice; it being evident, that a double quantity of caloric would have melted a double quantity of ice; and that the quantity of ice melted is an exact meaſure of the quantity of caloric employed to produce the effect; and of the quantity loſt by the only ſubſtance from which it could be obtained. The foregoing ſuppoſition is only made to explain more readily the nature of the experiments to be made with the above-mentioned apparatus, which is ſo contrived, 1. That the ice abſorbs all the caloric diſengaged from the bodies under examination. 2. That the ice is ſecured from the action of every other ſubſtance which might facilitate its fuſion; and, 3dly, To collect with care the water produced by the fuſion.

The apparatus conſiſts of three circular veſſels, nearly inſcribed in each other, as repreſented in the Chemical Plate XI. fig. 1, and 2; by which means three vacancies are

are produced. The interior space or vacancy, is formed by an iron grating upon the supports of the same metal; here it is that the bodies subjected to experiments are to be placed. The top of this cavity is closed by means of a cover: the middle space next to this is designed to contain the ice which surrounds the interior compartment: this ice is supported and retained by a grate upon which a cloth is spread; in proportion as the ice melts, water flows through the grate and the cloth, and is collected in a vessel placed underneath. Lastly the external place or compartment of the apparatus contains ice, intended to prevent the effect of the external heat of the atmosphere.

To use this machine, the middle or second space is filled with pounded ice, as is also the cover of the internal sphere: the same thing is done with regard to the external space, as well as to the general cover of the whole machine: the interior ice is suffered to drain; and when it ceases to afford water, the covering of the internal space is raised to introduce the body, upon which the experiment is intended to be made: the covering is to be put on immediately, and the whole apparatus remains untouched until the included body has acquired the temperature of 32°, or the freezing temperature of water, which is the common temperature of the internal capacity: the quantity of melted water afforded by the melting ice is then weighed; and this may be considered as an accurate measure of the caloric or matter of heat disengaged from the body, because the fusion of the ice is the effect of this heat only. Experiments of this kind last fifteen, eighteen, or twenty, hours.

It is of great consequence, that in this machine there should be no communication between the middle, or second, and the external space. The air of the room should not be lower than 32, because the ice would then receive a degree of cold lower than that temperature.

It is extremely easy, with this apparatus, to determine the phenomena which occur in operations where caloric is either disengaged or absorbed. If we wish, for instance, to ascertain the quantity of caloric which is disengaged from a solid body in cooling a certain number of degrees; let its temperature be first raised to 212°, it is then placed in the interior cavity *ffff*, fig. 2 and 3, of the calorimeter, and allowed to remain till we are certain that its temperature is reduced to 32°; the water produced by melting the ice during its cooling is collected, and carefully weighed; and this weight, divided by the volume of the body submitted to experiment, and multiplied into the degrees of temperature which it had above 32° at the commencement of the experiment, gives the proportion of specific caloric.

Fluids are contained in proper vessels, whose specific heat, or caloric, has been previously ascertained, and are operated upon in the machine in the same manner as directed for solids, taking care to deduct, from the quantity of water melted during the experiment, the proportion which belongs to the specific heat of the containing vessel. If the quantity of caloric disengaged during the combination of different substances is be determined, these substances are to be previously reduced to the freezing degree, by keeping them a sufficient time surrounded with pounded ice; the mixture is then to be made in the inner cavity of the calorimeter, in a proper vessel likewise reduced to 32°; and they are kept inclosed till the temperature of the combination has returned to the same degree: the quantity of water produced is a measure of the caloric disengaged during the combination.

To determine the quantity of caloric disengaged during combustion, and during animal respiration, the combustible bodies are burnt, or the animals are made to breathe, in the interior cavity, and the water produced is carefully collected. Guinea-pigs, which have the faculty of very eminently resisting the effects of cold, are extremely well adapted for this experiment. As the continual renewal of air is absolutely necessary in such experiments, we blow fresh air into the interior cavity of the calorimeter, by means of a pipe destined for that purpose, and allow it to escape through another pipe of the same kind; and that the heat of this air may not produce errors in the results of the experiments, the tube which conveys it into the machine is made to pass through pounded ice, that it may be reduced to 32° before it arrives at the calorimeter. The air which escapes must likewise be made to pass through a tube surrounded with ice, included in the interior cavity of the machine, and the water which is there produced must make a part of what is collected, because the caloric disengaged from this air is part of the product of the experiment.

It is somewhat more difficult to determine the specific caloric contained in the different gasses, on account of their small degree of density; for, if they are only placed in the calorimeter in vessels like other fluids, the quantity of ice melted is so small, that the result of the experiment becomes at best very uncertain. For this species of experiment, the air must pass through two metallic worms, or spiral tubes; one of these, through which the air passes, and becomes heated in its way to the calorimeter, is contained in a vessel full of boiling water; and the other, through which the air circulates within the calorimeter to disengage its caloric, is placed in the interior cavity of the machine. By means of a small thermometer placed at one end of the second worm, the temperature of the air, as it enters the calorimeter, is determined; and its temperature in getting out of the interior cavity, is found by another thermometer placed at the other end of the worm. By this contrivance we are enabled to ascertain the quantity of ice melted by determinate quantities of air or gas, while losing a certain number of degrees of temperature, and, consequently, to determine their several degrees of specific caloric. The same apparatus, with some particular precautions, may be employed to ascertain the quantity of caloric disengaged by the condensation of the gases or vapours of different liquids.

The various experiments which may be made with the calorimeter do not afford absolute conclusions, but only give us the measure of relative quantities; we have therefore to fix a unit, or standard point, from whence to form a scale of the several results. The quantity of caloric necessary to melt a pound of ice has been chosen as this unit; and, as it requires a pound of water of the temperature of 167° to melt a pound of ice, the quantity of caloric expressed by the unit, or standard point, is what raises a pound of water from 32° to 167°. When this unit is once determined, we have only to express the quantities of caloric disengaged from different bodies, by cooling a certain number of degrees, in analogous values: the following is an easy mode of calculation, given by Lavoisier for this purpose, and applied to one of his earliest experiments. He took 7 lb. 11 oz. 2 gros 36 grs. of plate-iron, cut into narrow slips, and rolled up, or expressing the quantity in decimals, 7·7070319 lbs. These being heated in a bath of boiling water to about 207·5°, were introduced into the interior cavity of the calorimeter. At the end of eleven hours, when the whole quantity of water melted from the ice had thoroughly drained off, he found that 1·109795 pounds of ice were melted. Hence, the caloric disengaged from the iron by cooling 175·5°, having melted 1·109795 pounds of ice, how much would have been melted by cooling 135°? This question gives the following statement in direct proportion, $175{\cdot}5 : 1{\cdot}109795 :: 135 : x = 0{\cdot}85384$. Dividing this quantity by the weight of the whole iron employed, viz. 7·7070319, the quotient 0·1109 is the quantity of ice which would have been melted by one pound of iron while cooling through 135° of temperature.

Fluid substances, such as sulphuric and nitric acids, &c. are contained in a matrass, having a thermometer adapted to the cork, with its bulb immersed in the liquid. The

The Calorimeter of Lavoisier and La Place

The matrass is placed in a bath of boiling water, and when, from the thermometer, we judge the liquid is raised to a proper temperature, the matrass is placed in the calorimeter. The calculation of the products, to determine the specific caloric of these fluids, is made as above-directed, taking care to deduct from the water obtained the quantity which would have been produced by the matrass alone, which must be ascertained by a previous experiment.

The various parts of the calorimeter, adapted to these several purposes, are delineated in the plate, as follows: Fig. 1, 2, and 3, give a perspective view of the apparatus, and exhibit a vertical and an horizontal section of the same; *ffff*, in fig. 2, shews the interior cavity in which the substances are to be placed; it is composed of a grating, or cage of iron wire, supported by several iron bars; this grating, or cage, for the sake of distinctness, is represented separately at fig. 4, with its lid or cover; *bb*, in fig. 2 and 3, denote the middle cavity, destined to contain the ice to be melted; this is supported by the grate *mm*, under which is placed the sieve *nn*. These two are represented separately at fig. 5 and 6. In proportion as the ice is melted, the water runs into the conical funnel *ccd*, fig. 2. This water may be retained or let out at pleasure by the stop-cock *u*. The external cavity *aaaa*, fig. 2 and 3, is filled with ice, to prevent any effect from external heat on the ice in the cavity *bbbb*; fig. 7, is the lid to cover the machine. The substances to be operated upon are placed in the thin iron bucket, fig. 8, the cover of which has an opening fitted with a cork, into which a small thermometer is fixed. When acids are used, they are put into a glass vessel, or matrass, fig. 9, which has also a small thermometer fitted to its neck, and is also supported by the small ring, fig. 10.

On the CHEMICAL CHARACTERS.

Language, in many cases, is incapable of expressing our conceptions with that rapidity and perspicuity, which we sometimes find necessary for an *instantaneous* communication of our ideas. Writing is still slower than speech, in the ordinary mode of expressing things by words at length; hence the introduction of signs and symbols, to express whole sentences by single marks. The chemical characters are an instance of this; they were invented by the earlier chemists, to save time in writing the names of substances that frequently occurred, in the same manner as we avoid repetitions by the use of pronouns, or of expressing sums in words, which are more expeditiously set down in figures.

We need not have recourse to the remote field of Chinese literature, to shew how admirably the simplicity, relative position, and connection of characters, are calculated to express ideas, at one glance of the eye, with a degree of accuracy and precision not to be obtained by the use even of many written words. Neither need we recur to the science of algebra, where, by the use of characters, the mind receives the proof, and assents to propositions almost instantaneously, which would have required a long series of verbal deductions in any other way. Our own science, chemistry, will afford us instances of the most striking nature. The tables at the end of Bergman's Essay on the Affinities, exhibit, in a speedy and intelligible manner, the greater part of many volumes of chemical results; and it is certainly easy, by a simple combination of chemical and algebraical characters, to write the whole contents of any chemical work in a small compass; yet so full, clear, and perspicuous, that whole pages may be read and understood in a few seconds.

Characters are either entirely arbitrary, or they have some resemblance to the idea they represent. The latter property is naturally aimed at, where it can be obtained, because it cannot but tend to assist the memory. Thus a number of dots were used to denote sand or powder; the figure of a retort, to denote the retort; and the combination of characters is used to denote similar combinations of the substances they represent. Very little of system appears in the ancient characters of chemists: those of the alchemists were certainly intended to screen their science under a mysterious veil; yet many of the characters of Bergman seem chiefly grounded on these ancient characters, with additions and improvements. But the characters of Hassenfratz and Adet are systematical throughout, and are now generally adopted. These two chemists were employed by the Academy of Sciences at Paris, in 1787, to correct and reform the chemical characteristics. Their official charge was to methodize and illustrate two problems or parts: 1. To find out general characters, or symbols, by which the then known simple substances, or considered as simple, as well as those which may be discovered in future, may be expressed in a constant and uniform manner. 2d. To combine those general characters in such a manner, that, with regard to compounds of the simpler substances, the number, nature, and proportion of their component principles, may be distinctly expressed by that union of the primitive symbols.

In order to solve the first part of the problem, Hassenfratz and Adet divided the simple substances, according to the modern discoveries, into four genera. To these they added two other genera; one for substances supposed to be compound, and whose decomposition is already foreseen; the other for compound bodies, with the constituent principles of which we are as yet unacquainted.

First Genus.—*Substances which appear to enter into the Composition of the greater number of Bodies.* For these they have chosen a short straight line, which can have four different positions. The vertical, which they have adopted for expressing caloric; the horizontal, adopted for oxygen; the oblique, from the right downwards to the left, the character of azot or nitrogen; lastly, the oblique from the left to the right, which may serve for future discoveries, as well as the zigzag or waving line in these four positions.—By a vertical zigzag line they express light.

Second Genus.—*Alkaline and Earthy Substances.* These are denoted by an equilateral triangle. With its vertex upwards, it signifies the alkalis; and with its vertex downwards, it is appointed to indicate the earths.—To distinguish the individual substances of each of these species, the initial letter of their Latin name is inscribed in the triangle: as P. for potassinum, S. for soda, C. for calx, A. for argilla. But, whenever two or more of these have the same initial letter in their name, the next consonant in order is added. Thus strontian-earth, is distinguished by St. from silex, marked only by S.—Ammoniac is left out from the alkalis, because its constituent parts are at present known. The initials of the Latin names were chosen, because they are known in every country, and the characters were designed to be universal, otherwise each nation would have a difference in these characters.

Third Genus.—*Inflammable Substances.* To signify these, the semicircle has been taken, with its four different positions. Opening to the left for hydrogen; opening to the right for carbon; opening downwards for phosphorus; opening upwards for sulphur. By doubling this semicircle, inflammables of future discovery may be denoted. Thus Dr. Pearson has lately employed two semicircles, placed vertically upon each other, and opening to the left, for representing the diamond, which is now considered as the purest carbon.

Fourth Genus.—*Metallic Substances,* for which the circle has been chosen. Gold has preserved its ancient sign, a circle with a point in the centre, heretofore used to represent *Sol*, the sun. The other metals are distinguished by inserting the first letter of their Latin name, but to avoid confusion in metals having the initial in their name, the next consonant in order, that is to say, begin-

ning the next syllable, is added to the first. In this manner As. distinguishes arsenicum from A argentum. M. with an annexed L. distinguishes molybdena from M. magnesium; and St. expresses stibium, or antimony, to distinguish it from stannum, or tin, denoted by S. inscribed in the circle; and platina is signified by P. with the prominent top of T, in contradiction to the simple P. by which plumbum, lead, is marked.

Fifth Genus.—*Acidifiable Substances*, which are justly supposed to be formed of several principles, and whose decomposition is at present foreseen. These are denoted by the square in its horizontal position. The initial of the Latin name of each is inscribed in the square, adding the first consonant of the next syllable, to distinguish any one from another of the same initial letter. Thus the benzoic, formic, saccholactic radicals, are distinguished by Bz. Fm. Sl. from the boracic, fluoric, succinic, to signify which B. F. S. are inscribed in the square.

Sixth Genus.—*Compound Substances, with the Constituent Principles of which we are as yet unacquainted.* To these the square, with its angle upwards, has been appropriated. The difference between each is again denoted, as in the preceding 2d, 4th, and 5th, genera, by inscribing the first letters of their Latin names, and adding, when necessary, one or two of the consonants next in order. These distinctions are all clearly expressed in the first five of the following tables, which have been projected by these able chemists.

As to the second part of the problem, the first law is, to join the primitive characters of the simple substances, &c. by two and two, three and three, four and four, &c. according as the compound substance consists of 2, 3, 4, &c. different principles; and the second law is, to diversify the position of those characters in such a manner, that the different proportions in which the simple, or at least less compound substances are chemically combined, may be sufficiently and distinctly indicated. Now the primitive characters may have eight different positions. Two horizontal, two vertical, two oblique to the right, and two oblique to the left. For instance, the square may be placed horizontally on the right or on the left side of the circle; or vertically, above or underneath it; or obliquely to its right or left, and in both cases either the circle or the square uppermost.—The four oblique positions have been rejected, to avoid confusion when not well written; and as it is of little importance which of two characters is placed to the right or to the left of the other, only one horizontal position has been adopted, in general, for binary combinations.

With respect to the second law, two characters are placed upon the same horizontal line, to indicate that the saturation is reciprocal, and that there is an equality in the proportions of the constituent parts of the compound substance represented.—However, if a triple or any multiple combination is to be signified, the character of any substance may be farther advanced to the left-hand, in proportion as it has a less affinity than the others with that denoted by the character placed on the right. But, in the vertical position, the character which is the inferior, indicates the substance denoted by it is in excess of proportion to the other.—Thus, the proportions of sulphur and potash in the alkaline sulphure are distinguished in three different ways:—their equality of proportion by the position of their respective characters next to each other, on the same horizontal line; and the excess of sulphur, or that of alkali, by placing the sign of sulphur, or that of the potash, undermost in the vertical junction of their signs.

From these general rules some exceptions are to be made. 1°. Caloric is always combined in some degree with every substance. Hence, to avoid the too frequent repetition of its character or symbol, it is omitted whenever the body represented is considered in the solid state, as zink; but it is added, either above or below the character of zink, to denote this metal in the liquid or elastic state; that is to say, in the state of fusion or sublimation. Water and aqueous vapour afford another example. 2°. Oxygen makes another exception; for its different proportions produce properties in the compound so remarkable as to require that they should not be mistaken. It produces, 1st. oxyds, as oxyd of sulphur; 2dly. acids, where the base predominates, as sulphureous acid; 3dly. acids in reciprocal saturation of the two substances combined, as sulphuric acid; and, 4thly. by combining with an acid, whose two principles are already saturated, the oxygen produces a combination divested of the characteristic properties of acids; though its retention is then so inconsiderable as to be set at liberty, and to regain the elastic state by a few rays of light. This last state of its combination is well known only in the oxygenated muriatic acid; and, to denote it, the character of oxygen is placed under the character of the acidifiable base, and detached from it. The combination of azot and oxygen likewise seems to produce these four species of compounds. Hence gaseous ozyd of azot, nitrous and nitric acid, and the sort of nitric acid which Monge says he has obtained, and which appears to be oxygenated nitric acid. The character of oxygen, therefore, has four positions: at the top of the character joined with it, on its right side towards the middle; underneath it, and joined; and, lastly, underneath it, and separated.

The characters formed by these laws from the primitive signs, as relating to simple substances, &c. offer six general simple characters: the line, the triangle, the semicircle, the circle, the square placed horizontally, and the square placed with one of its angles upwards. The first five, with the inscribed initial letters of the Latin names of the known metals, earths, &c. then known (at present increased to 63), have afforded to Adet and Hassenfratz fifty-four particular characters; which, combined two and two, form $\frac{54 \times 53}{2} = 1431$ signs for so many binary combinations. But as there can be expressed three states of combination, besides that oxygen is capable of four, the same number 1431, multiplied by three, will give 4293 different signs, to denote so many different compound substances.

On arguing farther upon the same principles, if two characters can have three different positions, the union of three will afford thirteen.

Hence the above fifty-four symbols, combined by three and three, produce $\frac{54 \times 53 \times 52}{2 \times 3} = 24804$, which, multiplied by thirteen, gives 322452 different ternary combinations of characters, capable of signifying so many substances, compounded of three principles; and, without calculating farther the number of symbols arising from the union of four, five, and more, of these fifty-four characters, the above shews that we have a sufficient number of characters to denote all substances hitherto known, or whose discovery may be expected.

Hence, then, it must be confessed, that the invention of these characters is extremely ingenious, and promises to be of no less general utility. They are of considerable advantage in making out Tables of Attractions in a small compass; and also in the Tables of Compositions, wherein one substance, whether simple or compound, being placed at the head, and the other on the left-hand side, the point or angle where the two columns concur, which bear these two signs, or characters, will shew the compound, like the product in the Pythagorean tables for multiplication.

The whole of what has been here stated, may be sufficiently understood by an attentive investigation of the first *five* of the following tables, as projected by Hassenfratz and Adet. The sixth table contains the chemical signs which occur in the writings of Bergman; and it was though fit to add finally the ancient signs and characters, that the reader may be at no loss in reading either the ancient or modern authors on chemistry.

TABLE

TABLE I. CHARACTERS in CHEMISTRY by Haffenfratz and Adet.

Simple Substances which can exist in the aeriform state in the ordinary temperature of the Atmosphere, and which entering into the composition of an infinity of substances demand a great simplicity of their Characters.		Light.
		Caloric Matter of Heat.
		Oxygen. Base of Vital Air
		Azot. Base of Vitiated Air, or Moffette
		Characters to express such new and simple Substances as may be discovered.
Alkalies which are as yet considered as simple Substances.	P	Potash. Caustic fixed Alkali.
	S	Soda. Caustic Mineral Alkali.
Simple Earths.	B	Barytes. Ponderous earth.
	C	Lime. Calx.
	M	Magnesia.
	A	Alumine. Argilaceous earth.
	S	Silex. Quartz.
Combustible Simple Substances, commonly called Inflammable Substances.		Hydrogen. Base of Inflammable Air.
		Carbon, or pure Charcoal
		Sulphur.
		Phosphorus.
		Characters to express such new combustible substances as will be discovered.
Bases which we do not as yet know, but whose nature we expect to be able to discover. Radical.	M	Muriatic.
	B	Boracic.
	F	Fluoric.
	S	Succinic.
	A	Acetic.
	T	Tartaric.
	T	Pyro-tartaric.
	O	Oxalic.
	G	Gallic.
	C	Citric.
	M	Malic.
	Bz	Benzoic.
	P	Pyro-lignic.
	Pm	Pyro-mucic.
	Cz	Camphoric.
	L	Lactic.
	SL	Saccho-lactic.
	Fm	Formic.
	P	Prussic.
	Sb	Sebacic.
	Bb	Bombic.
	L	Lithic.

Metals reducible by heat alone.	P	Platina.
		Gold. Aurum.
	A	Silver. Argentum.
A metal in the liquid State in the ordinary temperature of the atmosphere.	H	Mercury. Hydrargirum.
Malleable Metals.	S	Tin. Stannum.
	C	Copper. Cuprum.
	P	Lead. Plumbum.
	F	Iron. Ferrum.
Metals not malleable.	Z	Zink. Zincum.
	M	Manganese. Magnesium.
	N	Nickel. Niccolum.
	B	Bismuth. Bismuthum.
	ST	Antimony. Stibium.
	K	Cobalt. Kobaltum.
Acidifiable Metals.	As	Arsenic. Arsenicum.
	Mb	Molybden. Molybdenum.
	T	Tungsten. Tunstenum.
Compound bodies which are not acidifiable bases & whose component principles are very little known.	E	Ether.
	A	Alcohol.
	O	Fixed Oil.
	OV	Volatile Oil.
	B	Bitumen.
	M	Mucus.
General Characters.		Alkalies.
		Earths.
		Combustible Substances.
		Metallic Substances.
		Compound Acidifiable Bases.
		Non Acidifiable compound Substances.

TABLE II. COMBINATIONS OF CALORIC with different Simple Substances, producing the Solid, Liquid, and Aeriform States.

	Solid	Liquid	Aeriform		Solid	Liquid	Aeriform		Solid	Liquid	Aeriform
Azot				Copper	C	C	C	Pyro-tartareous Radical	P	P	P
Potash	P	P	P	Lead	P	P	P	Oxalic Radical	O	O	O
Soda	S	S	S	Iron	F	F	F	Gallic Radical	G	G	G
Barytes	B	B	B	Zink	Z	Z	Z	Citric Radical	C	C	C
Lime	C	C	C	Manganese	M	M	M	Malic Radical	M	M	M
Magnesia	M	M	M	Nickel	N	N	N	Benzoic Radical	Bz	Bz	Bz
Alumine	A	A	A	Bismuth	B	B	B	Pyro-lignic Radical	E	E	E
Silex	S	S	S	Antimony	Sb	Sb	Sb	Camphoric Radical	Cp	Cp	Cp
Hydrogen				Arsenic	As	As	As	Lactic Radical	L	L	L
Carbon				Molybdena	Ml	Ml	Ml	Saccho-lactic Radical	Sl	Sl	Sl
Sulphur				Tungsten	T	T	T	Formic Radical	Fm	Fm	Fm
Phosphorus				Muriatic Radical	M	M	M	Prussic Radical	P	P	P
Gold				Boracic Radical	B	B	B	Sebacic Radical	Sb	Sb	Sb
Platina	P	P	P	Fluoric Radical	F	F	F	Bombic Radical	Bb	Bb	Bb
Silver	A	A	A	Succinic Radical	S	S	S	Lithic Radical	L	L	L
Mercury	H	H	H	Acetous Radical	A	A	A	Ether	E	E	E
Tin	S	S	S	Tartareous Radical	T	T	T	Alcohol	A	A	A

TABLE III. THE KNOWN COMBINATIONS OF OXYGEN AND CALORIC, WITH DIFFERENT SUBSTANCES.

Nitrous Gas		Concrete Oxygenated Muriatic Acid	M	Liquid Sebacic Acid	Sb
Nitrous Acid Gas		Concrete Boracic Acid	B	Liquid Bombic Acid	Bb
Nitrous Acid		Fluoric Acid Gas	F	Oxyd of Tungste	T
Nitric Acid		Concrete Succinic Acid	S	Tungstic Acid	T
Oxygenated Nitric Acid		Liquid Tartareous Acid	T	Oxyd of Molybdena	Ml
Ice		Concrete Tartareous Acid	T	Concrete Molybdic Acid	Ml
Water		Liquid Pyro-tartareous Acid	T	Oxyd of Arsenic	As
Vapour of Water		Liquid Acetous Acid	A	Concrete Arsenic Acid	As
Carbonic Acid Gas		Acetous Acid Gas	A	Oxyd of Cobalt	K
Sulphureous Oxyd Gas		Liquid Acetic Acid	A	Oxyd of Antimony	Sb
Sulphureous Acid Gas		Concrete Oxalic Acid	O	Oxyd of Bismuth	B
Sulphureous Acid		Liquid Gallic Acid	G	Oxyd of Nickel	N
Liquid Sulphuric Acid		Liquid Citric Acid	C	Oxyd of Manganese	M
Concrete Sulphuric Acid		Liquid Malic Acid	M	Oxyd of Zink	Z
Concrete Phosphorous Acid		Concrete Benzoic Acid	Bz	Oxyd of Iron	F
Liquid Phosphorous Acid		Liquid Pyro-ligneous Acid	E	Oxyd of Lead	P
Liquid Phosphoric Acid		Liquid Pyro-mucous Acid	Pm	Oxyd of Copper	C
Liquid Muriatic Acid	M	Concrete Camphoric Acid	Cp	Oxyd of Tin	S
Muriatic Acid Gas	M	Liquid Lactic Acid	L	Oxyd of Mercury	H
Oxygenated Muriatic Acid Gas	M	Concrete Saccho-lactic Acid	SL	Oxyd of Silver	A
Liquid Oxygenated Muriatic Acid	M	Liquid Formic Acid	Fm	Oxyd of Gold	
		Prussic Acid Gas	Ps	Oxyd of Platina	P

TABLE IV. COMBINATIONS OF TWO SUBSTANCES.

Caloric forms a third in some of these Compositions.

Ammoniacal Gas	*Sulphure of Alumine*	*Sulphure of Antimony*	*Amalgam of Silver*
Concrete Ammoniac	*Sulphure of Gold*	*Sulphure of Cobalt*	*—— of Copper*
Carbonated Azotic Gas	*Sulphure of Silver*	*Sulphure of Arsenic*	*—— of Tin*
Sulphurated Azotic Gas	*Sulphure of Mercury*	*Sulphure of Molybden*	*Alloy of Tin & Copper*
Carbonated Hydrogen Gas	*Sulphure of Tin*	*Phosphure of Lead*	*of Tin & Lead*
Sulphurated Hydrogen Gas	*Sulphure of Copper*	*Phosphure of Iron*	*— of Iron & Manganese*
Phosphorated Hydrogen Gas	*Sulphure of Lead*	*Alloy of Platina & Gold*	*— of Iron & Nickel*
Sulphure of Potash	*Sulphure of Iron*	*— of Platina & Silver*	
Sulphure of Soda	*Sulphure of Zink*	*— of Gold & Silver*	
Sulphure of Barytes	*Sulphure of Nickel*	*— of Gold & Copper*	*Carbure of Iron*
Sulphure of Lime	*Sulphure of Bismuth*	*Amalgam of Gold*	

TABLE V. NEUTRAL SALTS COMPOSED OF THREE SUBSTANCES.

Caloric is not expressed because they are all supposed to be in the solid state. The Ammoniacal State are composed of four Substances.

Calcareous Acetat	*Calcareous Camphorat*	*Acidulous Oxalat of Potash*	*Sulphat of Lime*
Acetat of Alumine	*Citrat of Soda*	*Phosphat of Potash*	*Acidulous Sulphat of Alumine*
Acetat of Magnesia	*Ammoniacal Citrat*	*Phosphat of Soda*	*Sulphat of Alumine*
Acetat of Potash	*Calcareous Citrat*	*Ammoniacal Phosphat*	*Sulphat of Alumine with excess of base*
Acetat of Soda	*Fluat of Potash*	*Phosphat of Lime*	*Sulphat of Magnesia*
Acetat of Copper	*Fluat of Ammoniac*	*Phosphat of Iron*	*Sulphat of Silver*
Acetat of Iron	*Fluat of Lime*	*Phosphit of Soda*	*Sulphat of Mercury*
Ammoniacal Acetit	*Formiat of Soda*	*Prussiat of Iron*	*Sulphat of Tin*
Acetit of Potash	*Ammoniacal Formiat*	*Pyro-tartrit of Potash*	*Sulphat of Copper*
Calcareous Acetit	*Calcareous Formiat*	*Pyro-mucit of Soda*	*Sulphat of Lead*
Bombiat of Potash	*Lactat of Soda*	*Pyro-lignit of Ammoniac*	*Sulphat of Iron*
Ammoniacal Bombiat	*Ammoniacal Lactat*	*Saccho-lat of Potash*	*Sulphat of Zink*
Calcareous Bombiat	*Lactat of Lime*	*Sebat of Soda*	*Sulphat of Manganese*
Carbonat of Potash	*Gallat of Potash*	*Sulphit of Potash*	*Sulphat of Nickel*
Carbonat of Soda	*Malat of Potash*	*Sulphat of Potash*	*Sulphat of Bismuth*
Ammoniacal Carbonat	*Muriat of Potash*	*Acidulous Sulphat of Potash*	*Sulphat of Antimony*
Calcareous Carbonat	*Muriat of Soda*	*Sulphat of Potash with excess of base*	*Sulphat of Cobalt*
Barytic Carbonat	*Ammoniacal Muriat*		*Sulphat of Arsenic*
Magnesian Carbonat	*Barytic Muriat*	*Sulphat of Soda*	*Sulphat of Molybdena*
Carbonat of Iron	*Muriat of Iron*	*Acidulous Sulphat of Soda*	*Sulphat of Tungsten*
Benzoat of Potash	*Oxygenated Muriat of Soda*		*Succinat of Potash*
Ammoniacal Benzoat	*Nitrat of Potash, or Nitre*	*Sulphat of Soda with excess of base*	*Arseniat of Potash*
Calcareous Benzoat	*Nitrat of Soda*		*Acidulous Arseniat of Potash*
Borat of Soda	*Ammoniacal Nitrat*	*Sulphat of Ammoniac*	*Arseniat of Potash with excess of base*
Ammoniacal Borat	*Barytic Nitrat*	*Acidulous Sulphat of Ammoniac*	*Molybdat of Soda*
Calcareous Borat	*Nitrat of Silver*	*Sulphat of Ammoniac with excess of base*	*Ammoniacal Tungstat*
Camphorat of Potash	*Nitrit of Potash*		*Calcareous Tungstat*
Ammoniacal Camphorat	*Oxalat of Potash*	*Barytic Sulphat*	*Lithiat of Potash*

TABLE

TABLE VI. The Chimical Signs as they occur in the writings of Bergman.

Acids.		Earths.	Metallic Calces.
1. + Vitriolic.	16. + Amber.	29. Pure Ponderous.	44. Gold.
2. + Phlogisticated.	17. + Sugar of Milk.	30. Pure calcareous Lime.	45. Platina.
3. + Nitrous.	18. Acetous distilled.	31. Pure Magnesia.	46. Silver.
4. + Phlogisticated.	19. + Milk.	32. Pure Argillaceous.	47. Mercury.
5. + Marine.	20. + Ants.	33. Pure Siliceous.	48. Lead.
6. + Dephlogisticated.	21. + Fat.	34. ∇ Water.	49. Copper.
7. Aqua Regia.	22. + of Phosphorus.	35. Vital Air.	50. Iron.
8. + of Fluor.	23. + Perlatum.	36. Phlogiston.	51. Tin.
9. Arsenic.	24. + of Prussian blue.	37. Δ Matter of Heat.	52. Bismuth.
10. + Borax.	25. Aerial.	38. Sulphur.	53. Nickel.
11. + ⊕ Sugar.	**Alkalis.**	39. Saline Hepar.	54. Arsenic.
12. + Tartar.	26. Pure fixed Vegetable.	40. Spirit of Wine.	55. Cobalt.
13. + Sorrel.	27. Pure fixed Mineral.	41. Æther.	56. Zink.
14. + C Lemon.	28. Pure Volatile.	42. Essential Oil.	57. Antimony.
15. + Benzoin.		43. Unctuous Oil.	58. Manganese.
			59. Siderite.

TABLE VII. The Ancient Chemical Signs or Characters.

Δ Fire.	Regulus of Antimony.	c. Caustic vol Alkali.	Caput Mortuum.
Δ Air.	Arsenic.	Potash.	A Powder.
∇ Water.	Regulus of Arsenic.	Acids.	Ashes.
∇ Earth.	K Cobalt.	Vinegar.	B. A Bath.
f. Fixable Air.	N Nickel.	Vitriolic Acid.	B M; MB; Water-bath.
m. Mephitic Air.	S.M. Metallic Substances.	Nitrous Acid.	A B. Sand-bath.
Clay.	C Calx.	Marine Acid.	V.B. Vapour-bath.
Gypsum.	Orpiment.	Aquafortis.	An Hour.
C Calcareous Earth.	Cinnabar.	Aqua Regia.	A Day.
C V; Quicklime.	L.C. Lapis Calaminaris.	Vol Sulphureous Acid.	A Night.
Vitrifiable or Siliceous Earths.	Tutty.	Phosphoric Acid.	A Month.
Fluors or Fusible Earths.	Vitriol.	V. Wine.	Amalgam.
X Talk.	Sea Salt.	Spirit of Wine.	To Distil.
M.∇ Magnesia.	Sal Gem.	Rectified Spirit of Wine.	To Sublime.
A∇: Earth of Alum.	Nitre.	Æ Ether.	To Precipitate.
Sand.	Borax.	Lime Water.	A Retort.
☉ Gold.	S.S. Sedative Salt.	Urine.	An Alembic.
☽ Silver.	Sal Ammoniac.	Oil.	A Crucible.
♀ Copper.	Alum.	Essential Oil.	S.S.S. Stratum Super Stratum.
♃ Tin.	Tartar.	Fixed Oils.	C.C. Cornu Cervi Hartshorn.
Lead.	Alkali.	Sulphur.	A Bottle.
☿ Mercury.	Fixed Alkali.	Hepar of Sulphur.	gr. A Grain.
♂ Iron.	Volatile Alkali.	Phosphorus.	℈. A Scruple.
Zinc.	m. Mild fixed Alkali.	Phlogiston.	ʒ. A Drachm.
B; W Bismuth.	c. Caustic fixed Alkali.	Soap.	℥. An Ounce.
Antimony.	m. Mild vol Alkali.	⊕ Verdegris.	℔. A Pound.
		Glass.	dwt. A Penny weight.

On the ancient CHEMICAL CHARACTERS of the METALS.

Concerning the origin of these characters, we have the following ingenious account from professor Beckmann: Those metals earliest known, viz. copper, iron, gold, silver, lead, quicksilver, and tin, having received the same names as those heavenly bodies which appear to us largest, are distinguished by the like characters. On this two questions arise: Whether these names and characters were given first to the planets, or to the metals? When, where, and on what account, were they made choice of? and why were the metals named after the planets, or the planets after the metals? The latter of these questions cannot be answered with any degree of certainty; but something may be said on the subject which will not, perhaps, be disagreeable to those fond of such researches, and who have not had an opportunity of examining it.

That the present usual names were first given to the heavenly bodies, and at a later period to the metals, is beyond all doubt; and it is equally certain that they came from the Greeks to the Romans, and from the Romans to us. It can be proved also, that older nations gave other names to these heavenly bodies, at much earlier periods. The oldest appellations, if we may judge from some examples still preserved, seem to have originated from certain emotions which these bodies excited in the minds of men; and it is not improbable that the planets were, by the ancient Egyptians and Persians, named after their gods, and that the Greeks only adopted or translated into their own language the names which those nations had given them. The idea that each planet was the residence of a god, or that they were gods themselves, has arisen, according to the most probable conjecture, because rude nations worshipped the sun, which, on account of his beneficent and necessary influence over all terrestrial bodies, they considered either as the deity himself, or his abode; or, at any rate, as a symbol of him. In the course of time, when heroes, and persons who, by extraordinary circumstances, had rendered their names respected and immortal, received divine honours, particularly heavenly bodies, of which the sun, moon, and planets, seemed the fittest, were assigned to these divinities also. By what laws this distribution was made, and why one planet was dedicated to Saturn, and not to another, Pluche, who wrote on this subject, did not venture to determine; and on this point the ancients themselves are not agreed. When the planets were once dedicated to the gods, folly, which never stops where it begins, proceeded still farther, and ascribed to them the attributes and powers for which the deities, after whom they were named, had been celebrated in the fictions of their mythologists. This, in time, laid the foundation of astrology; and hence the planet Mars, like the deity of that name, was said to cause and to be fond of war; and Venus to preside over love and its pleasures.

The next question is, why were the metals divided by the ancient chemists among the gods, and named after them? Of all the conjectures that can be formed in answer to this question, the following appears the most probable: The number of the deified planets made the number seven so sacred to the Egyptians, Persians, and other early nations, that all those things which amounted to the same number, or which could be divided by it without a remainder, were supposed to have an affinity or a likeness to and connection with each other. The seven ancient metals, therefore, were considered as having some relationship to the planets, and with them to the gods, and were accordingly named after them. To each god was assigned a metal, the origin and use of which was under his particular providence and government; and to each metal were ascribed the powers and properties of the planet and divinity of the like name; from which arose, in the course of time, many of the ridiculous conceits of the alchemists.

The oldest trace of the division of the metals among the gods, is to be found in the religious worship of the Persians. Origen, in his Refutation of Celsus, who asserted that the seven heavens of the Christians, as well as the ladder which Jacob saw in his dream, had been borrowed from the mysteries of Mithras, says, "Among the Persians the revolutions of the heavenly bodies were represented by seven stairs, which conducted to the same number of gates. The first gate was of lead; the second of tin; the third of copper; the fourth of iron; the fifth of a mixed metal; the sixth of silver; and the seventh of gold. The leaden gate had the slow tedious motion of Saturn; the tin-gate the lustre and gentleness of Venus; the third was dedicated to Jupiter; the fourth to Mercury, on account of his strength and fitness for trade; the fifth to Mars; the sixth to the Moon; and the last to the Sun. Here, then, is an evident trace of metallurgic astronomy, as Borrichius calls it, or of the alchemical or mythological nomination of metals, though it differs from that used at present. According to this arrangement, tin belonged to Jupiter, copper to Venus, iron to Mars, and the mixed metal to Mercury. The conjecture of Borrichius, that the transcribers of Origen have, either through ignorance or design, transposed the names of the gods, is highly probable: for if we reflect that in this nomination men, at first, differed as much as in the nomination of the planets, and that the names given them were only confirmed in the course of time, it must be allowed that the causes assigned by Origen for his nomination, do not well agree with the present reading, and that they appear much juster when the names are disposed in the same manner as that in which we now use them. This ancient nomination of metals, appears to have been conveyed to the Brachmans in India; for we are informed that a Brachman sent to Apollonius seven rings, distinguished by the names of the seven stars or planets, one of which he was to wear daily on his finger, according to the day of the week. This can be no otherwise explained than by supposing that he was to wear the gold ring on Sunday; the silver one on Monday; the iron one on Tuesday; and so of the rest. Allusion to this nomination of the metals after the gods occurs here and there in the ancients. Dydimus, in his Explanation of the Iliad, calls the planet Mars the iron star. Those who dream of having had any thing to do with Mars, are, by Artemidorus, threatened with a chirurgical operation; for this reason, he adds, because Mars signifies iron. Heraclides says also in his allegories, that Mars was very properly considered as iron; and we are told by Pindar that gold is dedicated to the sun. Plato likewise, who studied in Egypt, seems to have admitted this nomination and meaning of the metals. We are at least assured so by Marsilius Ficinus, who says of the island Atlantis, that the exterior walls were covered with copper, and the interior with tin, and that the walls of the citadel were of gold. It is not improbable that Plato adopted this Persian or Egyptian representation, as he assigned the planets to the demons; but, perhaps, it was first introduced into his system only by his disciples. They seem, however, to have varied from the nomination used at present; as they dedicated to Venus copper, or brass, the principal component part of which is indeed copper; to Mercury tin, and to Jupiter electrum. The last-mentioned metal was a mixture of gold and silver; and, on this account, was probably considered to be a distinct metal, because, in early periods, mankind were unacquainted with the art of separating these valuable metals.

The characters by which these planets and metals are usually expressed, afford a striking example how readily the mind may be induced to suppose a connection between things which in reality heave no affinity or relation to each other. Antiquaries and astrologers, according to whose opinion the planets were first distinguished by these characters, consider them as the attributes of the deities

deities of the same name. The circle in the earliest periods among the Egyptians was the symbol of divinity and perfection; and seems with great propriety to have been chosen by them as the character of the sun, especially as, when surrounded by small strokes projecting from its circumference, it may form some representation of the emission of rays. The semicircle is, in like manner, the image of the moon, the only one of the heavenly bodies that appears under that form to the naked eye. The character ♄ is supposed to represent the scythe of Saturn; ♃ the thunderbolts of Jupiter; ♂ the lance of Mars, together with his shield; ♀ the looking-glass of Venus; and ☿ the caduceus or wand of Mercury. The expression by characters adopted among the ancient chemists, agrees with this mythological signification only in the character assigned to gold. Gold, according to the chemists, was the most perfect of metals, to which all others seemed to be inferior in different degrees. Silver approached nearest to it; but was distinguished only by a semicircle, which, for the more perspicuity, was drawn double, and thence had a greater resemblance to the most remarkable appearance of the moon; the name of which this metal had already obtained. All the other metals, as they seemed to have a greater or less affinity to gold or silver, were distinguished by characters composed of the characters assigned to these precious metals. Thus, in the character ☿, the adepts discover gold, with a silver colour. The cross placed at the bottom, which among the Egyptian hieroglyphics had always a mysterious signification, expresses, in their opinion, an unknown something, without which quicksilver would be silver or gold. This something is combined also with copper, the possible change of which into gold is expressed by the character ♀. The character ♂ declares the like honourable affinity also; though the semicircle is applied in a more concealed manner; for, according to the properest mode of writing, the point is wanting at the top, or the upright line ought only to touch the horizontal, and not to intersect it. Philosophical gold is concealed in steel; and, on this account, according to the ancient chemists, it produced such valuable medicines. Of tin one-half is silver, and the other consists of the something unknown; for this reason the cross with the half-moon appears in ♃. In lead this something is predominant, and a similitude is observed in it to silver. Hence in its character ♄, the cross stands at the top, and the silver character is only suspended on the right hand behind it. The mythological signification of these characters cannot be older than the Grecian mythology; but the chemical may be traced to a much earlier period. Some, who consider them as remains of the Egyptian hieroglyphics, pretend that they may be discovered on the table of Isis, and employ them as a proof of the high antiquity, if not of the art of making gold, at least of chemistry. We are told also that they correspond with many other characters, which the adepts have left us as emblems of their wisdom.

If we are desirous of deciding without prejudice respecting both these explanations, it will be found necessary to make ourselves acquainted with the oldest form of the characters, which, in all probability, like those used in writing, were subjected to many changes, before they acquired that form which they have at present. Saumaise, Du Cange, and Huet, took the trouble to collect these characters; and the following is the conclusion which they form from them: the character of Mars, according to the oldest mode of representing it, is evidently an abbreviation of the word Θουρος, under which the Greek mathematicians understood that deity; or, in other words, the first letter Θ, with the last letter ς placed above it. The character of Jupiter was originally the initial letter of Ζευς; and in the oldest manuscripts of the mathematical and astrological works of Julius Firmicus the capital Z only is used, to which the last letter ς was afterwards added at the bottom, to render the abbreviation more distinct. The supposed looking-glass of Venus is nothing else than the initial letter, distorted a little, of the word Φωσφορος, which was the name of that goddess. The imaginary scythe of Saturn has been gradually formed from the two first letters of his name Κρονος, which transcribers, for the sake of dispatch, made always more convenient for use, but at the same time less perceptible. To discover in the pretended caduceus of Mercury the initial letter of his Greek name Στιλβων, one needs only look at the abbreviations in the oldest manuscripts, where they will find that the Σ was once written as C; they will remark also that transcribers, to distinguish this abbreviation from the rest still more, placed the C thus ◡, and added under it the next letter τ. If those to whom this deduction appears improbable, will only take the trouble to look at other Greek abbreviations, they will find many that differ still farther from the original letters they express, than the present character ☿ from the C and τ united. It is possible also that later transcribers, to whom the origin of this abbreviation was not known, may have endeavoured to give it a greater resemblance to the caduceus of Mercury. In short, it cannot be denied that many other characters are real symbols, or a kind of proper hieroglyphics, that represent certain atributes or circumstances, like the characters of Aries, Leo, and other signs or symbols used in the ancient astronomy.

CHEM'NITZ, a town of Germany, in the circle of Upper Saxony, and marquisate of Meissen; containing three churches and an hospital: thirty-six miles west-south-west of Dresden, and thirty-two south-west of Meissen.

CHEM'NITZ (Martin), a Lutheran divine, born at Britzen, in the marquisate of Brandenburg, in 1522. His father was a wool-comber. After having learned the rudiments of literature, he went to Magdeburg, where he made some progress in arts and languages. Then he removed to Franckfort-upon-the-Oder, to cultivate philosophy under his relation George Sabinus; and then to Wirtemberg, where he studied under Philip Melancthon. Afterwards he became a school-master in Prussia; and, in 1552, was made librarian to the Prince. He now devoted himself wholly to the study of divinity, though he was a considerable mathematician, and skilled particularly in astronomy. He removed to Brunswick, where he spent the last thirty years of his life; and where he died in 1586. His works are, 1. Harmonia Evangeliorum; 2. Examen Concilii Tridentini; 3. A Treatise against the Jesuits. His Examination of the Council of Trent has always been esteemed as a masterly performance.

CHE'MOSH. See CHAMOS.

CHEMO'SIS, [from χαινω, to gape.] An inflammation of the eyes, where the white swims above the black, and gives the appearance of a gap or aperture.

CHE'MUNG, a town of United America in Tioga county, New York. By the state census of 1796, eighty one of its inhabitants were electors. It has Newton west, and Owego east, about 160 miles north-west from New York city, measuring in a straight line. Between this place and Newton, general Sullivan, in his victorious expedition against the Indians, in 1779, had a desperate engagement with the six nations, whom he defeated. The Indians were strongly intrenched, and it required the utmost exertions of the American army, with field pieces, to dislodge them; although the former, including 250 tories, amounted only to 800 men, while the Americans were 5000 in number, and well appointed in every respect.

CHEN-IN, a town of Asia, in the kingdom of Corea: thirty miles west-north-west of Tsin-tcheou.

CHEN-SI, a province of China, bounded on the east by Hoang-ho, which separates it from Chan-si; on the south by the provinces of Se-tchuen and Hou-quang, on the north by Tartary and the great wall, and on the west by the country of the Moguls. Chen-si is one of the most extensive provinces of the empire: it had formerly three viceroys;

viceroys; but at present it has only two, besides the governors of So-tcheou and Kan-tcheou, which are the strongest places in the country. This province in general is very fertile, commercial, and rich. It produced little rice, but the inhabitants have plentiful crops of wheat and millet; it is, however, subject to long droughts, and clouds of locusts sometimes destroy every thing that grows in the fields: the Chinese eat those insects boiled. The country abounds with drugs, rhubarb, musk, cinnabar, wax, honey, and coals, of which it contains inexhaustible veins; it has also rich gold mines, which, for political reasons, are not allowed to be opened: gold-dust is washed down in such abundance among the sand of the torrents and rivers, that a number of people have no other subsistence but what they gain by collecting it. Travellers remark that the natives of this country are more polite and affable to strangers, and have greater genius than the Chinese of the other northern provinces. This province is divided into two parts, the eastern and the western: it contains eight *fou*, or cities of the first class, and a hundred and six of the second and third. Si-ngan-fou is the capital.

CHEN-YANG, or MOUG-DEN, a city of Chinese Tartary, and capital of a department, or district, in the country of the Mantchew Tartars, situated on an eminence: the Mantchew Tartars have been at great pains to ornament it with several public edifices, and to provide it with magazines of arms and store-houses. They consider it as the principal place of their nation; and since China has been under their dominion, they have established the same tribunals here as at Peking, excepting that called Liipou: these tribunals are composed of Tartars only; their determination is final; and in all their acts they use the Tartar characters and language. It may be considered as a double city, one of which is inclosed within the other: the interior city contains the emperor's palace, hotels of the principal mandarins, sovereign courts, and the different tribunals; the exterior is inhabited by the common people, tradesmen, and all those who, by their employments or professions, are not obliged to lodge in the interior: the latter is almost a league in circumference, and the walls which inclose both are more than three leagues round: these walls were entirely rebuilt in 1631, and repaired several times since: fifty-four miles east-north-east of Peking.

CHEN-YANG, a district or department of Chinese Tartary, comprehending what was called Leao-tong, and extends as far as the great wall, which bounds it on the south; on the east, north, and west, it is defended by a breast-work and pallisade.

CHENALO'PEX, *s.* [from χην, a goose, and αλωπηξ, a fox.] The shell-drake, named from its being of the goose-kind, and crafty like the fox.

CHENAY', a town of France, in the department of the two Sevres, and chief place of a canton, in the district of St. Maixent: eight miles east of St. Maixent.

CHEN'COUR, or CHEMKON, a town of Armenia, on the frontiers of Gurgistan, which has a beautiful castle, grand caravanseras, and several mosques: 160 miles north-east of Erivan.

CHEN'DI, or CHANDI, a town of Africa, in the country of Nubia, the capital of a district, containing about 250 houses. Lat. 16. 39. N. lon. 33. 25. E. Greenwich.

CHENDOU'L, a river of Asia, in the Cabulistan, which runs into the Kameh, 25 miles east of Paishawur.

CHE'NE, a town of Savoy, in the Genevois: two miles and a half east of Geneva.

CHENEN'GO, a river of United America, in the state of New York, which runs into the Susquehana, two miles south of Chenengo.

CHENEN'GO, a town of United America, in the state of New York: 125 miles north-west of New York. Lat. 42. 8. N. lon. 76. W. Greenwich.

CHENERA'ILLES, a town of France, in the department of the Cereuse, and chief place of a canton, in the district of Aubusson: nine miles north of Aubusson.

CHENE'T, a town of Asiatic Turkey, in the province of Caramania: 100 miles south-west of Cogni.

CHENOCO'PRUS, *s.* [from χην, a goose, and κοπρος, dung.] Goose dung. It was formerly used as a powerful resolvent, diuretic, and anti-icteric. The green was thought the best; it was collected in spring, dried, and given from ʒ ss. to ʒ i. for a dose.

CHENOLE'A, *s.* in botany, a genus of the class pentandria, order monogynia, natural order of holoraceæ. The generic characters are—Calyx: perianth one-leafed, globular, somewhat fleshy, five-parted; segments bent in. Corolla: none. Stamina: filaments five, filiform, from upright bent in, inserted at the base of the calyx, and of the same length; anthers minute. Pistillum: germ superior; style filiform, very short; stigmas two, simple, subulate, acute, from spreading bent back, a little longer than the style. Pericarpium: capsule round, slightly depressed, umbilicate, one-celled. Seed: single, roundish, bifid at the tip, smooth.—*Essential Character.* Calyx, globular, one-leafed, five-parted; capsul, one-celled, containing one smooth seed, bifid at the tip.

There is but one species, chenolea diffusa. Stems several, radical, filiform, herbaceous, diffused, simple, and branched, covered with leaves, purple, smooth at bottom, subtomentose at top, unequal, the ends upright: branches alternate, scattered, few, very short. Leaves fastigiately opposite, sessile, ovate-lanceolate, blunt with a point, fleshy, entire, flat above, convex beneath, frequent, the uppermost more approximating and imbricate, from upright spreading, silvery tomentose, longer than the internodes. Flowers axillary, solitary, or in pairs, sessile in each axil, towards the tips of the branches. Native of the Cape of Good Hope, on the low coast. Cultivated in 1758, by Mr. Miller; flowers in August and September.

CHENONCE'AU, a town of France, in the department of the Indre and Loire: two leagues south-east of Amboise.

CHENOPO'DIO-MORUS, *s.* in botany. See BLITUM.

CHENOPO'DIUM, *s.* [from χην, a goose, and πους, a foot.] The herb GOOSE FOOT; a genus of the class pentandria, order digynia, natural order holoraceæ. The generic characters are—Calyx: perianth five-leaved, concave, permanent; divisions ovate, concave, membranaceous on the margin. Corolla: none. Stamina: filaments five, subulate, opposite the leaves of the calyx, and of the same length; anthers roundish, twin. Pistillum: germ orbiculate; style two-parted, short; stigmas obtuse. Pericarpium: none; calyx closed, five-cornered, five-angled, (angles compressed,) deciduous; seed single, lenticular, superior. In some species the style is observed to be trifid. *Essential Character.*—Calyx, five-leaved, five-cornered; corolla, none; seed one, lenticular, superior.

Species. I. With angular leaves. 1. Chenopodium bonus Henricus, angular-leaved goose-foot, English mercury, or allgood, good Henry, good king Harry, or wild spinach: leaves triangular-sagittate quite entire; spikes compound leafless axillary. Root perennial, branched. Stem twelve to eighteen inches in height, at bottom round and smooth, upwards finely grooved, and somewhat angular, covered with transparent powdery globules, and branched. Leaves petioled, alternate, smooth; underneath veiny, paler and mealy, somewhat waved. The female flowers numerous among the hermaphrodites. It is gathered while young and tender to eat as spinach. At Boston in Lincolnshire it is generally cultivated, and is there preferred to spinach. The young shoots peeled, and boiled, may be eaten as asparagus, and are gently laxative; the leaves are often boiled in broth; the roots are given to sheep that have a cough. As a medicine, this herb is ranked among the emollients, but rarely made use of in practice;

practice; the leaves are applied by the common people for healing slight wounds, and cleansing old ulcers. It grows in waste places, by road-sides, about farm-yards, &c. flowering and seeding from May to August. Mr. Miller thinks that it is not originally a native of England, but that, having been formerly cultivated in kitchen-gardens, the seeds have got out from them. Our oldest herbalists however mention it as a plant found commonly wild.

2. Chenopodium urbicum, or upright goose-foot: leaves triangular, somewhat toothed; racemes crowded, very straight, approximating to the stem, and very long. Distinguished by its very long racemes, altogether erect, and approximating to the stem; which is erect and simple. This and all our succeeding wild species are annual; grow abundantly on dunghills and in waste places; and flower from July to September.

3. Chenopodium atriplicis, or orach or purple goose-foot: leaves deltoid, coloured beneath; stem erect. This has the appearance, erect stature, height, colour, and leaves, of red garden orach. Found in Siberia, by Pallas. Native of China; introduced here in 1780, by M. Thouin.

4. Chenopodium rubrum, or red goose-foot: leaves cordate-triangular bluntish toothed, racemes erect, compound, somewhat leafy, shorter than the stem. Dr. Withering describes the stem as pale green, smooth, slightly scored with lines of a deeper green. No shining spangles on the leaves or calyx so as to give the plant a white appearance, but when held against a strong light an infinite number of shining particles appear. Dr. Stokes has corrected the specific character thus: leaves deltoid, tooth-sinuate, teeth acuminate; racemes erect, compound, leafy, shorter than the leaf.

5. Chenopodium murale, or wall or nettle-leaved goose-foot: leaves ovate shining toothed sharp, racemes branched naked. This species is distinguished by the particular form of its racemes, which are short and spread out widely, so as to give them a depressed appearance, the tops somewhat curled in: the racemes of the rubrum and urbicum, which are most liable to be mistaken for it, are perfectly upright: its glossy leaves and unpleasant smell contribute also to point it out. The whole plant is sometimes tinged with red. Curtis observes that this, and most other species of the genus, afford plenty of seeds, for the support of small hard-billed birds.

6. Chenopodium serotinum, or fig-leaved goose-foot: leaves deltoid sinuate-toothed wrinkled smooth uniform, racemes terminal. The stem, says Linnæus, is the height of a man, very much branched. Leaves pale green, resembling those of album, but broader.

7. Chenopodium album, or common or white goose-foot: leaves rhomboid-triangular erose entire behind, uppermost oblong: racemes erect. Stem upright, from one to three feet high, slightly crooked, somewhat angular and striated, solid, branched, smooth, sometimes purplish: branches alternate. Leaves deeply and irregularly indented, bluish green, covered especially underneath with a mealy powder; the uppermost oblong, less deeply indented and even entire. Racemes axillary, upright, forming a spike of flowers growing in little clusters. It is whiter than most of the chenopodiums; and varies exceedingly, both when young, and in its seeding state. This is the most common of the genus, occurring in every garden, on every dunghill, and in most corn fields. It is mentioned by Lightfoot and several other authors, as being boiled and eaten for greens, and is known by the name of *fat hen*, or *muck-weed*. Linnæus affirms that swine are extremely fond of it, and yet the murale and hybridum are said to be fatal to this animal, contrary to all probability, since the common goose-foots seem to be mild and gently laxative like spinach.

8. Chenopodium viride, or green goose-foot: leaves rhomboid tooth-sinuate, racemes branched somewhat leafy. Stem upright, green, with purplish angles. This species is so nearly allied to the foregoing, as to make it doubtful whether it be any thing more than a variety; accordingly Hudson gives it merely as such; and Villars considers it in the same light. Curtis however points out the following distinctions. The appearance of the whole plant is greener; the bright red colour at the angles of the joints is constant; the leaf is much longer; though not destitute of meal, yet this has it not in such profusion as the album; when the seeds are ripe, the tops of the stalks are more apt to hang down; the parts of fructification are smaller; the calyx is not quite so much covered with little globules; the seed is smaller, and reticulated with impressed dots, whereas in the album it is smooth.

9. Chenopodium hybridum, or bastard goose-foot: leaves cordate angular-acuminate, racemes branching naked. Stem from one to two feet high, upright, branched, angular, and perfectly smooth. Leaves smooth, without any meal, veiny, spreading, with three teeth on each side large and distant; in form resembling those of the thorn-apple. This species varies the least of any; the panicle of flowers is peculiarly branched and naked; it has a strong and disagreeable smell. It is not common near London, being observed only in Battersea-fields and about Northfleet; it has been found also near Ely and Colchester. Mr. Lightfoot enumerates it among the Scottish plants. If any of the chenopodiums be poisonous, this must be the species. Linnæus suspects it to have arisen from the viride.

10. Chenopodium botrys, or cluster or cut leaved goose-foot, or oak of Jerusalem: leaves oblong sinuate, racemes naked multifid. This sends up several stems from the root, which rise about two feet high. Leaves light green, alternate. Flowers axillary from the upper part of the branches, in loose racemes. They appear in July, and the seeds ripen in September. The leaves emit a very strong odour when bruised, somewhat like that of ambrosia; and for this principally the plant is preserved in gardens, for the flowers have no beauty. Native of the South of Europe. Cultivated in 1551.

11. Chenopodium ambrosioides, Mexican goose-foot, or oak of Cappadocia: leaves lanceolate toothed, racemes leafy simple. Stem from twelve to eighteen inches high, sometimes reddish, round, striated, with fine scattered hairs. Leaves pale green, oblong, sinuated; at the base of each, peduncles an inch long, on which are several little heads of flowers alternately disposed, with a leaflet under each. It grew first in Plater's garden, in the year 1619. Native of Mexico. The leaves and flowery heads have a strong and not unpleasant smell, and a moderately aromatic taste, somewhat bitterish: on much handling them, an unctuous resinous juice adheres to the fingers. The proper menstruum of their active matter is rectified spirit; but they give it out also to boiling water. The infusions, which are not unpalatable, are said to be of service in humoural asthmas and coughs, and other disorders of the breast: they are supposed also to be antispasmodic and antihysteric. The seed is reckoned among the anthelmintics, and the herb dried is put among clothes to keep away moths.

12. Chenopodium multifidum, or Buenos-Ayres goose-foot: leaves multifid, segments linear; flowers axillary sessile. This rises with a shrubby stalk three or four feet high; with oblong leaves cut into many linear segments. It grows naturally at Buenos Ayres.

13. Chenopodium anthelminticum, or wormseed goose-foot: leaves ovate-oblong toothed, racemes leafless. Stems three cubits high, straight, stiff, grooved, hairy, dividing into few branches to the middle, but above that more branched. Leaves green on both sides, the middle nerve only hairy. Grows at Buenos Ayres, and in Pennsylvania and New Jersey, where it is called wormseed and Jerusalem oak. The seeds are given to children against the worms. It has a disagreeable scent. Cultivated by Dr. Sherard at Eltham, 1732.

14. Chenopodium glaucum, or oak-leaved goose-foot: leaves

leaves ovate-oblong repand, racemes naked simple glomerate. Stem from twelve to eighteen inches high, angular, green. According to Villars, it has much affinity to the chenopodium album; but the leaves are blunt and quite white: the stems are lower, and very much branched.

II. With simple leaves. 15. Chenopodium vulvaria, or stinking goosefoot: leaves quite entire rhomboid-ovate, flowers conglomerate axillary. The whole plant is sprinkled with a white pellucid meal. This species is easily known by its decumbency, and its permanently disagreeable odour of stale salt fish, both green and dried. Common on dry banks, and at the foot of walls and paling. On account of its strong scent, it is reckoned an useful antihysteric: some recommend a conserve of the leaves, others an infusion in water, others a spirituous tincture of them. On some occasions, it may perhaps be preferable to the fetids which have been more commonly made use of, as not being accompanied with any pungency or irritation, and seeming to act merely by virtue of its odorous principle. It is omitted in the last edition of the London Pharmacopæia, and, as Allioni affirms, is not undeservedly neglected. This herb dyes a good strong greenish lemon colour.

16. Chenopodium polyspermum, or round-leaved goosefoot, upright blite, or allseed: leaves quite entire ovate, stem decumbent, cymes dichotomous, leaflets axillary. This species is sufficiently obvious from its square stalk generally of a bright red colour, its long extended branches, and its reddish seeds which are numerous and strikingly visible from being only in part covered with the calyx. It has the appearance of a small amaranth. Linnæus says the stem is decumbent; Curtis makes it in general nearly upright; according to Lightfoot and Reichard it is sometimes one, sometimes the other. Mr. Curtis remarks that it is a troublesome weed to the gardener, but scarcely injurious to the farmer. Mr. Woodward, however, says that it is generally found in turnip-fields; and Ray affirms that it grows abundantly in hop-grounds, and corn-fields where the soil is good. It is a very grateful food to fish in ponds.

17. Chenopodium scoparia, or flax-leaved goosefoot, belvedere, or summer cypress: leaves linear-lanceolate flat quite entire. This is a beautiful plant, naturally disposed to grow very close and thick, and in as regular a pyramid as if cut by art. The leaves are a pleasant green; were it not for that, it has so much the appearance of a cypress-tree, that at some distance it might be taken for it. Scopoli affirms that this plant drives away bugs. It grows wild in Carniola, Greece, China, and Japan. Cultivated 1633.

18. Chenopodium maritimum, or sea goosefoot, or white glasswort: leaves subulate semicylindric. Grows on seashores, and in salt marshes; it is an excellent pot-herb. It varies much in size and appearance; being either very small and decumbent, or else growing up into an erect woody shrub.

19. Chenopodium aristatum, or awned goosefoot: leaves lanceolate somewhat fleshy quite entire; corymbs dichotomous awned axillary. Native of Siberia and Virginia.

20. Chenopodium oppositifolium, or opposite-leaved goosefoot: leaves opposite lanceolate-subulate very short. Stem round, somewhat woody and even. The appearance of this is different from that of the other species: perperhaps it may be a *polycnemum*. Native of Siberia.

21. Chenopodium punctulatum, or dotted leaved goosefoot: leaves dotted with white, the bottom ones rhombovate sinuate, the uppermost eliptic; racemes lateral spiked leafy. Root annual; stem erect, two feet high, round, striated, rigid, yellowish at the base, red in other parts with white dots scattered all over it. The white dots magnified, appear to be round or oval granules, more or less flatted, dark in the middle, but lucid towards the edge: there are many of these on the upper leaves, but few on the lower. It is not a native of Europe. The seeds were sent by Marsigli, and the plant flowered in the garden at Pavia on the 28th of June, 1786.

22. Chenopodium triandrum, or three-stamened goosefoot: leaves cordate-sagittate, spikes terminal leafless interrupted. Found in New Zealand.

23. Chenopodium laterale, or branching oblong-leaved goosefoot: stem-leaves lanceolate obtuse, those of the branches oblong; peduncles lateral solitary one flowered. Introduced 1781, by P. M. A. Broussonet, M. D.

Propagation and Culture. Most of these plants are to be eradicated as weeds rather than cultivated. Being very succulent and exhausting, and abounding very much in seeds, they should be carefully destroyed, especially on dunghills. Sow the seed of English mercury in March, on a deep loamy soil, prepared as for asparagus, let the seedlings continue to grow till autumn; about the middle of September, taking advantage of a wet season, set the plants out on a bed similar to that on which they were sown, about a foot apart; keep them clear of weeds, and the ensuing spring and summer they will afford an abundant crop: the young shoots with their leaves and tops are to be cut as they spring up; and being a perennial plant it will continue thus plentifully to produce for a great number of years. In the winter the bed is to be covered with dung, which should be raked off as the spring advances, when the earth around the roots is carefully to be dug or forked up. The seeds of all the species succeed best, if they are sown in autumn; for when they are sown in the spring, they frequently lie a whole year before the plants come up: for which reason where the seeds scatter, the plants will come up much better than those which are sown by hand. See AMARANTHUS, ILLECEBRIUM, POLYCNEMUM, and SALSOLA.

CHENZI'NI, or CHINTING, a town of Poland, in the palatinate of Sandomirz; near it are mines of silver and lead, and quarries of marble; sixteen miles east of Malagocz.

CHEOPI'NA, [from χεω, to pour out, and πινω, to drink.] A measure containing sixteen ounces. A chopine.

CHE'OPS, or CHEOSPES, a king of Egypt, after Rhampsinitus, who built famous pyramids, upon which 1060 talents were expended only in supplying the workmen with leeks, parsley, garlic, and other vegetables.

CHE'OU, a town of China, of the second rank, in the province of Kiang-nan: 455 miles south of Peking. Lat. 32. 34. N. lon. 134. 9. E. Ferro.

CHE'OU-QUANG, a town of China, of the third rank, in the province of Chang-tong: five miles north-east of Tcin-tcheou.

CHE'OU-TCHANG, a town of China, of the third rank, in the province of Tche-kiang: five leagues southwest of Yen-tcheou.

CHE'OU-TCHANG, a town of China, of the third rank, in the province of Chang-tong: nine leagues northeast of Po.

CHE'OU-TCHING, a town of China, of the third rank, in the province of Fo-kien: sixty-two miles northeast of Kien-nhing.

CHE'OU-YANG, a town of China, in the province of Chan-si: ten miles east of Tai-yuen.

CHEPAWA'S, or CHIPEWAYS, an Indian nation in North America, inhabiting the coast of lake Superior and the islands in the lake. Other tribes of this nation inhabit the country round Saguinam, or Sagana bay and lake Huron, bay Puan, and a part of lake Michigan. They were lately hostile to the United States, but, by the treaty of Greenville, August 3, 1795, they yielded to them the island de Bois Blanc.

CHEPE'LIO, a small island near the coast of America, in the gulf of Panama, about a league in circumference: six leagues from Panama.

CHEPEL'LO, an island in the bay of Panama, South America,

America, and in the province of Darien, three miles from the town of Panama, which it supplies with provisions and fruits. Lat. 8. 46. N. lon. 80. 45. E.

CHEPOO'R, a small Spanish town on the isthmus of Darien and Terra Firma, in South America, seated on a river of the same name, six leagues from the sea.

CHEP'STOW, a seaport town, in the county of Monmouth, situated near the mouth of the Wye, over which is a bridge of stone and timber. It stands for the most part on the side of a hill; and the rocky cliffs on each side of the river have a most beautiful and romantic appearance. It is a large, well-built, populous, and flourishing, town, formerly walled round, and defended by a castle, part of which remains. In the month of March, 1647, the castle was garrisoned by king Charles the First, and continued in the hands of the royalists till May, 1648, when the Welch, under major Langhorne, colonel Poyer, and colonel Powell, were defeated; Poyer was executed, and most of the castles in Wales were conquered about this time. Chepstow is the port for all the towns that stand on the rivers Wye and Lug. Ships of 600 tons burden are built here; and the town of late is become so flourishing, that the merchants import their own wine from Oporto, and deals, hemp, flax, pitch, and tar, &c. from Norway and Russia, as ships of 700 tons burden come up to the town. The tide comes in at this place with greater rapidity than at Bristol, and sometimes rises at the bridge from thirty to sixty feet. In January 1768, the bridge was much damaged by an extraordinary rise of the tide, which then flowed above seventy feet. As half the bridge is in Monmouthshire, and the other half in Gloucestershire, it is maintained at the expence of both counties; and, in 1790 and 1791, it underwent a thorough repair. This port sends great quantities of timber to Portsmouth, Plymouth, Deptford, and Woolwich; and bark, iron, cyder, &c. to several parts of Ireland, Liverpool, and other places. There are five constant trading-vessels between this port and London, which in general go and return in two months. There is a market-boat of seventy tons burden, that goes regularly from this place to Bristol every Tuesday, and returns every Thursday. It has a market weekly on Saturday, well supplied with all sorts of provisions; and on the last Monday in every month for cattle and swine; also four fairs, Friday in Whitsun-week, Saturday before the 20th of June for wool, August 1, and Friday before St. Luke's day. It is three miles from West-ferry, five from the New Passage, fifteen from Monmouth, twenty-eight south-west of Gloucester, and 134 west-north-west of London. Lat. 51. 42. N. lon. 2. 36. W. Greenwich.

About four miles from Chepstow is Piercefield, deservedly an object of every stranger's attention; but it is to be seen only on Thursdays. The estate commences near the three miles stone, beyond which a road leads through the grounds up to the house, where the names of all visitors are registered. "We enter the shrubbery by a wicket at the west end of the lawn before the house, from whence we are conducted through a wilderness to the summer-house, where a scene bursts suddenly on our sight that cannot fail of enrapturing every spectator. The town and castle and bridge of Chepstow are now beneath us; the rocks opposite to them range themselves so as to appear over the town, above which, in an intervening space, we trace the Wye to its junction with the Severn, which exhibits an immense sheet of water, bounded by the Gloucestershire hills. The composition of this landscape and the fore-ground are well adapted for a picture. From hence the path, now rising, now descending, is continued through a wood, when, from an opening, we are presented with a rock-scene, but more contracted than that we have described. The path then ascends abruptly through a shady walk for near a mile. From an avenue, we look down the river and see a beautiful hanging wood. Above this rise the highest rocks on the Wye. Nothing can be grander than this scene; but, as we stand three hundred and seven feet above the level of the river, we lose much of the effect such stupendous heights must produce when viewed from their bases. From hence we gradually ascend to an eminence commanding the most extensive views. All that had before charmed us in detail, is now collected in one grand whole; rocks, woods, hills, vales, lawns, and rivers, blended in the most graceful confusion. The hills of Somersetshire, the Bristol channel, the Denny rock in the mid-channel of the Severn, and the beautiful peninsula of Llancot, are all within view; and contribute to form a picture, which can neither be conceived nor described, without detracting infinitely from its charms."

CHEQ, or Cherif, the prince of Mecca, who is, as it were, high priest of the law, and sovereign pontiff of all the Mahometans of whatever sect or country they be. See Caliph. The grand signior, sophis, moguls, khans of Tartary, &c. send him yearly presents, with vast sums of money, to provide for all the pilgrims during the seventeen days of their devotion.

CHEQUETAN', or Seguataneio, on the coast of Mexico, or New Spain, lies seven miles westward of the rocks of Seguataneio. Between this and Acapulco, to the eastward, is a beach of sand of eighteen leagues extent, against which the sea breaks so violently, that it is impossible for boats to land on any part of it; but there is a good anchorage for shipping at a mile or two from the shore, during the fair season. The harbour of Chequetan is very hard to be traced, and of great importance to such vessels as cruize in these seas, being the most secure harbour to be met with in a vast extent of coast, yielding plenty of wood and water; and the ground near it is able to be defended by a few men. When lord Anson touched here, the place was uninhabited.

CHER, a river of France, which rises near Auzance, in the department of the Creuse, passes by Montluçon, Amay-le-Vieux, St. Amand, Chateauneuf, St. Florent, Vierzon, Menetou, Villefranche, Chabris, Selles, St. Aignan, Montrichard, Blere, &c. and joins the Loire, a few miles below Tours.

CHER, a department of France, bounded on the north by the department of the Loiret, on the east by that of the Nyevre, from which it is separated by the Allier, on the south by the department of the Allier, and on the west by the department of the Indre and Loire, and Cher: it takes its name from the river Cher, which crosses a part of it. Bourges is the capital.

CHERAME'LA, *s.* in botany. See Averrhoa.

CHERAS'CO, a town of Italy, in the principality of Piedmont, and capital of a comté of the same name, on the borders of the comté of Asti, situated on a mountain, at the conflux of the Stura with the Tanaro. It is said to have been built by some inhabitants of Alba, Manzano, Miana, &c. who were driven away from their towns by the tyranny of their respective lords: they fixed on this spot, built a town, and surrounded it with walls; Christina of France, duchess of Savoy, caused the town to be fortified in the modern manner, with bastions, fosses, and outworks. Since that time Cherasco has been considered as the key and boulevard of the estates of Savoy, being situated on the frontiers of Piedmont, Montferrat, and the duchy of Milan; and strong both by art and nature. Cherasco was first a republic, governed by its particular laws, though professing to be dependant on the emperors of Germany, and to obey them. This flourishing state continued to the year 1260, when they took the oath of allegiance to Charles I. of Anjou, comte of Provence, afterwards king of Naples and Sicily, and continued subject to that crown till the reign of Jane I. queen of Naples, who took no care to protect her subjects from their enemies, when the inhabitants followed the example of other towns, and surrendered themselves voluntarily to Amadeus VI. comte of Savoy, and Jaques de Savoy, prince of Achaia. This situation they did not long enjoy, for, in a few years after, they became successively subject

subject to the marquis of Montferrat; Luchin Visconti, prince of Milan; a second time to Jane, queen of Naples; Galeas, and John Galeas de Visconti: Valentina, the daughter of this last prince, married Louis, duke of Orleans, and brought with her as a portion the town of Cherasco, and the country round: from the successors of this prince it came to Charles V. who gave it, in the year 1530, to Charles III. duke of Savoy, sirnamed the Good, in consideration of his marriage with Beatrice of Portugal. It was taken more than once in the same century by the Austrians and the French, but restored to Emanuel Philbert, son of Charles, by the peace of Cambray, in 1559. Victor Amadeus gave it the title of City, making it the capital of a province, and residence of a governor. The civil government is conducted by three syndics, twenty-eight counsellors, and eight masters of accompts. It is in the diocese of Asti, and has seven parish churches, four within the walls, and three without. The comté is about nine miles in diameter, the land is fertile, the plains producing great plenty of corn, and the hills, which are some higher, some lower, produce wine, both good, and in quantities for exportation: twenty miles south-south-east of Turin, fifteen miles east of Saluzzo. Lat. 44. 33. N. lon. 25. 27. E. Ferro.

CHERAW'S, a district of North America, in the upper country of South Carolina. Its length is about eighty-three miles, and its breadth sixty-three; and is subdivided into the counties of Darlington, Chesterfield, and Marlborough. By the census of 1791, there were 10,706 inhabitants, of which 7618 were white inhabitants, the rest slaves. It sends to the state legislature six representatives and two senators; and, in conjunction with Georgetown district, one member to congress. This district is watered by Great Pedee river, and many smaller streams, on the banks of which the land is thickly settled and well cultivated. The chief towns are Greenville and Chatham. The court-house in this district is fifty-two miles from Camden, as far from Lumberton, and ninety from Georgetown. The mail stops at this place.

CHER'BURG, a sea-port town of France, in the department of the Channel, situated at the bottom of a large bay, between Cape Barfleur and Cape la Hogue, containing about 6000 inhabitants. Before the revolution, it was the seat of a governor and an admiralty. Building of small vessels, and a manufacture of woollen stuffs, form the principal employment of the inhabitants. In the year 1758, the town was taken and plundered by the English, the port destroyed, and the ships burned in the harbour. This port has always been considered by the French as an object of great importance in the navigation of the English Channel, and immense sums have been expended in the erection of piers, deepening and enlarging the harbour, and erecting fortifications. Vessels of 900 tons can be admitted in high-water, and 250 in low: ten posts north of Coutances, and forty-one west-north-west of Paris. Lat. 49. 39. N. lon. 16. 2. E. Ferro.

CHERCHESE'NE, a town of Asiatic Turkey, in the province of Curdistan: sixty-two miles south of Kerkuk.

CHE'RCY, a town of France, in the department of the Yonne: four leagues west of Sens.

CHE'REM, a kind of excommunication in use among the Jews. There are some who assert that the persons thus devoted were afterwards put to death; whereof Jephtha's daughter is a memorable example. *Judges* xi. 29, &c.

CHE'REN-TABANAN', a town of Chinese Tartary. Lat. 41. 32. N. lon. 137. 17. E. Ferro.

CHE'RI-KIA'MEN, a post of Chinese Tartary: fifteen miles south-east of Petoure Hotun.

CHE'RI-OU'JOU, a town of Chinese Tartary: eight miles south of Geho.

CHE'RILUS, a Greek poet of Samos, flourished 479 years before Christ. He sung the victory gained by the Athenians over Xerxes, and was rewarded with a piece of gold for every verse. His poem had afterwards the honour of being rehearsed yearly with the works of Homer.

To CHE'RISH, *v. a.* [*cherir*, Fr.] To support and forward with encouragement, help, and protection; to shelter; to nurse up:

Whenever Buckingham doth turn his hate
Upon your grace, and not with duteous love
Doth *cherish* you and yours, God punish me
With hate in those where I expect most love. *Shakes.*

CHE'RISHER, *s.* An encourager; a supporter.—One of their greatest praises it is to be the maintainers and *cherishers* of a regular devotion, a reverend worship, a true and decent piety. *Spratt.*

CHE'RISHMENT, *s.* Encouragement; support; comfort. It is now obsolete:

The one lives her age's ornament,
That with rich bounty, and dear *cherishment*,
Supports the praise of noble poesie. *Spenser.*

CHERLE'RIA, *s.* [from *Jo. Hen. Cherler*, son-in-law to John Bauhin, whom he assisted in his history.] In botany, a genus of the class decandria, order trigynia, natural order caryophyllei. The generic characters are—Calyx: perianth five leaved; leaflets lanceolate, concave, equal. Corolla: petals none (unless you rather call the calyx or nectaries so); nectaries five, emarginate, placed in a circle, very small. Stamina: filaments ten, subulate, of which the alternate ones are affixed to the back of the nectaries; anthers simple. Pistillum: germ ovate; styles three, spreading; stigmas simple. Pericarpium: capsule ovate, three-celled, three-valved; seeds two or three, kidney-shaped.—*Essential Character.* Calyx, five-leaved; nectaries five, bifid, resembling petals; anthers alternate barren; capsule one-celled, three-valved, three-seeded.—There is only one species, called cherleria sedoides, or stone-crop cheleria, with leaves opposite, linear, rugged about the edge, connate at the base into a sheath. When the leaves are fallen, the sheaths remain with the keel of the leaves, investing the lower part of the stem; hence the affinity of this with the caryophylleous plants. It forms large green mossy tufts. Stems about two inches high, close matted. Flowers from the summits of the branches, single, erect, on very short peduncles, yellowish green: leaflets of the calyx streaked on the back with three lines. Nectaries much shorter than the calyx, fleshy and connected. Seguier describes the flower as having five petals: Haller and Scopoli deny its having any: Villars says, that they are so small, as to require the assistance of a glass to view them; but they are oblong, and cloven at the end. Found on the mountains of Dauphiné, Switzerland, Savoy, the Valais, Austria, Carniola, and the Highlands of Scotland. Perennial; flowering in July and August.

CHERMANSICK', a town of Asiatic Turkey, in the province of Natolia: thirty miles north-north-east of Milets.

CHER'MES, *s.* in entomology, a genus of insects belonging to the order of hemiptera. Their characters are drawn from the situation of the rostrum, which is placed in the breast; and from the shape of the antennæ, which are longer than the thorax. The wings are four in number, folding close along the sides of the abdomen; the feet are formed for leaping, their tarsi having two articulations. These animals are found inhabiting a great variety of different trees and plants, upon which they produce very singular excrescences: the Linnæan names affixed to each species are, for the most part, derived from the particular tree upon which they feed; that of the fig-tree is the largest, and therefore more easily examined than any of the rest of the tribe. The whole body of this insect is brown above, and green beneath; the antennæ are large, hairy, and of the same hue with the back. The wings, which are twice the length of the abdomen,

abdomen, are placed so as to form a kind of roof, as if to protect the animal from rain. Other species, of inferior size, frequent the elm, the ash, the cherry, and the fir; that which inhabits the last of these trees is provided with a sharp-pointed instrument by which it makes punctures in the extremity of the branches, in order to deposit its young. By this means the fir-tree chermes produces that enormous scaly protuberance, which is often seen at the summit of the branches, and which is formed by the extravasation of the juices through the wounds thus made.

The larva chermes has six feet: in figure, it resembles the perfect insect; its shape is oblong, and its motion slow. In the chrysalid state, the form is somewhat changed, by two small protuberances upon the thorax, the rudiments of future wings. When the chrysalids are about to undergo their last metamorphoses, they retreat to the under side of a leaf, to which they remain attached without motion. On the approach of their change, the membrane above the head and thorax is seen to split and open: the perfect insect then comes forth with its wings, leaving the spoils of its chrysalis still adhering to the leaf, and rent on the anterior part. The empty sloughs of these insects are often found in great plenty beneath the leaves of the fig-tree. The tubercles raised upon the branches of trees by the punctures of the chermes, not only become the residence of the animal, but also of its eggs and larva, which are contained in those cells with which they abound. The box-tree chermes produces no excrescences upon that plant: its punctures make the leaves bend in towards each other at their extremity; where their union forms at the summit of the branch, a hollow knob, in which the larva of that insect find shelter. Both in their larva and chrysalid state, many of the chermes eject from the anus a white saccharine substance resembling manna: within the hollow balls formed by the box-leaves, there are small soft grains of this substance deposited; and, in that state, it is frequently seen issuing from the anus of the insect that dwells there. Dr. Gmelin, in his improved edition of the Systema Naturæ of Linnæus, enumerates several new species.

CHER'MES MINERAL. See KERMES.

CHE'RO, a small island of European Turkey, in the Archipelago. Lat. 36. 53. N. lon. 43. 26. E. Ferro.

CHEROKEE', the ancient name of Tennessee River. The name of Tenessee was formerly confined to the southern branch which empties fifteen miles above the mouth of Clinch river, and eighteen below Knoxville.

CHEROKEE'S, a celebrated Indian nation, now on the decline. They reside in the northern parts of Georgia, and the southern parts of the state of Tennessee; having the Apalachian or Cherokee mountains on the east, which separate them from North and South Carolina, and Tennessee river on the north and west, and the Creek Indians on the south. The country of the Cherokees, extending westward to the Missisippi and northward to the Six Nations, was surrendered, by treaty at Westminster, 1729, to the crown of Great Britain. The present line between them and the state of Tennessee is not yet settled. A line of experiment was drawn in 1792, from Clinch river, across Holston to Chilhove mountain; but, the Cherokee commissioners not appearing, it is called a line of experiment. The complection of the Cherokees is brighter than that of the neighbouring Indians. They are robust and well made, and taller than many of their neighbours; being generally six feet high, a few are more, and some less. Their women are tall, slender, and delicate. Two of their chiefs visited England in 1764, and had an audience of his majesty. They were formerly a powerful nation; but by continual wars in which it has been their destiny to be engaged, with the northern Indian tribes, and with the whites, they are now reduced to about 1500 warriors; and they are becoming weak and pusillanimous. Some writers estimate their numbers at 2500 warriors. They have forty-three towns now inhabited.

CHE'RON (Elizabeth Sophia), daughter of a painter in enamel, was born at Paris in 1648, and studied under her father. At the age of fourteen her name was become famous. The celebrated Le Brun in 1672 presented her to the academy of painting and sculpture, which complimented her talents by admitting her to the title of academician. This ingenious lady divided her time between painting and learning languages, poetry, and music. She drew on a large scale a great number of gems, a work in which she particularly excelled. These pictures were no less admirable for a good taste in drawing, a singular command of pencil, a fine style of colouring, and a superior judgment in the chiaro-oscuro. She excelled in history, in oil-colours, in miniature enamels, in portrait painting, and especially in those of females. The academy of Ricovrati at Padua honoured her with the surname of Erato, and gave her a place in their society. She died at Paris, September 3, 1711, at the age of sixty-three.

CHÉRONNA'C, a town of France, in the department of the Charente: fifteen miles south of Confolent.

CHE'ROY, a town of France, in the department of the Yonne, and chief place of a canton, in the district of Sens: ten miles west of Sens.

CHERRONI'SO, a town of European Turkey, on the north-east coast of the island of Negropont: twenty-five miles east of Negropont.

CHER'RY, *s.* [*cerise*, Fr. *cerasus*, Lat.] The fruit of the cherry-tree. It was brought out of Pontus at the time of the Mithridatic victory by Lucullus, in the year of Rome 680; and was brought into Britain about 120 years afterwards, which was A. D. 55; and was soon after spread through most parts of Europe. *Miller*.

CHER'RY, *adj.* Resembling a cherry in colour:

Shore's wife hath a pretty foot,
A *cherry* lip, a passing pleasing tongue. *Shakespeare.*

CHER'RYCHEEKED, *adj.* Having ruddy cheeks:

I warrant them *cherrycheek'd* country girls. *Congreve.*

CHER'RYPIT, *s.* A child's play, in which they throw cherry-stones into a small hole.—What, man! 'tis not for gravity to play at *cherrypit*. *Shakespeare.*

CHERRY-TREE, and CHERRY-LAUREL, *s.* in botany. See PRUNUS and CORDIA.

CHER'RY-VAL'LEY, a post town of America, in Otsego county, New-York, at the head of the creek of the same name, about twelve miles north-east of Cooper's-town, and eighteen southerly of Conajohary, sixty-one west of Albany and 336 from Philadelphia. There is an academy here, which contained in 1796, fifty or sixty scholars. It is a spacious building, sixty feet by forty. The township is very large, and lies along the east side of Otsego lake and its outlet to Adiquatangie creek. By the state census of 1796, it appears that 629 of its inhabitants are electors. This settlement suffered severely from the Indians in the Amerian war.

CHER'SO, an island in the Adriatic, on the coast of Croatia, about 150 miles in circumference. It is stony and mountainous, but yields a great deal of wood, cattle, wine, oil, and honey. It belongs to the Venetians, who send a nobleman as governor every two years, with the title of count, or captain, who resides at the capital, situated in the centre of the island, which has the same name, and contains about 2500 inhabitants. Lat. 45. 10. N. lon. 32. 12. E. Ferro.

CHER'SON, a town of Russia, in the government of Ekaterinoslay, situated on the Dnieper, built and made a free port in the year 1774, chiefly constructed of hewn stone. It is intended to be the principal mart for all commodities of export and import; but if an extensive trade should take place in this quarter, the great depositary for the merchandize will be more conveniently fixed on some spot below the bar of the Dnieper, and about twelve miles south of Cherson. It contains a dock for the

construction

construction of large vessels; from which several men-of-war and frigates, as well merchant ships, have already launched. The humane Mr. Howard died in this town, on the 20th of January, 1790: 128 miles south-west of Ekaterinoslav, and 812 south of Petersburg. Lat. 46. 40. N. lon. 50. 40. E. Ferro.

CHERSONE'SUS, a Greek word, rendered by the Latins *Peninsula*; or a tract of land almost surrounded by the sea, but joined to the continent by a narrow neck or isthmus. There were many of these among the ancients, of which these five are the most celebrated: one called Peloponnesus; one called Thracian, at the south of Thrace, and west of the Hellespont, where Miltiades led a colony of Athenians; from its isthmus to its further shores, it measured 420 stadia. The third, called Taurica, now Crim Tartary, was situate near the Palus Mæotis. The fourth called Cimbrica, now Jutland, is in the northern parts of Germany; and the fifth, surnamed Aurea, lies in India, beyond the Ganges.

CHERT, *s.* PETROSILEX, *lapis corneus*, the *hornstein* of the Germans; a species of stone classed by Cronstedt among the siliceous earths. See MINERALOGY.

CHERT'SEY, a town of England, in the county of Surrey, situated near the banks of the Thames, formerly the residence of some of the Saxon kings; and the first burial place of Henry VI. who was afterwards removed to Windsor. Here was formerly an abbey, founded in the years 664, of which only part of the walls now remains. The principal manufactures are iron hoops, thread, and bricks. It has a weekly market on Wednesdays; and four fairs, first Monday in Lent, May 14, August 6, and Sept. 25. It is twenty miles west-south-west of London.

CHE'RUB, *s.* [כרב *plur.* כרבים. It is sometimes written in the plural, improperly, cherubims.] A celestial spirit, which, in the hierarchy, is placed next in order to the seraphim. See HIERARCHY. All the several descriptions which the Scripture gives us of *cherubin*, differ from one another; as they are described in the shapes of men, eagles, oxen, lions, and sometimes in a composition of all these figures put together. The hieroglyphical representations in the embroidery upon the curtains of the Tabernacle, were called by Moses, *Exod.* xxvi. 1. *cherubim* of cunning work. *Calmet.*

Heav'n's *cherubin* hors'd
Upon the sightless coursers of the air,
Shall blow the horrid deed in ev'ry eye,
That tears shall drown the wind. *Shakespeare.*

CHERU'BIC, *adj.* Angelic; relating to the cherubim:

Attentive, and with more delighted ear,
Divine instructor! I have heard, that when
Cherubic songs by night from neighb'ring hills
Aerial music send. *Milton.*

CHE'RUBIN, *adj.* Angelical:

This fell whore of thine
Hath in her more destruction than thy sword,
For all her *cherubin* look. *Shakespeare.*

To CHE'RUP, *v. n.* [from *cheer*; perhaps contracted from *cheer up*.] To chirp; to use a cheerful voice:

The birds
Frame to thy song their cheerful *cheruping*;
Or hold their peace for shame of thy sweet lays. *Spenser.*

CHER'VES, a town of France, in the department of the Charente: one league north-west of Cognac.

CHERVEU'X, a town of France, in the department of the Two Sevres, and chief place of a canton, in the district of St. Maixent: two leagues and a half north-east of Niort.

CHER'VIL, *s.* See CHÆROPHYLLUM and SCANDIX.

CHE'SAPEAK, one of the largest and safest bays in the United States of America. Its entrance is nearly east-north-east, and south-south-west, between Cape Charles, lat. 37. 12. and Cape Henry, lat. 37. in Virginia, twelve miles wide, and it extends 270 miles to the northward, dividing Virginia and Maryland. It is from seven to eighteen miles broad, and generally as much as nine fathoms deep; affording many commodious harbours, and a safe and easy navigation. It has many fertile islands, and these are generally along the east side of the bay, except a few solitary ones near the western shore. A number of navigable rivers and other streams empty into it, the chief of which are Susquehannah, Patapsco, Patuxent, Potowmack, Rappahannock, and York, which are all large and navigable. Chesapeak bay affords many excellent fisheries of herring and shad. There are also excellent crabs and oysters. It is the resort of swans, but is more particularly remarkable for a species of wild duck, called *canvasback*, whose flesh is entirely free from any fishy taste, and is admired by epicures for its richness and delicacy. In a commercial point of view, this bay is of immense advantage to the neighbouring states, particularly to Virginia. Of that state it has been observed, with some little exaggeration, however, that "every planter has a river at his door."

CHE'SELDEN (William), an eminent English surgeon and anatomist, born at Somerby in Leicestershire, in 1688. He was placed, about 1703, under Cowper the celebrated anatomist, in whose house he resided; and studied surgery under Mr. Ferne, head surgeon of St. Thomas's hospital (whom he afterwards succeeded), for nineteen years. In 1711 he was elected F.R.S. So early as the age of twenty-two he read lectures in anatomy; of which the syllabus was first printed in 1711, and afterwards annexed to his "Anatomy of the human body," printed in 1713, 8vo. He continued his lectures for twenty years, and during that period obliged the public with many curious and singular cases, which are printed in the Philosophical Transactions, the Memoirs of the academy of surgery at Paris, and other valuable repositories. His Osteography, inscribed to queen Caroline, was published by subscriptian in a handsome folio, 1733: a peevish critique on which work, was printed by Dr. Douglas, in 1735, under the title of "Remarks on that pompous book, the Osteography of Mr. Cheselden." It was animadverted on with more candour by the famous Haller, who, while he pointed out what was amiss in it, yet paid Mr. Cheselden all the praises he deserved. Heister, also, in his "Compendium of Anatomy," has done justice to his merit. In 1722, he gained striking applause in cutting for the stone; and the year after, he published his treatise on the high operation for the stone. In 1729, he was elected a corresponding member of the Royal Academy of Sciences at Paris; and, almost on the institution of the Royal Academy of Surgery in that city, 1732, had the honour of being the first foreigner associated to their learned body. In 1728, he immortalized himself by giving sight to a lad near fourteen years old, who had been totally blind from his birth, by the closure of the iris, without the least opening for light in the pupil. His fame was now so fully established, that he was esteemed the first man of his profession. He was elected head-surgeon of St. Thomas's hospital; at St. George's and the Westminster infirmary he was chosen consulting surgeon; and was also appointed principal surgeon to Queen Caroline. Having now obtained the utmost of his wishes as to fame and fortune, he sought for that most desirable of blessings, a life of tranquillity; and found it, 1737, in the appointment of head-surgeon to Chelsea hospital, which he held to his death. In 1751, he was seized with a paralytic stroke, from which, to appearance, he was perfectly recovered; when, April 10, 1752, a sudden stroke of apoplexy hurried him to the grave, at the age of 64. He was intimate with Pope, by whom he is often mentioned with honour, as well as affection.

CHE'SHAM, a market town of Buckinghamſhire, ſituated in a fertile vale, twenty-nine miles from London, nine from Rickmanſworth, five from Berkhampſted, and ſeven from Hemel Hempſtead. The town conſiſts of three ſtreets, the chief of which goes almoſt in a direct line from north to ſouth, in which is the market-houſe: the market is held on Wedneſdays, chiefly for corn. The principal manufactures are, 1ſt, Lace, which is accounted very good; and large quantities are made, eſpecially black lace. 2d, Shoes; it is computed that near 1000 pair of ſhoes are made per week. 3d, Wooden-ware, which is conſiderably large; in round-ware, hollow-ware, Tunbridge-ware, &c. There are three fairs annually, viz. April 21, July 22, both for cattle, and Sept. 28 for cattle and ſervants.

CHE'SHIRE, a county palatine of England, is diſtinguiſhed in its figure by the two horns which project to the eaſt and weſt of its northern ſide, bounded on the north by the rivers Merſey and Tame, which ſeparate it from Lancaſhire, and by a ſmall point of Yorkſhire; on the eaſt by the counties of Derby and Stafford, the limits of which are marked for the moſt part by hills and ſtreams; on the ſouth by Shropſhire and a detached part of Flintſhire; and on the weſt by Denbighſhire, Flintſhire, and the eſtuary of the Dee. Its length is thirty miles; its extreme breadth, from horn to horn, almoſt ſixty; but acroſs its middle part not forty. Cheſhire is in general a flat country. Its moſt hilly part is towards the eaſtern border, where are ſome conſiderable eminences, forming a chain with the Derbyſhire and Staffordſhire hills. An interrupted ridge of high ground alſo croſſes it from north to ſouth on the weſtern ſide, beginning with a bold promontory, overlooking the Merſey near Frodſham; then croſſing that large tract of heath called Delamere-foreſt; appearing again in the inſulated rock of Beeſton, crowned with the ruins of its ſtrong caſtle; and ceaſing in the wooded Broxton hills near Malpas. The reſt of the county is nearly level: its ſoil in many parts light and ſandy, with much red gritty rock, on which almoſt all the towns and villages are built; in others ſtiff clay; with a conſiderable intermixture of uncultivated moſs and heath. Several ſmall lakes, called *meres*, are interſperſed, particularly in the northern parts.

The rivers in this county are, firſt, the Dee, a ſtream held in great veneration by our Britiſh anceſtors. It has its riſe, and the principal part of its courſe, in Wales, and only viſits the weſtern border of Cheſhire, to which it ſerves for ſome ſpace as a boundary; then, croſſing over to the city of Cheſter, it flows from thence to the ſea, making a broad ſandy eſtuary, which ſeparates this county from Flintſhire. By embankments here made, much land has been gained from the tide, and a narrow but deeper channel, fitter for navigation, has been formed from Cheſter half way to the ſea. The Dee is navigable from near Elleſmere, in Shropſhire, to Cheſter; but, at this city, the continuity of the navigation is broken by a ledge of rocks running acroſs the bed of the river, and cauſing a ſort of caſcade. The Weever riſes in the northern part of Shropſhire, and, after running acroſs the middle of Cheſhire, and receiving the Dane from the eaſt, empties into the eſtuary of the Merſey. It is navigable to Winsford, ſome miles above Norwich. The Merſey itſelf belongs more to this county than to Lancaſhire, ſince it riſes juſt within Yorkſhire; and, coaſting firſt along the ſouthern ſide of the eaſtern horn of Cheſhire; then croſſes it, and reaches Lancaſhire only above Stockport.

Two commodities render Cheſhire particularly famous, its ſalt, and its cheeſe. The ſalt-works are at the three towns called Wyches, viz. Namptwich, Middlewich, and Northwich, and at Winsford and ſome other places. At moſt of theſe brine is pumped up from ſprings which contain the ſalt diſſolved in the bowels of the earth, and which is procured from the brine again by boiling. At Northwich vaſt pits of ſolid ſalt rock have been dug to a great depth, from which immenſe quantities are raiſed, partly to be purified on the ſpot by re-diſſolving and boiling, and partly to be exported in its crude ſtate. Moſt of the latter goes to Liverpool by means of the river Weever; and the plenty and cheapneſs of this commodity has been a principal cauſe of the great foreign commerce of that port. The clear annual duty received by government for Cheſhire ſalt amounts to 200,000l. The cheeſe of this county is noted for its mellowneſs and rich flavour; and great quantities of it are conſumed in various parts of England and Scotland, as well as exported abroad. About three-fourths of the land in Cheſhire is ſuppoſed to be paſtured or mown; and the graſs, except what is eaten by horſes, is chiefly conſumed by milking cows, as few cattle are fattened here. The farmers are leſs attentive to the beauty of their cows than in many other parts, the milk being the great object: and they keep them to a great age. More calves are fed in Cheſhire, during the months of March and April, than in any other part of England; but the veal is killed very young, as the milk cannot be long ſpared. The dairies are ſcattered over the whole county; but the principal are about Namptwich and the tract between the Dane and Weever, where the ſoil is moſt clayey. The chief manures of this county are marl and lime; the latter moſtly gotten on the eaſtern ſide. Coals are in conſiderable plenty in the north-eaſt; and ſome are alſo dug in the hundred of Wirral, or that peninſula which lies between the Dee and Merſey, whence they are ſent to Cheſter. The midſt of the county is principally ſupplied from Lancaſhire. Stone quarries are frequent in the hilly parts. The great canal of the duke of Bridgewater has its principal courſe in Cheſhire, entering the county from Mancheſter by croſſing the Merſey, and then running parallel to it, till it falls into that river at Runcorn. With this the grand canal communicates which joins the Trent and Merſey, and is called the Staffordſhire. This laſt canal croſſes Cheſhire, paſſing by Northwich and Middlewich. There is, beſides, another canal from Cheſter to Namptwich, intended to promote the commerce of that city by giving it the advantage of an exportation of ſalt.

Cheſhire is divided into ſeven hundreds, which contain 101 pariſhes, one city, and eleven market towns. The proportion of the cultivated parts of the county, and thoſe lie either waſte, or in a ſtate of little profit, are, according to a general view drawn up by Mr. Wedge, perhaps nearly as follows: arable, meadow, paſture, &c. about 615,000 acres; waſte lands, heaths, commons, greens, but few woods of any extent, 30,000 acres; peat bogs and moſſes 20,000 acres; common fields, probably, not ſo much as 1000 acres; ſea ſands within the eſtuary of the Dee, excluſive of what may be upon the ſhores of the river Merſey, 10,000 acres: in the whole 676,000 acres. Cheſhire has formerly been celebrated as the vale royal of England; and, if ſeen from the high lands about Macclesfield, the whole of the county to the weſtward has undoubtedly the appearance of one extended plain. Cheſter is the city; the market towns are Namptwich, Macclesfield, Malpas, Middlewich, Northwich, Congleton, Altringham, Frodſham, Knotsford, Stockport, and Sanbach. The yearly export of cheeſe from this county to London only, has been computed at 14,000 tons; to Briſtol and York, down the Severn and the Trent, 8000 more, beſides what is ſent to Scotland and Ireland.

CHE'SHIRE, a county of New-Hampſhire, in North America, on the eaſt bank of Connecticut river. It has the ſtate of Maſſachuſetts on the ſouth, Grafton county on the north, and Hillſborough county eaſt. It has thirty-four townſhips, of which Charleſtown and Keene are the chief, and by the cenſus 28,772 inhabitants.

CHE'SHIRE, a town of America, in Berkſhire county, Maſſachuſetts; famous for its good cheeſe; 140 miles north-weſt from Boſton.

CHE'SHIRE, a town of America in New-Haven county, Connecticut, fifteen miles north of New-Haven city, and


DERBY SHIRE
YORKSH.
STAFFORD SH.
SHROPSHIRE
DENBIGH SHIRE
FLINT SH.
IRISH SEA
RIVER DEE
Buxton
Leek
Stockport
Manchester
Macclesfield
Newcastle under Lyne
Warrington
Sandbach
Betley
Whitchurch
Chester
Liverpool
Flint
Part of Flint Sh.
British Miles

C H E S H I R E.

and twenty-six south-west of Hartford. It contains an episcopal church and academy, and three congregational churches.

CHES'LEY, a town of France, in the department of the Aube, and chief place of a canton, in the district of Ervy: nine miles south-east of Ervy.

CHE'SNE, a town of France, in the department of the Ardennes, and chief place of a canton, in the district of Vouziers, fifteen miles south of Mezieres.

CHE'SNE (Joseph du), QUERCETANUS, lord of la Violette, and physician to the French king, was born at Armagnac. After having passed a considerable time in Germany, he went and practised in Paris. He made great progress in the study of chemistry, to which he was particularly devoted. The success that attended his practice in this science, excited the spleen of the rest of the physicians, and especially that of Guy Patin, who was continually bringing out sarcasms against him. This learned chemist, who is called du Quesne by Moreri, died at Paris, at a very advanced age, in 1609. He wrote in French verse, The Folly of the World, 1583, 4to. 2. The great Mirror of the World, 1593, 8vo. He also composed several books of chemistry, which had great reputation, considering the then obscure state of that science.

CHE'SNE (André du), called the father of French history, was born in Tourane, in 1584; and was crushed to death by a cart, as he was passing from Paris to his country-house, in 1640. His labours, for such they may be properly called, consist of, 1. Histoire de Papes, 2 tom. fol. 2. Histoire d'Angleterre, 2 tom. fol. 3. Histoire des Cardinaux François. 4. Recueil des Historiens de France. This last was intended to contain twenty-four volumes in folio; the two first of which, from the origin of the nation to Hugh Capet, he published himself. The third and fourth, from Charles Martel to Philip Augustus, were in the press when he died: and his son, Francis du Chesne, who inherited his industry as well as his learning, published the fifth, from Philip Augustus to Philip le Bel. 5. Historiæ Normannorum Scriptores Antiqui, Paris, 1619, in folio. This collection has been much esteemed.

CHESNUT-HILL, a town of America in Northampton county, Pennsylvania.

CHES'NUT-TREE. See FAGUS.

CHESS, *s.* [*echecs*, Fr.] By some called the GAME of WAR: a very ancient and ingenious game, performed with different figures and pieces of wood, to be moved in various directions on a board, divided into sixty-four squares called houses. Each player is furnished with eight of these carved figures, called *dignified pieces*, viz. a king, a queen, two bishops, two knights, and two rooks; also with eight common pieces, called *pawns*. These, for the sake of distinction, are painted of two opposite colours, white and black.

As this game appears to be of very high antiquity, so the honour of inventing it is claimed by different nations. The contest lies principally between the Hindoos, the Chinese, and the Persians. In support of the first claim, we are told by Sir William Jones, in the second volume of his Asiatic Researches, that the game of chess has been immemorially known in Hindoostan, by the name of Chaturanga, or the four members of an army, viz. elephants, horses, chariots, and foot-soldiers. This learned author at the same time observes, that though it is confidently asserted Shanscrit books on chess exist, yet no account of the game has hitherto been discovered in the classical writings of the Brahmins. The late Mr. Daines Barrington attributes the invention of the game to the Chinese; and in this he is supported by a paper published in the Transactions of the Royal Irish Academy for 1794, vol. 5, by Mr. Eyles Irwin. It states, that when Mr. Irwin was at Canton, a young mandarin of his acquaintance, on seeing the English chess-board on his table, recognized its similarity with that used for a game of their own; and, on the next day, he brought his board and equipage for Mr. Irwin's inspection, and soon afterward gave him a manuscript extract from a book, relating the origin and invention of the Chinese game, called by them *chong-kè*, or the *royal game*. Some of the principal differences in the Chinese chess are, that, instead of a queen, the king has a son on each side for his support; and that there is a piece called the *rocket-boy*, stationed between the lines of each party, who acts with the motion of a rocket, vaulting over a man, and taking his adversary at the other end of the board. This, as Mr. Irwin observes, is an irrefragable proof of the antiquity of the military use of gunpowder by the Chinese. The manuscript extract attributes the invention of the game to a Chinese general (about 1965 years ago), who by its means reconciled his soldiers to passing the winter in quarters in the country of Shensi, the cold and inconveniences of which were likely to have occasioned a mutiny among them. Other writers contend, that chess is a game of Persian invention, since *scab mutb* is the Persic term for check mate; and since the Persians were sedulous in recommending it to their young princes, as a game calculated to instruct kings in the art of war, and as the name they gave it, Schatrak, signifies the game of schah, or king. Whether the Greeks or Romans were acquainted with this game, is doubtful, because though several passages which might be supposed to have such a reference, relate to some game of skill, yet it is evident that chess is not intended. It has been attributed to Palamedes, who lived during the Trojan war: but the line from Sophocles, on which this opinion is founded, teaches nothing more than that he invented some game which was played with pebbles or cubes. Palamedes was so renowned for his sagacity, that almost every early discovery was ascribed to him.

If we recur to the original names of the pieces with which this game is played, we shall readily be convinced that it is of Asiatic original; but whether carried from India into Persia, and thence into China, or *vice versa*, seems to be of as little real importance, as it is difficult, or impossible, to ascertain the fact. The first piece of chess, or king, seems always to have retained the dignity of its character, under whatsoever designation it might have been used in different countries. The second piece of chess, called the queen, has certainly undergone a great violation of character. The old French authors call it fierce, fierche, and fierge, or fiercir. Corruptions of the Latin fiercia, derived from the Persian ferze or firzin, the name of that piece in Persic; and signifies a minister or vizir. Of the word fierge, they have made, vierge virgo, and afterwards lady or queen. The resemblance of the words made this change very easy, and it seemed so much the more reasonable, because that piece is placed next to the king, and at its first moves, like the pawns, could only move two steps, which made it one of the least considerable of the board, as the authors of two ancient treatises of the game of chess acknowledge. This constraint upon the lady of chess was displeasing to our forefathers. They looked upon it as a sort of slavery, more suitable to the jealousy of the Eastern people, than to the liberty which ladies have always enjoyed amongst us. They extended, therefore, the steps and prerogatives of that piece, and, in consequence of the gallantry so natural to the western people, the lady became the most considerable piece of all the game. Yet there was still an absurdity in this metamorphosis of the firzim or vizier into queen, and this incongruity remains to the present day, without our taking notice of it.

When a pawn, or a common soldier, has traversed through the enemy's battalions, and penetrated so far as the last line of the board, he is not allowed to return back, but is honoured with the step and prerogatives of the queen. If the ferzin, or the fierge, be a vizir, a first minister, or a general of an army, we can easily comprehend how a pawn or a simple soldier may be elevated to their rank, in recompence of the valour with which he has pierced through the enemy's battalions. But if the

fierge

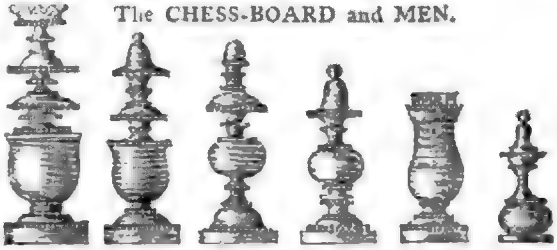
fierge be a lady, a queen, or the king's wife, by what odd metamorphosis does the pawn change his sex, and become a woman that was a soldier before? And how do they make him marry the king, in recompence of that valour of which he has given such proofs? This absurdity proves that the second piece of chess has been *mal apropos* called lady or queen.

The third piece of chess, which we call the bishop; the French, fol; the Spaniards, *alferez*; and the Italians, alfiere; serjeant, in the East; was of the figure of an elephant, and whose name it bore. The knight, which is the fourth piece, has the same name and figure every where. The fifth piece, which we call the rook, and the French tour, is called by the eastern people, the rokh, and the Indians make it of the figure of a camel, mounted by an horseman with a bow and arrow in his hand. The name of rokh, which is common both to the Persians and Indians, signifies, in the language of the East, a sort of camel used in war, and placed upon the wings of their armies by way of light-horse. The rapid motion of this piece, which jumps from one end of the board to the other, agrees so much the better with this idea of it, as at first it was the only piece that had this motion. The king, queen, and pawn, made but one step, the bishop but two, as well as the knight, neither of them going farther than the third square, including that which they quitted. The rook alone was unbounded in his course, which may agree to the lightness of the dromedary, but in no way to the immobility of towers, or fortresses, the figures which we now generally give to those pieces. The sixth, and last piece, is the pawn, or common soldier, which has hitherto suffered no change. The Chinese, if not the inventors, certainly made great alterations in this game; they introduced new pieces, under the form of artillery. Tamerlane made yet greater changes in this game; and, by the new pieces which he invented, and the motion he gave them, he increased the difficulty of a game already too complicated to be looked upon as a mere amusement; but these additions have not been approved of, and the ancient manner of playing, each with sixteen pieces only, and upon a board of sixty-four squares, has taken place again. Much confusion, however, has arisen, from the arbitrary change of the names, as well as forms, of the chessmen, by different nations. Some have retained the forms, whilst they have altered the names; and others the names, after having changed the forms. Thus it has happened with cards; we retain the Spanish name of clubs and spades, whilst we have adopted the French suits.

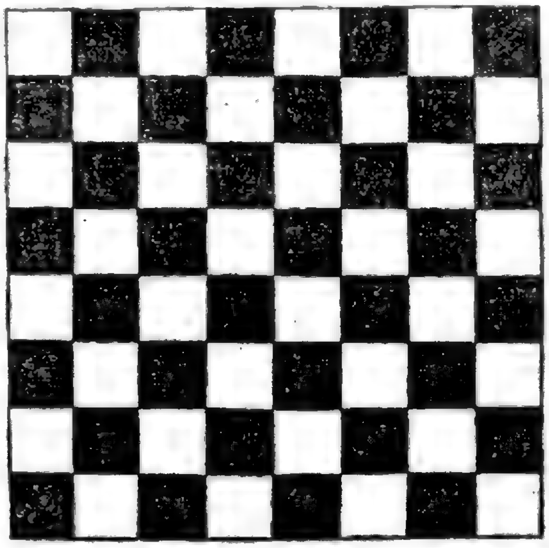
It is said that this game was imported from Constantinople, during the time of the crusades, first into Italy and Spain, and then into England, and other countries; and hence arose the general corruption and variation of the European names of the chessmen. With us, the queen has been stiled the *old woman*, or *nurse*; but, by the French, and after them the English in the middle ages, *fierca*, *fierges*, &c. but the title *queen* is, nevertheless, of considerable antiquity. The bishop appears to have been termed by English writers, *alphin*, *aufin*, &c. from an Arabic word which signifies an elephant; the French sometimes denominated it *fol*, sometimes an *archer*: by the Germans it was called the *hound* or *runner*; by the Russians and Swedes, the *elephant*; by the Poles, the *priest*. The knight has always retained this distinction on the French and English chess-board; the Germans, from the nature of their motion, give them the appellation of *leapers*; and the Russians call them *horses*. The rook has been considered as a castle or fortress. It is probable that the European form of the castle was copied in part from some ancient Indian piece of the elephant with a a castle on his back. The pawns are supposed to receive their name from *pedones*, a barbarous Latin term for foot-soldiers. The Germans, Danes, and Swedes, have converted them into peasants. The writers of the middle ages, in speaking of the chessmen, universally stile them *familiæ*.

We next come to speak of placing the men on the board, and the rules by which the game is to be played. The white king is to be placed on the fourth black house from the corner of the board, in the first and lower rank; and the black king is to be placed on the fourth white house, on the opposite, or adversary's side of the board; the queens are to be placed next to the kings, in houses of their own colour. Next to the king and queen on each hand, place the two bishops; next to them the two knights; and, last of all, on the corners of the board, the two rooks. The pawns are to be placed, without distinction, on the second rank of the house, one before each of the dignified pieces. Having thus disposed of the men, the onset is commonly begun by the pawns, which march straight forward in their own file, one house at a time, except the first moves, when it can advance two houses, but never moves backwards. The manner of their taking the adversary's men is sideways, in the next house forwards; where, having made captures of the enemy, they move forward as before. The rook goes forward, or crosswise, through the whole file, and back again: the knight skips backward and forward to the next house, save one of a different colour, with a sidling march, or aslope; and thus kills his enemies that fall in his way, or guards his friends that may be exposed on that side: the bishop walks always in the same colour of the field that he is placed in at first, forward and backward, aslope, or diagonally, as far as he can: the queen's walk is more universal, as she takes all the steps of the before-mentioned pieces, excepting that of the knight; as to the king's motion, it is one house at a time, and that either forward, backward, sloping, or sideways. A figure of the chessmen and chess-board is added, for the better information of the reader.

The CHESS-BOARD and MEN.



King. Queen. Bishop. Knight. Rook. Pawn.



As to the value of the different pieces; next to the king, is the queen; after her, the rooks; then the bishops; and last of the dignified pieces, comes the knight. The difference of the worth of pawns is not so great as that of noblemen; only it must be observed, that the king's bishop's pawn is the best in the field; and therefore the skilful gamester will be careful of him. It ought also to be observed, that, whereas, any man may be taken, when he falls within the reach of any of the adversary's pieces; it is otherwise with the king, who, in such a case, is only to be saluted with the word *check*, warning him of his danger, out of which it is absolutely necessary that he move; and, if it so happens that he cannot move without exposing himself to the like inconveniency, it is check-mate, and the game is lost. The rules of the game are as follow:

1. In order to begin the game, the pawns must be moved before the pieces, and afterwards the pieces must be brought out to support the pawns. The kings', queens', and bishops', pawns should be moved first, that the game may be well opened. The pieces must not be played out early in the game, because the player may thereby lose his move; but, above all, the game should be well arranged before the queen is played out. Useless checks should also be avoided, unless some advantage is to be gained by them, because the move may be lost, if the adversary can either take or drive the piece away. 2. If the game is crowded, the player will meet with obstructions in moving his pieces; for which reason he should exchange pieces or pawns, and castle his king as soon as it is convenient, endeavouring at the same time to crowd the adversary's game, which may be done by attacking his pieces with the pawns, if the adversary should move his pieces out too soon. To castle the king, is to cover the king with a castle; this is done by a certain move which each player has a right to, whenever he thinks proper. 3. The men should be so guarded by one another, that, if a man should be lost, the player may have it in his power to take one of the adversary's in return; and if he can take a superior piece, in lieu of that which he loses, it would be an advantage, and distress the adversary. 4. The adversary's king should never be attacked without a force sufficient; and if the player's king should be attacked without having it in his power to attack the adversary's, he should offer to make an exchange of pieces, which may cause the adversary to lose a move. 5. The board should be looked over with great attention, and the men reconnoitered, so as to be aware of any stroke that the adversary might attempt in consequence of his last move. If, by counting as many moves forward as possible, the player has a prospect of success, he should not fail doing it, and even sacrifice a piece or two to accomplish his end. 6. No man should be played till the board is thoroughly examined, that the player may defend himself against any move the adversary may have in view; neither should the attack be made till the consequences of the adversary's next move are considered; and when an attack may with safety be made, it should be pursued without catching at any bait that might be thrown out, in order for the adversary to gain a move, and thereby cause the design to miscarry. 7. The queen should never stand in such a manner before the king, that the adversary, by bringing a rook, or a bishop, could check the king if she were not there; as it might be the loss of the queen. 8. The adversary's knight should never be suffered to check the king and queen, or king and rook, or queen and rook, or the two rooks, at the same time; especially if the knight is properly guarded; because, in the two first cases, the king being forced to go out of check, the queen, or the rook, must be lost; and, in the two last cases, a rook must be lost, at least, for a worse piece. 9. The player should take care, that no guarded pawn of the adversary's fork two of his pieces. 10. As soon as the kings have castled on different sides of the board, the pawns on that side of the board should be advanced upon the adversary's king, and the pieces, especially the queen and rook, should be brought to support them; and the three pawns belonging to the king that is castled, must not be moved. 11. The more moves a player can have, as it were in ambuscade, the bett[illegible], that is to say, the queen, bishop, or rook, is to be placed behind a pawn, or piece, in such a position as that, upon playing that pawn, or piece, a check is discovered upon the adversary's king, by which means a piece of some advantage is often gained. 12. An inferior piece should never be guarded with a superior, when a pawn would answer the same purpose; for this reason, the superior piece may remain out at play; neither should a pawn be guarded with a piece, when a pawn would do as well. 13. A well-supported pawn, that is passed, often costs the adversary a piece; and when a pawn, or any other advantage, is gained without endangering the loss of the move, the player should make as frequent exchanges of pieces as he can. The advantage of a passed pawn is this; if the player and his adversary have each three pawns upon the board, and no piece, and the player has one of his pawns on one side of the board, and the other two on the other side, and the adversary's three pawns are opposite to the player's two pawns, he should march with his king as soon as he can, and take the adversary's pawns: if the adversary goes with his king to support them, the player should go to the queen with his single pawns: and then, if the adversary goes to hinder him, he should take the adversary's pawns, and move the others to queen. To queen, is to make a queen; that is, to move a pawn into the adversary's back row, which is the rule at this game, when the original one is lost. 14. When the game is near finished, each party having only three or four pawns on each side of the board, the king must endeavour to gain the move in order to win the game. For instance, when the player brings his king opposite to the adversary's, with only one square between, he will gain the move. 15. If the adversary has his king and one pawn on the board, and the player has only his king, he cannot lose the game, provided he brings his king opposite to the adversary's, when the adversary is directly before or on one side of his pawn, and there is only one square between the kings. 16. If the adversary has a bishop, and one pawn, on the rook's line, and this bishop is not of the colour that commands the corner square the pawn is going to, and the player has only his king, if he can get into that corner, he cannot lose; but, on the contrary, may win by a *stale*, which is, when the king is blocked up so as to have no move at all. 17. If the player has greatly the disadvantage of the game, having only his queen left in play, and his king happens to be in a position to win, as above-mentioned, he should keep giving check to the adversary's king, always taking care not to check him, where he can interpose any of his pieces that make the *stale*; by so doing he will at last force the adversary to take his queen, and then he will win the game by being in a stale-mate. 18. The player should never cover a check with a piece that a pawn pushed upon it may take, for fear of getting only the pawn in exchange for the piece. 19. A player should never crowd his adversary up with pieces, for fear of giving a stale-mate inadvertently; but always should leave room for his king to move.

Though this game should ever be played with the utmost degree of foresight and caution, yet it is necessary to warn a player against playing a timid game. He should never be too much afraid of losing a rook for an inferior piece; because, although a rook is a better piece than any other, except the queen, it seldom comes into play to be of any great use till the end of the game; for which reason it is often better to have an inferior piece in play, than a superior one to stand still, or moving to no great purpose. If a piece is moved, and is immediately drove away by a pawn, it may be reckoned a bad move, because the adversary gains a double advantage over the player, in advancing at the same time the other is made to

to retire. Although the first move may not seem of consequence between equal players, yet a move or two more lost after the first, makes the game scarcely recoverable. Many indifferent players think nothing of the pawns, whereas three pawns together are strong; but four, which constitute a square, with the assistance of other pieces, well managed, make an invincible strength, and, in all probability, may produce a queen, when very much wanted. It is true, that two pawns, with a space between, are no better than one; and if there should be three over each other in a line, the game cannot be in a worse way. This shews the pawns to be of great consequence, provided they are kept close together. Some players are apt to risque losing the game, in order to recover a piece: this is an error; for it is much better to give up a piece, and attack the enemy in another quarter; by so doing, the player has a chance of snatching a pawn or two from, or gaining some advantage over, the adversary, whilst his attention is taken up in pursuing this piece.

If the queen and another piece are attacked at the same time, and that by removing the queen, the piece must be lost; if two pieces can be gained in exchange for the queen, the queen should be given up, it being the difference of three pieces, and consequently more than the value of the queen. By losing the queen, the game is not thrown into that disorder which it would otherwise have been: in this case it is judicious to give the queen for a piece, or a pawn or two; it being a well-known fact amongst good players, that he who begins the attack, and cannot maintain it, being afterwards obliged to retire, generally loses the game. A player should never be fond of changing without reason; because the adversary, if he is a good player, will ruin his situation, and gain a considerable advantage over him; but rather than lose a move, when a player is stronger than his adversary, it is good play to change, for he thereby increases his strength. When the game is almost drawn to a conclusion, the player should recollect, that his king is a capital piece, and consequently should keep him in motion; by so doing he generally gets the move, and often the game. As the queen, rook, and bishop, operate at a distance, it is not always necessary in the attack to have them near the adversary's king. If a man can be taken with different pieces, the player should take his time, and consider which of those pieces is the best to take it with. If a piece can be taken almost at any time, the player should not be in a hurry about it, but try to make a good move elsewhere before he takes it. A player should be cautious how he takes his adversary's pawn with his king, as it often happens to be a safeguard to it.

The laws of the game are: 1. If a player touches a man, he must play it; and if he quits it, he cannot recall it. 2. If, by mistake, or otherwise, a false move is played, and the adversary takes no notice of it till he has played his next move, it cannot be recalled by either of the parties. 3. If a player misplaces the men, and he plays two moves, it is at the option of the adversary to permit him to begin the game or not. 4. If the adversary plays, or discovers a check to a player's king, and gives no notice of it, the player may let him stand still till he does. 5. After the king is moved, a player cannot castle. We shall give an example of playing the game from Mr. Philidor, whose celebrity as a chess-player in this, and other countries, is already well known. He moves, 1st. *White*. The king's pawn two steps. *Black*. The same.—2d. *W*. The king's bishop at his queen's bishop's fourth square. *B*. The same.—3d. *W*. The queen's bishop's pawn one move. *B*. The king's knight at his bishop's third square.—4th. *W*. The queen's pawn two moves. *B*. The pawn takes it.—This pawn is played two moves, for two very importat reasons; the first is, to hinder your adversary's king's bishop to play upon your king's bishop's pawn; and the second, to put the strength of your pawns in the middle of the exchequer, which is of great consequence to attain the making of a queen.—5th. *W*. The pawn retakes the pawn.—When you find your game in the present situation, viz. one of your pawns at your king's fourth square, and one at your queen's fourth square, you must push neither of them before your adversary proposes to change one for the other: in this case you are to push forwards the attacked pawn. It is to be observed, that pawns, when sustained in a front line, hinder very much the adversary's pieces to enter into your game, or take any advantageous post. This rule may serve for all other pawns thus situated. *B*. The king's bishop at his queen's knight's third square.—If, instead of retiring his bishop, he gives you check with it, you are to cover the check with your bishop, in order to retake his bishop with your knight, in case he takes your bishop; your knight will then defend your king's pawn, otherwise unguarded. But probably he will not take your bishop, because a good player strives to keep his king's bishop as long as possible.—6th. *W*. The queen's knight at his bishop's third square. *B*. The king castles.—7th. *W*. The king's knight at his king's second square.—You must not easily play your knights at your bishop's third square, before the bishop's pawn has moved two steps, because the knight proves an hindrance to the motion of the pawn. *B*. The queen's bishop's pawn one move.—8th. *W*. The king's bishop at his queen's third square.—Your bishop retires to avoid being attacked by the black queen's pawn, which would force you to take his pawn with your's; this would very much diminish the strength of your game, and spoil entirely the project already mentioned, and observed in the first and second moves. *B*. The queen's pawn two moves.—9th. *W*. The king's pawn one move. *B*. The king's knight at his king's square.—10th. *W*. The queen's bishop at his king's third square. *B*. The king's bishop's pawn one move.—He plays this pawn to give an opening to his king's rook; and this cannot be hindered, whether you take his pawn or not.—11th. *W*. The queen at her second square.—If you should take the pawn offered to you, instead of playing your queen, you would be guilty of a great fault, because your royal pawn would then lose its line; whereas, if he takes your king's pawn, that of your queen supplies the place, and you may afterwards sustain it with that of your king's bishop's pawn: these two pawns will undoubtedly win the game, because they can now no more be separated without the loss of a piece, or one of them will make a queen, as will be seen by the sequel of this game. Moreover, it is of no small consequence to play your queen in that place, for two reasons; the first, to support and defend your king's bishop's pawn; and, secondly, to sustain your queen's bishop, which being taken, would oblige you to retake his bishop with the above-mentioned last pawn; and thus your best pawns would have been totally divided, and of course the game indubitably lost. *B*. The king's bishop's pawn takes the pawn.—He takes the pawn to pursue his project, which is to give an opening to his king's rook, and make it fit for action.—12th. *W*. The queen's pawn retakes it. *B*. The queen's bishop at his king's third square.—He plays this bishop to protect his queen's pawn, and with a view to push afterwards that of his queen's bishop's. He might have taken your bishop without prejudice to his scheme, but he chuses rather to let you take his, in order to get an opening for his queen's rook, though he suffers to have his knight's pawn doubled by it; but you are again to observe, that a double pawn is no ways disadvantageous when surrounded by three or four other pawns. However, to avoid criticism, this will be seen in the back-game, beginning from this twelfth move, to which you are sent after the party is over; the black bishop will then take your bishop; it will also be shewn, that, playing well on both sides, it will make no alteration in the case. The king's pawn, together with the queen's or the king's bishop's pawn, well played, and well sustained, will certainly win the game.—13th. *W*. The king's knight at his king's bishop's fourth square.—Your king's pawn being

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as yet in no danger, your knight attacks his bishop, in order to take it, or have it removed. *B.* The queen at her king's second square.—14th. *W.* The queen's bishop takes the black bishop.—As it is always dangerous to let the adversary's king's bishop batter the line of your king's bishop's pawn; and as it is likewise the most dangerous piece to form an attack, it is not only necessary to oppose him by times to your queen's bishop, but you must get rid of that piece as soon as a convenient opportunity offers. *B.* The pawn takes the bishop.—15th *W.* The king castles with his rook.—You chuse to castle on the king's side, in order to strengthen and protect your king's bishop's pawn, which you will advance two steps as soon as your king's pawn is attacked. *B.* The queen's knight at his queen's second square.—16th. *W.* The knight takes the black bishop. *B.* The queen takes the knight.—17th. *W.* The king's bishop's pawn two steps *B.* The king's knight at his queen's bishop's second square.—18th. *W.* The queen's rook at its king's place. *B.* The king's knight's pawn one move.—He is forced to play this pawn, to hinder you from pushing your king's bishop's pawn upon his queen.—19th. *W.* The king's rook's pawn one move.—The king's rook's pawn is played to unite all your pawns together, and push them afterwards with vigour. *B.* The queen's pawn one move.—20th. *W.* The knight at his king's fourth square. *B.* The king's rook's pawn one move.—He plays the pawn to hinder your knight entering in his game, and forcing his queen to remove; were he to play otherwise, your pawns would have an open field.—21st. *W.* The queen's knight's pawn one move. *B.* The queen's rook's pawn one move.—22d. *W.* The king's knight's pawn two steps. *B.* The king's knight at his queen's fourth square.—23d. *W.* The knight at his king's knight's third square.—You play this knight to enable yourself to push your king's bishop's pawn next; it will be then supported by three pieces, the bishop, the rook, and the knight. *B.* The king's knight at the white king's third square.—He plays this knight to hinder your project, by breaking the strength of your pawns, which he would undoubtedly do by pushing his king's knight's pawn; but you break his design by changing your rook for his knight.—24th. *W.* The queen's rook takes the knight. *B.* The pawn takes the rook.—25th. *W.* The queen takes the pawn. *B.* The queen's rook takes the pawn of the opposite rook.—26th. *W.* The rook at his king's place.—You play your rook to protect your king's pawn, which would remain in the lurch as soon as you push your king's bishop's pawn. *B.* The queen takes the white queen's knight's pawn.—27th. *W.* The queen at her king's fourth square. *B.* The queen at her king's third square.—The queen returns to hinder the check mate, now ready prepared.—28th. *W.* The king's bishop's pawn one move. *B.* the pawn takes it.—29th. *W.* The pawn takes again.—Were you not to take with your pawn, your first project, laid in the beginning of the game, would be reduced to nothing, and you would run the risque of losing the game. *B.* The queen at her fourth square.—He offers to change queens, in order to break your scheme of giving him check-mate with your queen and bishop.—30th. *W.* The queen takes the queen. *B.* The pawn takes the queen.—31st. *W.* The bishop takes the pawn in his way. *B.* The knight at his third square.—32d. *W.* The king's bishop's pawn one move.—You are to observe, when your bishop runs upon white, you must strive to put your pawn always upon black, because then your bishop serves to drive away your adversary's king or rook when between your pawns; the same when your bishop runs upon black, to have then your pawns upon white. Few players have made this remark, though a very essential one. *B.* The queen's rook at the white queen's knight's second square—33d. *W.* The bishop at his queen's third square. *B.* The king at his bishop's second square.—34th. *W.* The bishop at the black king's bishop's fourth square. *B.* The knight at the white queen's bishop's fourth square.—35th. *W.* The knight at the black king's rook's fourth square. *B.* The king's rook gives check.—36th. *W.* The bishop covers the check. *B.* The knight at the white queen's second square.—37th. *W.* The king's pawn gives check. *B.* The king at his knight's third square.—As his king may retire at his bishop's square, it is necessary to send you to a second back-game, which will shew you how to proceed in this case.—38th, *W.* The king's bishop's pawn one move. *B.* The rook at its king's bishop's square.—39th. *W.* The knight gives check at the fourth square of his king's bishop. *B.* The king at his knight's second square.—40th. *W.* The bishop at the black king's rook's fourth square. *B.* Plays any where the white pushes to queen.

Being now driven to the first *back-game*, it becomes a continuation of the preceding game, from the 12th move.

12th. *W.* The queen's pawn retakes it. *B.* The king's bishop takes the white queen's bishop.—13th. *W.* The queen takes the bishop. *B.* The queen's bishop at his king's third square.—14th. *W.* The king's knight at his king's bishop's fourth square. *B.* The queen at her king's second square.—15th. *W.* The knight takes the bishop. *B.* The queen takes the knight.—16th. *W.* The king castles his rook. *B.* The queen's knight at his queen's second square.—17th. *W.* The king's bishop's pawn two moves. *B.* The king's knight's pawn one move.—18th. *W.* The king's rook's pawn one move. *B.* The king's knight at his second square.—19th. *W.* The king's knight's pawn two steps. *B.* The queen's bishop's pawn one move.—20th. *W.* The knight at his king's second square. *B.* The queen's pawn one move.—21st. *W.* The queen at her second square. *B.* The queen's knight at his third square.—22d. *W.* The knight at his king's knight's third square. *B.* The queen's knight at his queen's fourth square.—23d. *W.* The queen's rook at its king's square. *B.* The queen's knight at the white king's third square.—24th. *W.* The rook takes the knight. *B.* The pawn takes the rook.—25th. *W.* The queen takes the pawn. *B.* The queen takes the white queen's rook's pawn.—26th. *W.* The king's bishop's pawn one move. *B.* The queen takes the pawn.—27th. *W.* The king's bishop's pawn one move. *B.* The knight at his king's square.—28th. *W.* The king's knight's pawn one move. *B.* The queen at the white queen's fourth square.—29th. *W.* The queen takes the queen. *B.* The pawn takes the queen.—30th. *W.* The king's pawn one move. *B.* The knight at his queen's third square.—31st. *W.* The knight at his king's fourth square. *B.* The knight at his king's bishop's fourth square.—32d. *W.* The rook takes the knight. *B.* The pawn takes the rook.—33d *W.* The knight at the white queen's third square. *B.* The king's bishop's pawn one move, or any where; the game being lost.—34th. *W.* The king's pawn one move. *B.* The king's rook at its queen's knight's square.—35th. *W.* The bishop gives check. *B.* The king retires, having but one place.—36th. *W.* The knight gives check. *B.* The king removes.—37th. *W.* The knight at the black queen's square discovering check. *B.* The king moves where he can.—38th. *W.* The king's pawn, making a queen, gives check-mate in the mean time. There requires no animadversions on the moves of this back-game, they being almost all the same as in the first game.

Being now driven to a second *back-game*, it will begin from the 37th move.

37th. *W.* The king's pawn gives check. *B.* The king at his bishop's square.—38th. *W.* The rook at its queen's rook's square. *B.* The rook gives check at the white queen's knight's square.—39th. *W.* The rook takes the rook. *B.* The knight retakes the rook.—40th *W.* The king at his rook's second square. *B.* The knight at the white queen's bishop's third square.—41st. *W.* The knight at his king's bishop's fourth square. *B.* The knight at the white king's fourth square.—42d. *W.* The knight takes the pawn. *B.* The rook at its king's knight's fourth square.—43d. *W.* The king's pawn one move, and gives check. *B.* The king at his bishop's second square.—44th. *W.* The

W. The bishop gives check at the black king's third square. *B*. The king takes the bishop.—45th. *W*. The king's pawn makes a queen, and wins the game.

It is a fact, equally curious and remarkable, that this game has been in vogue amongst the crowned heads and nobility of almost all the kingdoms of the earth. It is recorded in the Modern Universal History, vol. ii. that Al Amin, khalif of Bagdad, and his freedman Kuthar, were playing at chess, without the least apprehension of impending danger, when Al Mamun's forces pushed the siege of Bagdad with so much vigour, that the city was upon the point of being carried by storm. On this occasion he cried out, when he was warned of his danger, "Let me alone! for I see check-mate against Kuthar." It is farther recounted of him, that he commanded the different provinces of the empire, to send to his court all such persons as were most expert at chess, to whom he allowed pensions, and passed the most considerable part of his time among them. This was about the year 808.

Ben-Ziad, khalif of Mecca, was very fond of chess. "Is it not extraordinary," said he to the favourite he was playing with, "that sixteen pieces, placed on so small a plane as this chess-board, should give me more trouble to manage, than so many millions of men, that cover the immense surface of my empire?"

In the chronicle of the Moorish kings of Granada, we find it related, that in 1396, Mehmed Balba seized upon the crown in prejudice of his elder brother, and passed his life in one continued round of disasters. His wars with Castile were invariably unsuccessful; and his death was occasioned by a poisoned vest. Finding his case desperate, he dispatched an officer to the fort of Solobrena, to put his brother Juzaf to death, lest that prince's adherents should form any obstacle to his son's succession. The alcayde found the prince playing at chess with an *alfaque* or priest. Juzaf begged hard for two hour's respite, which was denied him. At last, with great reluctance, the officer permitted him to finish his game; but, before it was concluded, a messenger arrived with the news of the death of Mehmed, and the unanimous election of Juzaf to the crown.

When Charles XII. of Sweden, was at Bender, Voltaire says, "for his only amusement, he played sometimes at chess. If little things paint men, I may be allowed to mention, that he always made the king march at that game; he made use of it more than any of the other pieces, and by that means he lost every game. And again, when he was besieged by the Turks, in the house in which he had shut himself up, near Bender, after he had well barricadoed his house, he sat down coolly to play at chess with his favourite Grothusen, as if every thing had been in profound security."

Mr. Coxe says, "chess is so common in Russia, that during our continuance at Moscow, I scarcely entered into any company where parties were not engaged in that diversion; and I very frequently observed in my passage through the streets, the tradesmen and common people playing it before the doors of their shops or houses. The Russians are esteemed great proficients in chess; with them the queen has, in addition to the other moves, that of the knight, which, according to Philidor, spoils the game; but which certainly renders it more complicated and difficult, and of course more interesting. The Russians have also another method of playing the game of chess, namely, with four persons at the same time, two against two; and for this purpose, the board is larger than usual, contains more men, and is provided with a greater number of squares. I was informed that this method was more difficult, but far more agreeable than the common game."

In a battle between the French and English, in the year 1117, an English knight seizing the bridle of the French king, and crying to his comrades, *the king is taken*; the prince struck him to the ground with his sword, saying, *Ne sçais tu pas qu'aux echecs on ne prend pas le roi?*—"Dost thou not know that at chess the kings are never taken?" The meaning of which is this: At the game of chess, when the king is reduced to that pass that there is no way for him to escape, the game ends, because the royal piece is not to be exposed even to an imaginary affront.

John Frederick, Elector of Saxony, having been taken prisoner by Charles V. was condemned to death: the decree was intimated to him while at chess with Ernest of Brunswick, his fellow-prisoner. After a short pause, and making some reflections on the irregularity of the emperor's proceedings, he turned to his antagonist, whom he challenged to finish the game. He played with his usual ingenuity and attention, and, having beat Ernest, expressed all the satisfaction that is commonly felt on gaining such victories. He was not, however, put to death, but set at liberty after five years confinement.

King Charles I. was at chess, when news was brought of the final intention of the Scots to sell him to the English; but so little was he discomposed by this alarming intelligence, that he continued his game with the utmost composure, so that no person could have known that the letter he had received had given him information of any thing remarkable.

King John was playing at chess, when the deputies from Rouen came to acquaint him that their city was besieged by Philip Augustus, but he would not hear them until he had finished his game.

Carte, the historian, mentions a chess-match in the year 1087, between our Henry I. before he was king, and Louis le Gros, son to Philip king of France. Louis having lost several games, and much money, was so irritated, that he threw the chessmen at Henry's head; in return for which, Henry struck the French prince with the board, laid him bleeding on the floor, and would have killed him, had it not been for timely interposition. Daines Barrington is however unwilling to allow, either to England or France, so early an acquaintance with chess, as this relation assigns: he rather supposes the game to have been *drafts*.

The late Dr. Franklin has made some very ingenious and applicable comparisons between the game of chess and the common affairs of human life. He says that life is a kind of chess, in which we have often points to gain, and competitors or adversaries to contend with, and in which there is a vast variety of good and ill events, that are, in some degree, the effects of prudence or the want of it. By playing at chess, then, we may learn, 1st. *Foresight*, which looks a little into futurity, and considers the consequences that may attend an action: for it is continually occurring to the player, "If I move this piece, what will be the advantage of my new situation? What use can my adversary make of it to annoy me? What other moves can I make to support it, and to defend myself from his attacks." 2d. *Circumspection*, which surveys the whole chess board, or scene of action, the relations of the several pieces, and situations, the dangers they are respectively exposed to, the several possibilities of their aiding each other, the probabilities that the adversary may take this or that move, and attack this or the other piece, and what different means can be used to avoid his stroke, to turn its consequences against him. 3d. *Caution*, not to make our moves too hastily. This habit is best acquired by observing strictly the laws of the game, such as, "If you touch a piece, you must move it somewhere; if you set it down, you must let it stand:" and it is therefore best that these rules should be observed, as the game thereby becomes more the image of human life, and particularly of war; in which, if you have incautiously put yourself into a bad and dangerous position, you cannot obtain your enemy's leave to withdraw your troops, and place them more securely, but you must abide all the consequences of your rashness. And lastly, we learn by chess the habit of not being discouraged by present bad appearances

appearances in the state of our affairs, the habit of hoping for a favourable change, and that of persevering in the search of resources. The game is so full of events, there is such a variety of turns in it, the fortune of it is so subject to sudden vicissitudes, and so frequently, after long contemplation, one discovers the means of extricating oneself from a supposed insurmountable difficulty, that we are encouraged to continue the contest to the last, in hopes of victory by our own skill, or at least of giving a stale-mate by the negligence of our adversary. And whoever considers, what in chess he often sees instances of, that particular pieces of success are apt to produce presumption, and its consequent inattention, by which the loss may be recovered, will learn not to be too much discouraged by the present success of his adversary, nor to despair of final good fortune, upon every little check he receives in the pursuit of it.

CHESS-BOARD, *s.* The board or table on which the game of chess is played:

And cards are dealt, and *chess-boards* brought
To ease the pain of coward thought. *Prior.*

CHESS-MAN, *s.* A puppet for chess.—A company of *chess-men* standing on the same squares of the chess-board where we left them, we say they are all in the same place, or unmoved. *Locke.*

CHESS-PLAYER, *s.* A gamester at chess.—Thus, like a skilful *chess-player*, he draws out his men, and makes his pawns of use to his greater persons. *Dryden.*

CHESS-PLAYER artificial; see AUTOMATON, vol. ii. p. 579.

CHESS-TREES, in ship-building. See NAVAL ARCHITECTURE.

CHES'SOM, *s.* Mellow earth.—The tender *chessom* and mellow earth is the best, being mere mould, between the two extremes of clay and sand; especially if it be not loomy and binding. *Bacon.*

CHES'SY, a town of France, in the department of the Rhone and Loire: four leagues north-west of Lyons.

CHEST, *s.* [cyꞅꞇ, Sax. *cista*, Lat.] A box of wood, or other materials, in which things are laid up:

But more have been by avarice opprest,
And heaps of money crouded in the *chest*. *Dryden.*

A chest of drawers, a case with moveable boxes or drawers. The trunk of the body, or cavity from the shoulders to the belly.—Such as have round faces, or broad *chests*, or shoulders, have seldom or never long necks. *Brown.*

To CHEST, *v. a.* To reposite in a chest; to hoard.

CHEST-FOUN'DERING, *s.* A disease in horses. It comes near to a pleurisy, or peripneumony, in a human body. See FARRIERY.

CHEST'ED, *adj.* Having a chest; as, broad-chested, narrow-chested, &c.

CHES'TER, a very ancient city, the capital of Cheshire, situated on the river Dee, about twenty miles from the Irish sea, a considerable time the station of the twentieth Roman legion, the command of which was given to Julius Agricola, by the emperor Vespasian, and of course must have been built before his time, but probably not many years, though fanciful writers have dated its antiquity to a remote period indeed. It is seated on the western side of the county, distant about twenty miles east from Denbigh; forty north from Shrewsbury; forty-six north-west from Stafford; seventy-six north-west from Derby; and seventy-five south from Lancaster. Lat. 53° 15′ N. lon. 3° 2′ W. from London; its distance from the latter city being 182 miles. Mr. Pennant very concisely describes it in the following words: "The city is of a square form; which evinces the origin to have been Roman, being in the figure of their camps, with four gates facing the four cardinal points, four principal streets, and a variety of lesser, crossing the others at right angles, dividing the whole into lesser squares. The walls are built on a soft free-stone rock, high above the circumjacent country;" and are said to have been built by the Mercian lady Ethelfleda. "The structure of the four principal streets is without a parallel; they run direct from east to west, and north to south, and were excavated out of the earth, and sunk many feet beneath the surface. The carriages are driven far below the level of the kitchens, on a line with ranges of shops, over which passengers walk in galleries, which the inhabitants call the rows, secure from wet or heat. In the rows are ranges of shops," and steps to descend into the street.

Such is the antiquity of Chester, that the stranger, who can pass through without bestowing on it some little share of attention, must have an incurious eye indeed.—The exploring hand of time has, at different periods, presented to the antiquarian some valuable treasures: among these, is a Roman altar, erected by Flavius Longus, tribune of the victorious 20th legion, and his son Longinus, in honour of the emperors Dioclesian and Maximinian; another, discovered in 1653, (now at Oxford,) inscribed to Jupiter; also, a statue of Mithras, and a beautiful altar, with other Roman antiquities, found in the yacht field in 1779; the coins of Vespasian, Constantius, Trajan, Adrian, &c. have at different times been found; and there is little doubt but Chester is still rich in records of antiquity, which the researches of posterity may possibly discover.

The city contains nine parish churches, a Roman Catholic chapel, and six places of worship for Dissenters of different persuasions. It is said to have been first erected into a corporation in 1242, and is now governed by a mayor, recorder, aldermen, sheriffs, common councilmen, &c. The city walls are kept in repair by an officer, called a Murenger, and a rate called murage, on all imports by persons not free of the city. The custody of the gates of Chester was committed to very considerable noblemen: East-gate, to the earl of Oxford; Bridge-gate, to the earl of Shrewsbury; Water-gate, to the earl of Derby; and North-gate, to the mayor. The principal manufacture is gloves: and its fairs are resorted to three times a year by a great concourse of the Irish linen merchants. The castle is a noble structure, having a tower ascribed to Julius Cæsar, and bearing his name, which, as well as its workmanship, prove it to have been originally built by the Romans, though the present walls are evidently Norman. The number of inhabitants, including the suburbs, is estimated at 15,000. Here Henry II. and Malcolm IV. of Scotland, had an interview in 1159, and the latter ceded the three counties of Northumberland, Cumberland, and Westmoreland, formerly wrested from the English crown. Richard II. in his 21th year, converted Chester into a principality, annexing it to the castle of Holt, the lordship of Bromfield and Yale, Chirkland, and several other places in Wales and on the borders, enacting that it should be given only to the king's eldest son. But Henry IV. rescinded an act that encroached so much on the dignity of his son as prince of Wales. The king's eldest is, however, created earl of Chester. The sweating sickness destroyed here, in 1506, ninety-one householders in three days, and only four women; and was followed, in 1517, by a dreadful pestilence. A more grievous one visited it in 1647, after it was taken by the parliament forces, under sir William Brereton, having held out a twenty weeks siege, and surrendered February 3d, 1645-6, on terms that did honour to the spirit of the besieged. The markets are kept on Wednesdays and Saturdays. The fairs on the last Thursday in February for cattle; July 5, and October 10, for cattle, cloth, hardware, hops, and Manchester goods.

The Exchange is a large handsome pile, supported by five columns in the centre. It is 126 feet long, and forty-six broad; and has a row of shops on the west side. The year 1698 was the time of its erection, in the mayoralty of colonel Robert Whitley. The quarter sessions, and the annual election of city officers, are held here in a large

large commodious common-hall. The exchange also contains a mansion-house, for the occasional entertainment of the corporate body.

The Cathedral stands on the east side of the Northgate-street; the reigns of Henry VI. VII. and VIII. are mentioned as the periods in which the greater part of this sacred edifice was erected. Simon Ripley, chosen abbot in 1485, built the broad-aisle. The abbey, which gave birth to this see, was of such antiquity as to have been a nunnery more than eleven hundred years ago. The neatness of the choir, and the Gothic appearance of the tabernacle-work, have a pleasing effect on the eye. The bishop's throne, which is superbly ornamented, is said to have been the ancient shrine of St. Werberg. There are in this see two archdeaconries, Chester and Richmond; it is a suffragan to York; and the diocese includes Cheshire and Lancashire, a part of Cumberland, Westmoreland, Flintshire, and Denbighshire. It contains 256 parishes, 101 of which are impropriate. The bishopric is valued in the king's books at 420l. 1s. 8d. and the tenths of the clergy amount to 435l. 12s. per annum. The first bishop of Chester was John Bird, in 1541.

The church of St. John Baptist stands without the walls, in a most delightful situation, on the east side of the city; it was once collegiate, and was founded by king Ethelred, in 689, in consequence of a visionary admonition, to build it on the spot where he should find a white hind. The west side of the steeple now presents an imperfect figure of this legend. The church is a magnificent pile, and evidently of Saxon origin; there are no remains of the north and south transepts, and a great part of the east end is demolished by the fall of the centre tower. The chapels above the old choir (now the parish church) present melancholy pictures of the ravages of time; to the eye of the antiquary, these ruins are a rich feast. Here is an anchorite's cell, where Harold, after his defeat at Hastings, is said to have closed his eyes.

Among the many public charities which distinguish this city, there is an excellent foundation for thirty decayed freemen, to each of whom is allowed the sum of 4l. annually, and a gown every third year. Here are thirty alms-houses, exclusive of six behind the Bluecoat-school: namely, ten in St. Michael's parish; four in St. John's; six in Commonhall-lane; six in St. Olave's parish; and four in Trinity.

Four miles from the city is Eaton-hall, the fine seat of Earl Grosvenor, and the spacious forest of Delamere. They say here was formerly an old city, now called the Chamber on the Forest, probably some fort or camp to secure the road. From hence is a fine prospect of the Welsh mountains.

The jurisdiction court of the county palatine of Chester, is under the magistracy of the city. Where felony is committed by any inhabitant of the palatine of Chester, in another county, process shall be made to the exigent where the offence was done, and, if the offender then fly into the county of Chester, the outlawry shall be certified to the officers there. 1 *H.* 4. *c.* 18. The sessions for the county palatine of Chester, is to be kept twice in the year, at Michaelmas and Easter: and justices of peace in Chester shall be nominated by the Lord Chancellor. Stats. 32 *H.* 8. *c.* 43. 33 *H.* 8. *c.* 13. Recognisances of statutes-merchant may be acknowledged, and fines levied before the mayor of Chester, for lands lying there. 2 & 3 *Ed.* 6. *c.* 31. But no writ of protection shall be granted in the county palatine.

CHES'TER, a town of the American States, in Lunenburg county, Nova Scotia, on Mahone bay, settled originally by a few families from New-England. From Windsor it is twenty-five miles.

CHES'TER, a town of the American States, in Hampshire county, Massachusetts, adjoining Westfield on the east, and about twenty miles north-west of Springfield. It contains 1119 inhabitants.

CHES'TER, a large, pleasant, and elegant town of the American States, in Rockingham county, New-Hampshire. It is twenty-one miles in length; and on the west side is a large lake, which sends its waters to Merrimack river. It was incorporated in 1722, and contains 1902 inhabitants, who are chiefly farmers. It is situated on the east side of Merrimack river, fourteen miles north-west of Haverhill, as far west of Exeter, thirty-five west by south of Portsmouth, six northerly of Londonderry, and 306 from Philadelphia. From the compact part of this town there is a gentle descent to the sea, which, in a clear day, may be seen from thence. It is a post town, and contains a congregational church. Rattlesnake hill, in this township, is a great curiosity: it is half a mile in diameter, of a circular form, and 400 feet high. On the south side, ten yards from its base, is the entrance of a cave, called the Devil's Den, which is a room fifteen or twenty feet square, and four feet high, floored and circled by a regular rock, from the upper part of which are dependent many excrescences, nearly in the form and size of a pear, which, when approached by a torch, throw out a sparkling lustre of almost every hue. It is a cold, dreary place, of which many frightful stories are told by those who delight in the marvellous.

CHES'TER, a town of the American States, in Windsor county, Vermont, west of Springfield, and eleven miles west by south of Charlestown, in New-Hampshire, and contains 981 inhabitants.

CHES'TER, a borough and post town of the American States, in Pennsylvania, and the capital of Delaware county, pleasantly situated on the west side of Delaware river, near Marcus Hook, and thirteen miles north-east of Wilmington. It contains a court house and a goal. From Chester to Philadelphia is twenty miles by water, and fifteen north-east by land; here the river is narrowed by islands of marsh, which are generally banked, and turned into rich and valuable meadows. The first colonial assembly was convened here, the 4th of December, 1682. The place affords genteel inns and good entertainment, and is the resort of much company from the metropolis, during the summer season. It was incorporated in December, 1795, and is governed by two burgesses, a constable, a town-clerk, and three assistants.

CHES'TER, a county of the American States, in Pennsylvania, west of Delaware county, and south-west of Philadelphia; about forty-five miles in length, and thirty in breadth. It contains thirty-three townships, of which West-Chester is the shire town, and 27,937 inhabitants. Iron ore is found in the northern parts, which employs six forges. These manufacture about 2000 tons of bar-iron annually.

CHES'TER, a town of the American States, in Shannandoah county, Virginia, situated on the point of land formed by the junction of Allen's or North River, and South River, which form the Shannandoah; sixteen miles south by west of Winchester. Lat. 39. 2. N. lon. 78. 22. W.

CHES'TER, a county of the American States, in Pinckney district, South Carolina, on Wateree river, containing 6866 inhabitants. It sends two representatives, but no senator, to the state legislature.

CHES'TER, a town of the American States, in Cumberland county, Virginia, situated on the south-west bank of James river, fifteen miles north of Blandford, and six south of Richmond.

CHES'TER-RIVER, a navigable water of the eastern shore of Maryland, which rises two miles within the line of Delaware state, by two sources, Cyprus and Andover creeks, which unite at Bridgetown; runs nearly south westward; after passing Chester it runs south nearly three miles, when it receives south-east creek, and fifteen miles farther, in a south-west direction, it empties into Chesapeak bay, at Love point. It forms an island at its mouth, and by a channel on the east side of Kent Isle, communicates with Eastern bay.

CHES'TER LE STREET, an ancient town, in the county

county of Durham, through which runs the great post-road from London to Edinburgh, six miles north from the city of Durham, and nine miles south from Newcastle-upon-Tyne. It is pleasantly situated in a valley, upon the west side of the river Wear. It derives much benefit from the great number of coal-mines carried on in its neighbourhood. The town consists of only one street, about three quarters of a mile long, running nearly north and south. Camden informs us, that it was a Roman station, and the first wing of the Astures lay there in garrison. It was called *Chester on the Street*, from its being on the Roman causeway. The Saxons called it *Concester*, or *Conkchester*, from a rivulet called *Cone*, which runs through the north end of it, over which is a small stone bridge of three arches, noticed by Leland in his Itinerary. In the year 882, Eardulph, bishop of Lindisfarn, or Holy Island, fled to this place with his clergy and the remains of St. Cuthbert, as a place of safety from the cruelty of the Danes, who had pillaged Holy Island, and were carrying all before them with fire and sword. After raising a church of wood, the see was fixed here, which continued for 113 years, in a succession of eight bishops: and from hence it was removed in 995, by Aldhunus the last bishop, to Durham. Egelrick, the fourth bishop, took down this church of wood and raised one of stone; in digging the foundation of which, he found such a large sum of money (buried, as was supposed, by the Romans), that he gave up the bishopric, and returned to the monastery of Peterborough, where he had been abbot. The church was dedicated to St. Mary and St. Cuthbert, and was a rectory till 1286, when Anthony Beck, then bishop of Durham, made it a collegiate church, with a dean, seven prebendaries, five chaplains, three deacons, and other ministers. The church, though low, is well built, and the inside is very neat. In the north aisle, is a very fine arrangement of monuments of the ancient and noble family of the Lumleys, beginning at Liulphus in the time of the Conqueror, down to the reign of queen Elizabeth, erected, by John lord Lumley, in 1595. There is a fine spire on this church, supposed to be the neatest in the north of England.

About a mile east, on the opposite side of the Wear, on a most delightful rising ground, stands Lumley Castle, the ancient seat of the Lumleys, but now of the right honourable lord Scarborough. An anecdote of James I. has been handed down here with much pleasantry, and is regarded as authentic. The king, with the bishop of Durham, paid a visit to lord Lumley, at this castle, when his lordship entertained his majesty with shewing him a very beautiful, long, and uninterrupted, pedigree of his family. The king, wearied with its length, desired his lordship to allow him to digest what knowledge he had got; "for by my saul (exclaims his majesty) I did na ken that Adam's name was Lumley."

CHES'TER RIDGE, a mountain of United America, in the state of Pennsylvania, in which iron and lead ores are found: 140 miles west-north-west of Philadelphia.

CHES'TERFIELD, the chief town in the beautiful and fertile vale of Scarsdale, and the second considerable town in the county of Derby, is pleasantly situated between two rivulets, the Hyper and Rother, in a prolific soil. The Saxon name of *Chester* proves it to be a place of antiquity. It contains, in the town and neighbourhood immediately adjoining, near 1000 houses and about 5000 inhabitants, and is a very flourishing and increasing place. It has a silk and a cotton-mill, a manufactory of worsted and cotton stockings, carpets, &c. Ten potteries are established here; and near the town are large iron foundries, the ore and coal for which are dug in the neighbourhood. Large quantities of lead are sent from Chesterfield by the new canal, cut from this place to the river Trent, which it joins below Gainsborough. This conveyance also serves for the iron and other heavy goods; much corn, groceries, &c. are also brought up, to the great benefit of the town and neighbourhood.

Chesterfield was formerly an ancient demesne belonging to the crown. King John made it a free borough, and in the 6th year of his reign gave it his great favourite, William Briever; he likewise granted it the same privileges as were enjoyed by the towns of Nottingham and Derby. By his charter he established a fair during eight days, beginning at the Exaltation of the Holy Cross; and two weekly markets, on Tuesdays and Saturdays, the former of which has been long discontinued. In the year 1294, a guild of merchants was granted to the town, with all privileges appertaining thereto, and it was governed by an alderman and twelve brethren, until the reign of Queen Elizabeth, who first incorporated it under the name of the mayor, six aldermen, six brethren, and twelve capital burgesses, who are assisted by a town-clerk. It gives title of earl to the family of Stanhope.

The church is a large handsome structure, with eight bells, built in the form of a cathedral, and dedicated to All Saints. The spire, which rises to the height of 230 feet, is covered with lead; and, by its extraordinary appearance, (for, on whatever side you view it, it appears not only twisted, but to lean,) surprizes every spectator.

The free-school was founded in the reign of queen Elizabeth, and was formerly one of the largest in the north of England. The master and usher are both clergymen. Here are several alms-houses; six situated within the Saltern-gate, and five others situated in the church-yard.

Chesterfield has more than once been visited by that dreadful calamity the plague. It began in October 1586, and was called the great plague, to distinguish it from a less fatal infection which broke out in 1608-9. That venerable antiquary, Dr. Pegge, has given a particular account of this; and has traced the Roman road called the Iknild, or Rignell-street, to the very suburbs of the town. He has also given a particular account of the battle fought at Chesterfield in the reign of Henry III. in 1266, and published several antiquities of the neighbourhood, which may be seen in the Archæologia.

The market, which is on Saturdays, is large, and well supplied with corn, provisions, &c. and the fairs are on January 27, February 28, the first Saturday in April, May 4, July 4, September 25, and November 25. Chesterfield is distant from Sheffield twelve miles, Derby twenty-six, Buxton twenty-three, and 149 from London.

Hardwick-Hall and Chatsworth, two noble seats belonging to the duke of Devonshire, are in the neighbourhood of Chesterfield.

Bolsover-Castle, the seat of the duke of Portland, is six miles from this town; it stands on a rising ground, and commands one of the finest prospects in England. At the distance of two miles, is Whittington, where the earl of Devonshire, the earl of Danby, and their coadjutors, used to meet and consult on the means of bringing about the glorious revolution. The room called the plotting-parlour, and the chair in which the earl of Devonshire used to sit, is still to be seen.

CHES'TERFIELD, a town of the American States, in Hampshire county, Massachusets, fourteen miles west of Northampton. It contains, by the census, 1183 inhabitants.

CHES'TERFIELD, a town of the American States, in Cheshire county, New-Hampshire, on the east bank of Connecticut river, having Westmoreland north and Hinsdale south. It was incorporated in 1752, and contains 1905 inhabitants. It lies about twenty-five miles south by west of Charlestown, and 100 west of Portsmouth. About the year 1730, the garrison of fort Dummer was alarmed with frequent explosions and with columns of fire and smoke emitted from West-river mountain, in this township, and four miles distant from that fort. The like appearances have been observed at various times since;

ſince; particularly one in 1752, was the moſt ſevere of any. There are two places, where the rocks bear traces of having been heated and calcined, and evident marks of an approaching volcano.

CHES'TERFIELD, a county of the American States, in South Carolina, in Cheraws diſtrict, on the north Carolina line. It is about thirty miles long, and twenty-nine broad.

CHES'TERFIELD, a county of the American States, in Virginia, between James and Appamatox rivers. It is about thirty miles long, and twenty-five broad; and contains 14,214 inhabitants.

CHES'TERFIELD INLET, on the weſt ſide of Hudſon's-bay, in New South Wales, upwards of 200 miles in length, and from ten to thirty in breadth; full of iſlands.

CHESTER'FIELD (earl of). See HERALDRY, and STANHOPE.

CHES'TERTOWN, a poſt town of the American States, and the capital of Kent county, Maryland, on the weſt ſide of Cheſter river, ſixteen miles ſouth-weſt of Georgetown, thirty-eight eaſt by ſouth from Baltimore, and eighty-one ſouth-weſt of Philadelphia. It contains a college, court-houſe, and gaol. The college was incorporated in 1782, by the name of Waſhington. It is under the direction of twenty-four truſtees, who are empowered to ſupply vacancies and hold eſtates, whoſe yearly value ſhall not exceed 6000l. currency. In 1787, it had a permanent fund of 1250l. a year ſettled upon it by law. Lat. 39. 12. N. lon. 75. 57. W.

CHEST'NUT, *ſ.* [*chaſtaigne*, Fr. *caſtanea*, Lat.] The fruit of the cheſtnut tree:

A woman's tongue,
That gives not half ſo great a blow to th' ear,
As will a *cheſtnut* in a farmer's fire. *Shakeſpeare.*

The name of a brown colour:

Merab's long hair was gloſſy *cheſtnut* brown. *Cowley.*

CHEST'NUT, *ſ.* in botany. See FAGUS.

CHEST'NUT, HORSE, *ſ.* in botany. See ÆSCULUS.

CHE'TA, a river of Siberia, which runs into the Chatanga. Lat. 70. 20. N. lon. 125. 15. E. Ferro.

CHE'TA, a river of Ruſſia, which runs into the Eniſei. Lat. 69. 40. N. lon. 103. E. Ferro.

CHETE'CAN HEAD, a cape on the weſt coaſt of the iſland of Cape Breton. Lat. 46. 40. N. lon 60. 45. W. Greenwich.

CHETI'MACHAS, a lake of North America, in Louiſiana, near the mouth of the Miſſiſſippi, twenty-four miles long, and nine broad. Lake de Portage, which is thirteen miles long, and one and a half broad, communicates with this lake at the northern end, by a ſtrait a quarter of a mile wide. The country bordering on theſe lakes, is low and flat, timbered with cypreſs, live and other kinds of oak; and on the eaſtern ſide, the land between it and the Chatalaya river is divided by innumerable ſtreams, which occaſion as many iſlands. Some of theſe ſtreams are navigable. A little diſtance from the ſouth eaſtern ſhore of the lake Chetimachas, is an iſland where perſons paſſing that way generally halt as a reſting place. Nearly oppoſite this iſland, there is an opening which leads to the ſea. It is about 150 yards wide, and has ſixteen or ſeventeen fathom water.

CHET'TENHAM, a town of the American States, in Montgomery county, Pennſylvania.

CHE'TRAN, a town of Arabia: ſix miles ſouth of Kalaba.

CHE'VAGE, *ſ.* [*chevagium*, Lat. from the Fr. *chef*, head.] A tribute or ſum of money, formerly paid by ſuch as held lands in villenage to their lords, in acknowledgment, and was a kind of head or poll money. Of which Bracton, *lib.* 1. *cap.* 10, ſays thus; Chevagium *dicitur recognitio in ſignum ſubjectionis & dominii de capite ſuo.* Lambard writes this word *chivage*; but it is more properly *chiefage*: and anciently the Jews, whilſt they were admitted to live in England, paid chevage or poll-money to the king, as appears by 8 *Edw.* 1. It ſeems alſo to be uſed for a ſum of money, yearly given to a man of power for his protection, as a chief head or leader: but Lord Coke ſays, that in this ſignification, it is a great miſpriſon for a ſubject to take ſums of money, or other gifts yearly of any, in name of *chevage*, becauſe they take upon them to be their chief heads or leaders, *Co. Lit.* 140. Spelman in *v. Chevagium* ſays, it is a duty paid in Wales, *pro filiabus maritandis.*

CHEVA'GNES, a town of France, in the department of the Allier, and chief place of a canton, in the diſtrict of Moulins: nine miles eaſt of Moulins.

CHEVALIER', *ſ.* [*chevalier*, Fr.] A knight; a gallant ſtrong man:

Renowned Talbot doth expect my aid;
And I am lowted by a traitor villain,
And cannot help the noble *chevalier.* *Shakeſpeare.*

CHEVALIER', with horſemen, is when a horſe in paſſaging upon a walk or trot, his far fore-leg croſſes or overlaps the other fore-leg every time or motion.

CHEVAN'CY LE CHA'TEAU, a town of the Netherlands, in the duchy of Luxemburg, about three miles from Montmedy.

CHE'VAUK DE FRISE, *ſ.* [Fr. The ſingular *Cheval de Friſe* is ſeldom uſed.] The Frieſland horſe, which is a piece of timber, larger or ſmaller, and traverſed with wooden ſpikes, pointed with iron, five or ſix feet long; uſed in defending a paſſage, ſtopping a breach, or making a retrenchment to ſtop the cavalry. It is alſo called a turnpike or tourniquet.

CHE'VEN, *ſ.* [*cheveſne*, Fr.] A river fiſh, the ſame with chub.

CHE'VERIL, *ſ.* [*chevereau*, Fr.] A kid; kid-leather. *Obſolete.*—O, here's a wit of *cheveril*, that ſtretches from an inch narrow to an ell broad. *Shakeſpeare.*

CHE'VERNY, a town of France, in the department of the Loire and Cher: ſeven miles ſouth of Blois.

CHEVIL'LY, a town of France: five miles ſouth of Paris.

CHE'VIOT HILLS, are hills in the county of Northumberland, near which was a free chace called *Cheviot*, corruptly *Chevy Chace*, the ſeat of the encounter between the Percies and the Douglaſſes, celebrated in the ancient popular ſong: ſix miles from the borders of Scotland, and eighteen ſouth of Berwick.

CHEVI'RE, a town of France, in the department of the Mayne and Loire: five miles north-weſt of Baugé.

CHE'VISANCE, *ſ.* [from *chevir*, Fr. i. e. *Venir à chef de quelque choſe*, to come to the head or end of a buſineſs.] An agreement or compoſition made; an end or order ſet down between a creditor or debtor; or ſometimes an indirect gain in point of uſury, &c. In ſome ancient ſtatutes it is often mentioned, and ſeems commonly uſed for an unlawful bargain or contract. In the ſtat. 13 *Eliz. c.* 7, it is uſed ſimply, in the ſenſe explained by Dufreſne, for making contracts.

CHEVREAU' (Urban), was born at Loudun, in France, in 1613. His inclination led him to the ſtudy of the belles lettres, in which he made ſo conſiderable progreſs, that he obtained a diſtinguiſhed rank among the learned. His application to letters however did not unqualify him for buſineſs; for he was a man of great addreſs and knowledge of the world, and on that account advanced to be ſecretary to Chriſtina queen of Sweden. The king of Denmark engaged him alſo at his court. Several German princes entertained him, and among the reſt the elector palatine Charles Lewis, father to the ducheſs of Orleans. At his return to Paris, he was made preceptor and afterwards ſecretary to the duke of Mayne. Then he retired to Loudun, where he died in 1701, almoſt 88 years of age. He was the author of an Univerſal Hiſtory, which was much eſteemed.

CHEVRE'GNY, a town of France, in the department of

of the Aiſne, and chief place of a canton, in the diſtrict of Laon: five miles ſouth of Laon.

CHE'VRES, a town of France, in the department of the Charente: eighteen miles eaſt of Angoulesme.

CHEVREU'SE, a town of France, in the department of the Seine and Oiſe, and chief place of a canton, in the diſtrict of Verſailles: eight miles ſouth-weſt of Verſailles.

CHEVRON', *ſ.* [French.] One of the honourable ordinaries in heraldry. It repreſents two rafters of a houſe ſet up as they ought to ſtand.

CHEUX, a town of France, in the department of Calvados, and chief place of a canton, in the diſtrict of Caen: two leagues weſt of Caen.

To CHEW, *v. a.* [ceopyan, Sax. *kauwen*, Dutch. It is very frequently pronounced *chaw*, and perhaps properly.] To grind with the teeth; to maſticate.—By *chewing*, ſolid aliment is divided into ſmall parts: in a human body, there is no other inſtrument to perform this action but the teeth. By the action of *chewing*, the ſpittle and mucus are ſqueezed from the glands, and mixed with the aliment; which action, if it be long continued, will turn the aliment into a ſort of chyle. *Arbuthnot.*—To meditate; or ruminate in the thoughts:

While the fierce monk does at his trial ſtand,
He *chews* revenge, abjuring his offence;
Guile in his tongue, and murder is his hand,
He ſtabs his judge, to prove his innocence. *Prior.*

To taſte without ſwallowing:

Heaven's in my mouth,
As if I did but *chew* its name. *Shakeſpeare.*

Some books are to be taſted, others to be ſwallowed, and ſome few to be *chewed* and digeſted: that is, ſome books are to be read only in parts; others to be read, but not curiouſly; and ſome few to be read wholly, with attention. *Bacon.*

To CHEW, *v. n.* To champ upon; to ruminate:

Old politicians *chew* on wiſdom paſt,
And blunder on in buſineſs to the laſt. *Pope.*

CHEYNE (George), a phyſician of great learning and abilities, born in Scotland in 1671, and educated at Edinburgh under Dr. Pitcairn. He paſſed his youth in cloſe ſtudy, and with great temperance; but coming to London, when about thirty, and finding the younger gentry and free-livers to be the moſt eaſy of acceſs and moſt ſuſceptible of friendſhip, he changed on a ſudden his former manner of abſtemious living, in order to force a trade, having obſerved this method to ſucceed with ſome others. The conſequence was, that he grew daily in bulk, and in intimacy with his gay acquaintance; ſwelling to ſuch an enormous ſize, that at length he exceeded thirty-two ſtone weight; and was forced to have the whole ſide of his chariot made open to receive him. He grew ſhort-breathed, lethargic, nervous, and ſcorbutic; ſo that his life became a burden to him. In this deplorable condition, after having tried all the power of medicine in vain, he reſolved to try a milk and vegetable diet; the good effects of which quickly appeared. His ſize was gradually reduced, and he recovered his ſtrength, activity, and cheerfulneſs, with the perfect uſe of all his faculties. In ſhort, by a regular adherence to this regimen, he lived to a mature age, dying at Bath in 1740, aged 72. He wrote ſeveral treatiſes that were well received; particularly an Eſſay on Health and Long Life, and The Engliſh Malady, or a Treatiſe of Nervous Diſeaſes; both the reſult of his own experience. In ſhort, he had great reputation in his own time, both as a practitioner and as a writer; and moſt of his books paſſed through ſeveral editions. He is to be ranked among thoſe phyſicians who have accounted for the operations of medicines, and the morbid alterations which takes place in the human body, upon mechanical principles. A ſpirit of piety and of benevolence, and an ardent zeal for the intereſts of virtue, are predominant throughout his writings.

CHE'ZE (La), a town of France, in the department of the North Coaſts, and chief place of a canton, in the diſtrict of Loudeac: one league and a half ſouth-eaſt of Loudeac.

CHE'ZERY, a town of Savoy, ceded to France in the year 1760.

CHE'ZY l'ABBAYE, a town of France, in the department of the Aiſne, and chief place of a canton, in the diſtrict of Chateau Thierry: one league and a half ſouth-ſouth-weſt of Chateau Thierry.

CHI-HING, a town of China, of the third rank, in the province of Quang-tong: ſix leagues ſouth-weſt of Nan-yong.

CHI'A, *ſ.* [from Χιος, an iſland where they are propagated]. A ſweet fig of the iſland of Chio or Scio. Alſo an earth from that iſland, formerly uſed in fevers, but long ſince diſcontinued.

CHIABRE'RA (Gabrielo), an Italian poet, born at Savone in 1552. He went to ſtudy at Rome, where Aldus Manutius and Muretus gave him their friendſhip, and aided him with their counſels. Urban VIII. and the princes of Italy, honoured him with many public marks of eſteem. In 1624, Urban, himſelf a poet, as well as a protector of poets, invited him to Rome for the holy year; but Chiabrera excuſed himſelf, on account of old age and infirmities. He died at Savone in 1638, aged 86. As he was one of the greateſt wits, ſo he had another ſingularity, which was, to be one of the ugliest men in Italy. He left heroic, dramatic, paſtoral, and lyric, poems, which were collected and publiſhed at Rome, in 1718, 8vo. by the abbé Paolucci. His lyrics are ſaid to be the moſt eſteemed.

CHIAMET'LAN, a maritime province of Mexico, in North America, with a town of the ſame name, ſaid to be thirty-ſeven leagues either way, from north to ſouth or from eaſt to weſt. It is very fertile, contains mines of ſilver, and produces a great deal of honey and wax. The native Indians are well made and warlike. The river St. Jago empties into the ſea here, north-weſt from the point of St. Blas. The chief town is St. Sebaſtian.

CHIAMET'LAND-ISLANDS, a cluſter of ſmall iſlands in the Pacific Ocean, near the coaſt of Mexico. Lat. 22. 20. N. lon. 86. 40. W. Ferro.

CHIAM'PA, a country of Aſia, bounded on the north by the deſert of Cochinchina, on the eaſt and ſouth by the Indian Sea, and on the weſt by Cambodia. It is little known.

CHIA'NA, a river of Italy, which joins the Tiber, about ten miles ſouth of Orvieto.

CHIAN'NI, a town of Italy, in the duchy of Tuſcany: ſixteen miles eaſt-ſouth-eaſt of Leghorn.

CHIANT'LA, a town of Mexico, in the province of Chiapa: 100 miles ſouth-eaſt of Chiapa dos Eſpagniolos.

CHI'AOUS, *ſ.* a word in the original Turkiſh, ſignifying "envoys," are officers to the number of 5 or 600 in the grand ſignior's court, under the command of a chiaous baſchi. They frequently meet in the grand viſier's palace, that they may be in readineſs to execute his orders, and carry his diſpatches into all the provinces of the empire. The chiaous baſchi aſſiſts at the divan, and introduces thoſe who have buſineſs there.

CHIA'PA, a river and inland province of Mexico or New-Spain, in the audience of Mexico. This province is bounded by Tobaſco on the north; by Yucatan north-eaſt; by Socunuſco ſouth-eaſt; and by Vera Paz on the eaſt. It is eighty-five leagues from eaſt to weſt, and about thirty where narroweſt, but ſome parts are near 100. It abounds with woods of pine, cypreſs, cedar, oak, walnut, wood-vines, aromatic gums, balſams, liquid amber, tacamahaca, copal, and others, that yield pure balſams; alſo with corn, cocoa, cotton, and cochineal; pears, apples, quinces, &c. Here they have achiotte, which the natives mix

mix with their chocolate to give it a bright colour. Chiapa abounds with cattle of all sorts; it is famous for a fine breed of horses, so valuable, that they send their colts to Mexico, though 500 miles distant. Beasts of prey are here in abundance, with foxes, rabbits, and wild hogs. In this province there is variety of snakes, particularly in the hilly parts, some of which are said to be twenty feet long, others of a curious red colour, and streaked with white and black, which the Indians tame, and put them about their necks. The Chiapese are of a fair complexion, courteous, understand music, painting, and mechanics, and are obedient to their superiors. The principal river is that of Chiapa, which running from the north through the country of the Quelens, falls into the sea at Tabasco. It is well watered; and by means of Chiapa river, they carry on a brisk trade with the neighbouring provinces, which chiefly consists in cochineal and silk; in which last commodity the Indians employ their wives for making handkerchiefs of all colours, which are bought up by the Spaniards and sent to Europe. Though the Spaniards reckon this one of their poorest provinces in America, as having no mines of gold or silver, nor any harbour on the South Sea, yet in size it is inferior to none but Guatimala. Besides, it is a place of great importance to the Spaniards, because the strength of all their empire in America depends on it; and into it is an easy entrance by the river Tabasco, Puerto Real, and its vicinity to Yucatan.

CHIA'PA, the name of two towns in the above province; the one is sometimes called *Cividad Real*, or the Royal city, and the other *Chiapa de los Indos*, inhabited by Spaniards. Cividad Real is a bishop's see, and the seat of the judicial courts. It is delightfully situated on a plain, surrounded with mountains, and almost equally distant from the north and south seas, and 200 leagues north-west from Guatimala. The bishop's revenue is 8000 ducats a year. It has several monasteries; and the cathedral is an elegant structure. This city is governed by magistrates chosen amongst the burgesses of the town, by a particular privilege granted them by the king of Spain. Lat. 17. N. lon. 96. 40. W.

The other town, called *Chiapa de los Indos*, that is, as belonging to the Indians, is the largest they have in this country, and lies in a valley near the river Tabasco, which abounds with fish, and is about twelve leagues north-west of Chiapa, or Cividad Real. The celebrated Bartholomew de las Casas, the friend of mankind, was the first bishop of Chiapa; and, having complained to the court of Madrid of the cruelties of the Spaniards here, procured the people great privileges, and an exemption from slavery. This is a very large and rich place, with many cloisters and churches. On the river they have several boats, in which they often exhibit sea-fights and sieges. In the environs are several farms well stocked with cattle, and some sugar plantations.

CHIAREN'ZA, or CLARENCE, a town of European Turkey, on the west coast of the Morea, near the Mediterranean, near the river Sillus, once a considerable place, but now almost ruined: eighty-four miles south-west of Livadia, and eighty west of Corinth.

CHIA'RI, a town of Italy, in the Bressan, between Brescia and Crema, where the Imperialists obtained a victory over the French in 1701: twelve miles west of Brescia.

CHIA'RI (Joseph), a celebrated Italian painter, was the disciple of Carlo Maratti; and adorned the churches and palaces of Rome with a great number of fine paintings. He died of an apoplexy in 1727, aged 73.

CHIAROMON'TE, a town of Sicily, in the Valley of Noto: twenty-five miles west of Syracuse.

CHIAS'CIO, a river of Italy, which runs into the Tiber, near Torsciano.

CHIASEL'LIS, a town of Italy, in the country of Friuli, belonging to the state of Venice: seven miles west of Palma-la-Nuova.

CHIAVA'N, a town of Persia, in the province of Ghilan: 120 miles north-west of Reshd.

CHIAVA'RI, a town of Italy, in the state of Genoa: fifteen miles west-north-west of Brugneto.

CHIAVEN'NA (County of), a country of Swisserland, in alliance with the Grisons, situated at the foot of the Rhetian Alps, to the north of the lake of Como, about eight leagues long, and six wide. The country is for the most part fertile in wine and pastures. The inhabitants raise a good deal of silk; but not corn sufficient for their wants; this they obtain of their neighbours for cattle, wine, and silk. The inhabitants are Catholics, and depend on the bishop of Como for spiritual matters. It came under the Grisons at the same time with the Valteline, and is governed by a commissary.

CHIAVEN'NA, a town of Swisserland, and capital of the county of the same name. It is situated at the foot and upon the side of a mountain, and contains about 3000 souls. The inhabitants carry on but little commerce. The principal articles of exportation are stone pots, called lavezzi, and raw silk. The whole country produces about 3,600 pounds of the last commodity. A manufacture of silk stockings, the only one in the town, has been lately established. The neighbouring country is covered with vineyards; but the wine is of a meagre sort, and only a small quantity is exported. The great support of Chiavenna is the transport of merchandize, this town being the principal communication between the Milanese and Germany. From hence the goods are sent either by Coire into Germany, or through Pregalia and the Engadinas into the Tyrol. There is a duty laid by the Grisons upon all the merchandize which passes through Chiavenna; but this duty is so small, that the whole customs, including those in the Valteline, are farmed for 17,000 florins, or about 1260l. per annum. The principal object of curiosity in the environs of Chiavenna is the fortress in ruins, seated upon the summit of a rock, which overlooks the town, and celebrated in the history of the Grisons for its almost impregnable strength. Thirty-eight miles north of Como, and thirty-five south of Coire. Lat. 46. 12. N. lon. 9. 31. E. Greenwich.

CHIAUL'SA, a town of Mexico, in the province of Tlascala: twenty miles south-west of Puebla de los Angelos.

CHIAVORO'TO, a town of Germany, in the duchy of Carinthia: eight miles south of Tarvis. In March, 1797, the Austrians were defeated by the French republican army, near this town.

CHIBA'RA TAI KIAMEN, a post of Chinese Tartary: six leagues north of Geho.

CHI'CACOLE, a circar in the eastern part of Hindoostan. Its length, from the borders of Rajahmundry to Chilka lake, is 270 miles. A small part of this circar is in cultivation; the rest consists of woods, waters, towns, and barren wastes.

CHI'CACOLE, a city of Hindoostan, the ancient *Cocala*, formerly the capital of the circar, and residence of the rajah, forty miles from Vizigapatam.

CHICA'NE, *s.* [*chicane*, Fr. derived by Menage from the Spanish word *chico*, little.] The art of protracting a contest by petty objection and artifice.—His attornies have hardly one trick left; they are at an end of all their *chicane*. *Arbuthnot*.—Artifice in general. This sense is only in familiar language:

Unwilling then in arms to meet,
He strove to lengthen the campaign,
And save his forces by *chicane*. *Prior*.

To CHICA'NE, *v. n.* [*chicaner*, Fr.] To prolong a contest by tricks.

CHICA'NER, *s.* [*chicaneur*, Fr.] A petty sophister; a trifling disputant; a wrangler.—This is the way to distinguish the two most different things I know, a logical *chicaner* from a man of reason. *Locke*.

CHICA'NERY,

CHICA'NERY, *s.* [*chicanerie*, Fr.] Sophistry; mean arts of wrangle.—His anger caused him to destroy the greatest part of these reports; and only to preserve such as discovered most of the *chicanery* and futility of the practice. *Arbuthnot.*

CHICAN'GA, or CHACANGA, a kingdom of Africa, which was formerly a part of the country of Monomatapa, rich in gold mines. It is called *Manica*, from the principal town, which is situated on the river Sofala. Lat. 20. 13. S. lon. 28. E. Greenwich.

CHICAPE'E, or CHICKABEE, a river of North America, in Massachusetts, which rises from several ponds in Worcester county, and running south-west unite with Ware river, and six miles further empties into the Connecticut at Springfield, on the east bank of that river.

CHI'CAS, or TARIJA, a district or jurisdiction of South America, in the country of Buenos Ayres; the province is extensive, and affords food to numerous herds of cattle: the capital is St. Jago de Colayata.

CHICCAMOG'GA, a large creek of North America, which runs north westerly into Tennessee river. Its mouth is six miles above the Whirl, and about twenty-seven south-west from the mouth of the Hiwassee. The Chiccamogga Indian towns lie on this creek, and on the bank of the Tennessee.

CHI'CHAR, [ככר, Heb. In general what is of a flat round form; as, a loaf of bread, a level tract of land encompassed with hills, a round piece of lead, a round mass of silver or gold.] A talent.—A talent of silver, according to Dr. Cumberland, weighed 3000 shekels, and was, in our money, 353l. 1s. 10d. The talent of gold was of the same weight, and, in our money, 5075l. 15s. 7d. *Taylor's Hebrew Concordance.*

CHICHE', a town of France, in the department of the Two Sevres, a chief place of a canton, in the district of Chatillon sur Sevre: six miles south-east of Bressuire.

CHI'CHELY (Henry), archbishop of Canterbury, was born at Higham Ferrers in Northamptonshire. After being educated at Winchester college, he became fellow of New college in Oxford (where he took the degree of LL. D.) and chaplain to Robert Medford, bishop of Salisbury, who, about 1402, made him archdeacon of Salisbury. This preferment he exchanged two years after, for the chancellorship of that diocese. Henry IV. sent him to congratulate Gregory XII. on his advancement to the papacy, who conferred on Chichely the bishopric of St. David's, which fell vacant during his absence from England in 1407. In 1409, he was deputed by the synod of London, to the general council held at Pisa, for healing the schism of the church. In 1414, upon the death of Arundel, he was translated to the see of Canterbury. A subsidy being demanded this year of the parliament, the commons addressed the king to seize the revenues of the clergy, and apply them to the public service. To ward off this blow, Chichely advised the clergy to make a voluntary offer of a large subsidy, and to engage the king to assert his title to the crown of France; that, being embroiled in a foreign war, his attention might be diverted from domestic affairs. This expedient succeeded. In 1416, he gave a singular proof of his justice and steadiness. Lord Strange, with his lady and servants, coming to St. Dunstan's church to vespers, and meeting sir John Trussel there, had long been at variance with lord Strange, the servants of the latter drew their swords in the church, wounded sir John, his son, and others, and killed one who had interposed. The archbishop, being informed of the affair, interdicted the church, as being polluted with blood, and publicly excommunicated the authors and accomplices of the crime. And lord Strange and his lady, having, pursuant to a summons, appeared before him at St. Paul's, and implored the church's pardon, he imposed on them this penance, that their servants who were the immediate offenders, should in their shirts and drawers only, and he and his wife with tapers in their hands, walk from St. Paul's to St. Dunstan's, with which they complied; and when the archbishop purified St. Dunstan's church, lady Strange filled the vessels with water, and both she and her lord were commanded to offer a pyx and an altar-cloth. About 1424, he founded in Higham Ferrers, his college for eight fellows, four clerks, six choristers, and a master; he also erected a spacious hospital, for the poor of that place. In 1439, he founded and endowed All-Souls college in Oxford; and he likewise contributed to the building of Croydon church, and Rochester bridge. He died April 12, 1443, having enjoyed the archiepiscopal see twenty-nine years, and was buried in the cathedral of Canterbury.

CHI'CHESTER, a very neat and opulent city, the metropolis of Sussex, situated on a healthy and pleasant plain, distant sixty-three miles from London, eighteen from Portsmouth, and thirty-six from Winchester. The scite of Chichester is a gentle elevation, of which the cross is nearly in the centre. The Lavant, forming here a semi-circle, encompasses it on part of the east side, the whole of the south, and the greatest part of the west. From the cross proceed four streets at right angles, whose direction is towards the four cardinal points, from which each of them is named. The city is surrounded by a stone wall, in which, formerly, were four gates opening into the four principal streets: but they were taken down, as well to enlarge the prospect, as to admit the free circulation of air. The streets are handsome, broad, airy, and well paved. There are within the walls six parish-churches: St. Peter the Great, (which is within the cathedral,) St. Peter the Less, St. Olave's, St. Martin's, St. Andrew's, and All Saints. Without the east gate is a church dedicated to St. Pancrass; and without the west gate is the parish of St. Bartholomew, which has only a burying-ground, the church having been entirely demolished, together with that of St. Pancrass, without east gate, in 1642, when the city was besieged and taken by Sir Wm. Waller. There is also a chapel in St. Martin's-lane, dedicated to the virgin Mary. This was formerly a nunnery, founded by William dean of Chichester, in the reign of Henry II. It is now converted into an hospital or charitable foundation, for six men, and six women, under the patronage of the dean and chapter, having several valuable estates held under it. The cathedral is built on the scite where the church of St. Peter the Great stood before the see was removed from Selsea; and, tho' not large, is yet a very elegant Gothic structure. The spire is of very curious workmanship, and 300 feet in height. The choir is extremely neat, having been lately repaired and beautified at a considerable expence. The great tower, to the north-west of the church, was built by Robert Raymond, at what time we cannot ascertain. Camden calls him R. Riman, and says, that "he built it with the very same stones he had provided to build him a castle at Appledram, hard by where he lived." It is a curious Gothic structure, and contains a musical ring of eight bells. Ralph Nevile (lord chancellor of England) was a great benefactor to this church. He gave his noble palace, which at that time stood where Lincoln's-inn now stands, to his successors, the bishops of Chichester, for ever; where some of them lived when they repaired to London: he also gave to them the estate called Chichester-rents, in Chancery-lane, being the only part now remaining of that great benefaction. During the civil wars in this kingdom, in the unhappy reign of King Charles I. the church of Chichester did not escape that desolating fury of the puritans, which fell so heavy on all the cathedral churches in England, and disgraced the annals of this country. The present chapter consists of the dean, and four prebendaries called to residence, and therefore called canons resident. Formerly the bishop, the dean, the chanter, the chancellor, the treasurer, and two archdeacons (of Chichester and Lewes) dignitaries, and the thirty-two prebendaries, composed the chapter. The service of the choir is performed by four minor-canons, called vicars choral. The church, as it now stands, was rebuilt

rebuilt by Seffrid, (the second of that name, and the seventh bishop of Chichester,) together with the palace, the cloisters, and the common houses; and finished the whole within the space of fourteen years.

Though it is certain that Chichester is an opulent, populous, and flourishing, city, yet it is undeniable that there has been no manufactory in it till very lately, and that the trade of it is but small: its situation upwards of two miles from the quay, being unfavourable for extensive trade. In the reign of James I. an act of parliament was obtained to remedy this inconvenience, by making the Lavant navigable up to the city; but it was never put in execution. A manufactory of baize, blankets, and coarse cloths, has lately been established. There was a considerable manufactory of needles here, but which is now nearly annihilated. In this city, which is distinguished for the multiplicity of its charities, is an excellent dispensary for the relief of the sick poor, supported by voluntary subscription. The arm of the sea, near which the city stands, is spacious, well sheltered, and capable of receiving ships of great burthen. Many of its banks are steep; where wharfs and warehouses might be erected at a small expence. The entrance lies at a place called Cock Bush, near West Wittering, (where it is supposed Ella first landed,) and a small island on the opposite side called Hayling. The channel is not difficult; but there are sand-banks off the mouth of the harbour, which render it impossible for ships of heavy burthen to come in unless at spring tides. Merchant vessels are frequently built and repaired here, and sometimes ships of war. The present flourishing state of the city is owing to several causes; the principal of which is its situation, being in the midst of a fruitful and opulent country for many miles round; whose wealth, if it does not finally center here, at least circulates through it, and, by a constant and regular influx, feeds and invigorates that trade, which without such a supply, would soon droop and decay. Another great advantage it derives from the salubrity of its air; being sheltered from the north by a long ridge of adjoining hills, and refreshed from the south by the breezes from the sea; and standing on something of an elevation, it is free from fogs and damps; whence it is frequented and inhabited by many people of independent fortune. The corporation consists of a mayor, high-steward, alderman, common council, &c. The mayor has a court of request for the recovery of small debts. In his public capacity he is attended by four serjeants at mace, with a crier, &c. For the city there are four justices of the peace, chosen out of the aldermen. Five annual fairs are held in this city and its suburbs, viz. St. George's-day, Whit-Monday, St. James's-day, Michaelmas-fair at that term, and Sloe-fair, which is ten clear days after. The weekly markets are on Wednesdays and Saturdays, which are plentifully supplied from the country for many miles round, with all kinds of provision, especially fish of various kinds. Every Wednesday fortnight there is a large market for sheep and black cattle.

On the Broil, near the city, is the vestige of a Roman camp, in the form of an oblong square, being about half a mile in length, and half as much in breadth. It is surrounded by a strong rampire inward, and a single graff outward; which, considering the nature of the soil, being a hard gravel, must have been a work of much labour. As it is well-known that Vespasian resided long among the Belgian Britons in the reign of Claudius, antiquarians are of opinion, that it was he who raised this camp for the security of his forces, as the country was then in a very unsettled condition. Four miles north of Chichester is Goodwood, the noble seat of the duke of Richmond. It is very agreeably situated in a spacious park, and commands an extensive and delightful prospect. Goodwood formerly belonged to the family of Percy; but was purchased by the present duke's ancestors, who pulled down the old Gothic structure, and erected a very neat mansion on its scite. His grace, the present duke of Richmond, however, is now erecting a very noble and extensive mansion-house, the expence of which is estimated at 60,000l. The walls are cased with flint, and the four angles or corners of the building are finished with round towers, which have all together a very majestic and elegant appearance. The stabling is a very fine building, inferior to few, if any, in England. The sea, and the Isle of Wight terminates the south prospect, and St. Roche's-hill covers it from the north.

Eight miles south of Chichester, is the pleasant peninsula of Selsea, improperly called *island*, where the see of Chichester was first founded. Bede derives the name of it from *seals*—*eia*, signifying, in the ancient Saxon, the Island of Seals. The same author says, "it is surrounded on all sides by the sea, except on the north-west, where there is an entry into it of about a stone's throw *(jactus fundæ)* over." When Adelwach gave this place to Wilfred, it contained eighty-seven families, which, reckoning six persons to a family, amounted to upwards of 500 souls. The present church is a stately Gothic structure, situated at the north-east end of the parish. By the munificence of the south Saxon kings, a monastery was founded here; but which, with the ancient city of Selsea, was swallowed up by the ocean, some remains of the monastery, and also of the city, Camden says, "are visible at low water, the sea having encroached considerably upon the land here." Though we are of the same opinion with this learned author, yet it is difficult to fix upon the exact spot where the city stood; as, about half a mile out at sea, there are several places having the ruins of buildings under water. The best anchoring ground off the island is to this day called the Park; and the rocks between the island and the shoals farther out bear the name of the Streets; where, we have been told, a tomb-stone, with an inscription thereon, was some years ago drawn up by the fishermen. The same author mentions Selsea as being famous for "producing most excellent wheat, and the best cockles in England;" to which we may add, that the best prawns are caught here, the greatest part of which are sent to London by land carriage.

About five miles south-west of Chichester, on the confines of Hampshire, is Bosenham, or Bosham; where it is said, a daughter of Canute the Great was buried; and where Harold, son of earl Godwin, (the most powerful subject that ever was in England,) had a mansion of retirement. We are informed from Testa de Nevil (which was the inquision of lands made in king John's time), that the conqueror "gave Boseham to William Fitz-Aucher, and his heirs, in fee-farm, paying out of it yearly into the exchequer forty pounds of silver, tried and weighed: and afterwards William Marshall held it as his inheritance." The church of Bosham is a spacious, venerable, Gothic edifice, built at the sole expence of William Warlewast, bishop of Exeter, about the year 1119; in the reign of Henry I. it was made collegiate for a dean and prebendaries, and endowed with many privileges which it enjoyed till the general dissolution, when it was made parochial. The stalls for the prebendaries are still standing, and over them are carvings of great antiquity.

Stanstead, the elegant and rural seat of Mr. Barwell, is four miles distant from Chichester. It was formerly the seat of the earl of Scarborough, afterwards of the earl of Halifax, who left it by his will to his daughter, (Mrs. Donaldson,) since Mrs. Archdale. Stanstead is confessedly situate in one of the most delightful situations in the kingdom: the house has been lately rebuilt by its present munificent possessor in the first stile of elegance, and commands a complete view of Portsmouth, the Isle of Wight, the ships at Spithead, together with an extensive prospect of the sea. The gardens are delightful, the walks in the park extremely rural, and the many vistas in them, which terminate in some agreeable prospect

so judiciously planned, that, though art has conducted the whole process, she lies concealed, and only nature strikes the eye.

CHI'CHESTER, a town of the American States, in Rockingham county, New-Hampshire, about thirty-five miles north-west of Exeter, and forty-five from Portsmouth. It lies on Suncock river and was incorporated in 1727.

CHI'CHESTER, UPPER and LOWER, two towns of the American States, in Delaware county, Pennsylvania.

CHI'CINCE, a town of Lithuania: eight miles north of Rohaczow.

CHICK, or CHICKEN, *s.* [cicen, Sax. *kiecken*, Dutch. *Chicken* is the old plural of *chick*, though now used as a singular noun.] The young of a bird, particularly of a hen, or small bird.—Having the notion that one laid the egg out of which the other was hatched, I have a clear idea of the relation of dam and *chick*. *Locke.*—A word of tenderness.—A term for a young girl:

Then, Chloe, still go on to prate
Of thirty-six and thirty-eight;
Pursue your trade of scandal-picking,
Your hints, that Stella is no *chicken*. *Swift.*

"Though the fox runs, the *chicken* has wings." That is, as wise as the deceitful may think themselves, innocence is seldom so unguarded, but it has some defence or protection; and if no other, always that of providence. "To reckon one's *chickens* before they are hatch'd." Lat. *Ante victoriam encomium canere*, Pl. in Lys. (to sing triumph before the victory;) and so the French, *Chanter le triomphe avant la victoire*. The Germans say, *Ib russt haase, ehe dann er im netze liegt*, (You cry out hare, before he is in the net.) To be too forward in one's dependance.

CHICK-PEA, *s.* in botany. See CICER.

CHICKAHO'MINY, a navigable river in Virginia. At its mouth in James river, thirty-seven miles from Point Comfort, in Chesapeak bay, is a bar, on which is only twelve feet water at common flood tide.

CHICKAMA'GES, a part of the Cherokee nation of Indians, known by this name, inhabit five villages on Tennessee river.

CHICKASAW', on the eastern bank of the Mississippi, within the territories of the American States, in lat. 35. N. The Spaniards erected here a strong stockaded fort, with cannon, and furnished it with troops, all in the space of twenty-four hours, in the month of June, 1795. It has since been given up to the American States, according to the treaty of 1796.

CHICKASAW', a river of North America which empties into the Mississippi on the east side, 104 miles north from the mouth of Margot, and sixty-seven south-west of Mine-au-fer. The lands here are of an excellent quality, and covered with a variety of useful timber, canes, &c. This river may be ascended, during high floods, upwards of thirty miles, with boats of several tons burden.

CHIKASAW'S, a famous nation of American Indians, who inhabit the country on the east side of the Mississippi, on the head branches of the Tombigbee, Mobile, and Yazoo, rivers, in the north-west corner of the state of Georgia, and north of the country of the Chactaws. Their country is an extensive plain, well watered from springs, and of a good soil. They have seven towns, the central one of which is in lat. 34. 23. N. lon. 89. 30. W. In 1539, Ferdinand de Soto, with 900 men, besides seamen, sailed from Cuba with a design to conquer Florida. He travelled northward to the Chickasaw country, about lat. 35. or 36. and three years after died, and was buried on the bank of Mississippi river.

CHICKENHEART'ED, *adj.* Cowardly; timorous; fearful:

Now we set up for tilting in the pit,
Where 'tis agreed by bullies, *chickenhearted*,
To fright the ladies first, and then be parted.
Prologue to Spanish Fryar.

CHIC'KENPOX, *s.* An exanthematous distemper, so called from its being of no very great danger. See MEDICINE.

CHICK'WEED, *s.* in botany. See ALSINA and ARENARIA. Bastard, see BUFONIA. Water, see CALLITRICHE.

CHICLA'NA, a town of Spain, in the province of La Mancha: twenty-two miles north of Ubeda.

CHICOMUZE'LO, a town in the province of Chiapa, in New Spain, having a cave very narrow at the entry, but spacious within, with a stagnant lake, which is, however, clear, and is two fathoms deep towards the banks.

CHICOYNEAU' (François), first physician to the French king, was born at Montpellier in 1672. Having obtained his doctor's degree, he was sent to stop the progress of the plague then raging at Marseilles, by the duke of Orleans, regent of the kingdom. The boldness and confidence with which he entered that city, where every one seemed only waiting for death, had a striking effect on their fears. He encouraged the inhabitants, and quieted their alarms by his presence; hope seemed to reanimate every breast, and his success was beyond expectation. His services were rewarded by marks of honour and a pension from the king. In 1731 he was called to court to be physician to the royal children, by the interest of Chirac, whose daughter he had married; and after whose death he was made first physician to the king, counsellor of state, and superintendant of the mineral waters of the kingdom. He died at Versailles in 1752, aged near eighty. The most curious of his works is that wherein he maintains that the plague is not contagious; Lyons and Paris, 1721, 12mo.

To CHIDE, *v. a.* preter. *chid* or *chode*, part. *chid* or *chidden*; [cidan, Sax.] To reprove; to check; to correct with words: applied to persons:

Above the waves as Neptune shew'd his face,
To *chide* the winds, and save the Trojan race. *Waller.*

To drive with reproof.—To blame; to reproach; applied to things:

Winds murmur'd through the leaves your long delay,
And fountains, o'er the pebbles, *chid* your stay. *Dryd.*

To CHIDE, *v. n.* To clamour; to scold:

The mother scream'd, the father *chid*,
Where can this idle wench be hid? *Swift.*

To quarrel with; to make a noise:

As does a rock against the *chiding* flood,
Should the approach of this wild river break,
And stand unshaken yours. *Shakespeare.*

"Woe to the house where there is no *chiding*." Where the masters or heads of families, or parents of children, are so remiss as never to find fault or correct, libertinism will gradually creep into and get the upper hand; and in such families woe will as certainly ensue.

CHI'DER, *s.* A rebuker; a reprover:

Not her that chides, sir, at any hand, I pray.—
I love no *chiders*, sir. *Shakespeare.*

CHIEF, *adj.* [*chef*, the head, Fr.] Principal; most eminent; above the rest in any respect.—These were the *chief* of the officers that were over Solomon's works. 1 *Kings.*

Your country, *chief* in arms, abroad defend;
At home, with morals, arts, and laws, amend. *Pope.*

Eminent; extraordinary.—A froward man soweth strife, and a whisperer separateth *chief* friends. *Proverbs.*—Capital; of the first order; that to which other parts are inferior, or subordinate.—I came to have a good general view of the apostle's main purpose in writing the epistle, and the *chief* branches of his discourse wherein he prosecuted it. *Locke.*—It is used by some writers with a superlative termination; but improperly, as the comparative *chiefer* is never found:

We beseech you, bend you to remain
Here in the cheer and comfort of our eye,
Our *chiefest* courtier, cousin, and our son. *Shakespeare.*

CHIEF, *s.* A military commander; a leader of armies; a captain:

A wit's a feather, and a *chief* a rod;
An honest man's the noblest work of God. *Pope.*

A prudent *chief* not always must display
His pow'rs in equal ranks, and fair array;
But with th' occasion and the place comply,
Conceal his force, nay, seem sometimes to fly. *Pope.*

In Spenser it seems to signify somewhat like achievement; a mark of distinction:

Where be the nosegays that she dight for thee?
The coloured chaplets wrought with a *chief*,
The knottish rush-rings, and gilt rosemary. *Spenser.*

In heraldry.—The *chief* is so called of the French word *chef*, the head or upper part: this possesses the upper third part of the escutcheon.

CHIEF-RENTS, the rents of freeholders of manors often so called, i. e. *reditus capitales.* They are also denominated quit-rents, *quieti reditus*; because thereby the tenant goes quit and free of all other services. 2 *Com.* 42.

CHIEF-TENANTS, tenants in *capite*, holding immediately under the king, in right of his crown and dignity. See CAPITE, and TENURE.

CHIEF'DOM, *s.* Sovereignty. *Not in use.*—Zephyrus being in love with Chloris, and coveting her to wife, gave her for a dowry the *chiefdom* and sovereignty of all flowers and green herbs. *Spenser.*

CHIEF'LESS, *adj.* Wanting a head; being without a leader:

And *chiefless* armies doz'd out the campaign,
And navies yawn'd for orders on the main. *Pope.*

CHIEF'LY, *adv.* Principally; eminently; more than common.—Any man who will consider the nature of an epic poem, what actions it describes, and what persons they are *chiefly* whom it informs, will find it a work full of difficulty. *Dryden.*

CHIEF'RIE, *s.* A small rent paid to the lord paramount.—Would the reserved rent at this day be any more than a small *chiefrie*? *Swift.*

CHIEF'TAIN, *s.* Captain; a leader; a commander; the head of a clan.—It broke and absolutely subdued all the lords and *chieftains* of the Irishry. *Davies.*

CHIELEFA', a town of European Turkey, in the Morea, near the gulf of Coron. It was taken by the Venetians in 1685.

CHIEMSE'E, a lake of Germany, in the circle of Bavaria; it contains several islands, particularly Herrenwerd and Frawenwerd, the former of which is the see of a bishop, suffragan of Saltzburgh, founded in the thirteenth century.

CHIEN'TO, a river of Italy, in the state of the Church, which runs into the Adriatic, between Fermo and Recanati.

CHIE'RI, a town of Piedmont, situated on the declivity of a hill, in an agreeable country, the air soft and healthy: the hills to the north and east are covered with vines, while those to the west and south are covered with fruit-trees of different kinds; the land is fertile, and the inhabitants industrious: they have manufactures of cloth and silk. Its ancient name was Cherium, or Carium, and is called by the French *Quiers.* It was burned by the emperor Frederic Barbarossa, in the year 1154, but was soon after rebuilt. It is surrounded by an ancient wall defended by towers, with a fosse: and had formerly a fortress, named Rochetta, demolished in the sixteenth century. It has six gates, and four grand squares or palaces, many churches, and religious houses, though only two parishes within the walls, and one without: six miles east of Turin. Lat. 44. 45. N. lon. 25. 25. E. Ferro.

CHIE'RS (La), a river of France, which runs into the Meuse, between Mouzon and Sedan.

CHIE'SA (La), a river of Italy, which runs into the Oglio, at Caneto, in the Mantuan.

CHIE'TI, a city of Italy, in the kingdom of Naples, and capital of the province of Abruzzo Citra, the see of an archbishop, erected by pope Clement VII. seventy-five miles east-north-east of Rome. Lat. 42. 22. N. lon. 31. 46. E. Ferro.

CHIET'TA (La), a town of France, in the department of the Jura, and chief place of a canton, in the district of Orgelet: eleven miles north-east of Orgelet.

CHIE'VANCE, *s.* [probably from *achevance*, Fr. purchase.] Traffic, in which money is extorted; as discount. *Now obsolete.*—There were good laws against usury, the bastard use of money; and against unlawful *chievances* and exchanges, which is bastard usury. *Bacon.*

CHIE'VRES, a town of the Netherlands, in the county of Hainaut: four miles south of Ath.

CHIEU'TI, a town of Italy, in the kingdom of Naples, and province of Capitanata: thirteen miles south-south-east of Termola.

CHIF'FLET (John James), a physician, born at Besançon, a town of Franche Comté, in 1588. He was descended from a family, which had greatly distinguished itself by literary merit. He was educated at Besançon, and then travelled through several parts of Europe, where he became acquainted with all the men of letters, and made his way into the cabinets of the curious. At his return he applied himself to the practice of physic; but being sent by the town of Besançon, where he had been consul, on an embassy to Elizabeth Clara Eugenia, archduchess of the Low Countries, that princess prevailed on him to continue with her in quality of physician in ordinary. Afterwards he became physician to Philip IV. of Spain, who honoured him very highly, and treated him with great kindness. Chifflet imagined, that these bounties and honours obliged him to take up arms against all who were at variance with his master; and this induced him to write his book, intituled, "Vindiciæ Hispanicæ," against the French. He wrote several pieces in Latin, which were both ingenious and learned. He died very old, and left a son, John Chifflet, who afterwards made a figure in the republic of letters, and particularly for his knowledge of the Hebrew. He had another son, called Julius Chifflet, well skilled in languages and in the civil law, and who had the honour to be invited to Madrid by the king of Spain in 1648, where he was made chancellor of the order of the golden fleece. There were also Philip Chifflet, canon of Besançon; Laurence and Peter Francis Chifflet, jesuits; all men of high reputation in the learned world.

CHIGGERON', a river of Asia, which rises in Persia, and runs into the Caspian Sea, a little to the north of Amol.

CHI'GI, (Fabio), or pope Alexander VII. was born at Sienna in 1599. In 1655 he was elected pope, by the votes of all the sixty-four cardinals who were in the conclave: an unanimity of which there are but few instances in the election of popes. There is a volume of his poems extant. He loved the *Belles-Lettres*, and the conversation of learned men. He was extremely fond of stately buildings: the grand plan of the college *Della Sapienza*, which he finished, and adorned with a fine library, remains a proof of his taste in architecture. He died in 1667.

CHIGNEC'TO, a town of Nova Scotia, on the coast of the bay of Fundy, near which was a smart action between the British troops, under the command of major Lawrence, with some French and Indians, in 1749, and another between the British, under the command of lieutenant Scott, and the same enemies, in 1756.

CHI'GY-SUR-VARME, a town of France, in the department of the Yonne: two leagues and a half east-south-east of Sens

CHIHMECO'MET ISLAND, or CHICKMINOCK-CUMINOCK,

MINOCK, on the coast of North Carolina, lies between Roanoke island and the northern entrance into Pamlico sound.

CHIHOHOE'KI, an Indian nation of America who were confederates of the Lenopi or Delawares, and inhabited the western bank of Delaware river, which was anciently called by their name. Their southern boundary was Duck creek, in Newcastle county.

CHILAPAN', a town in New Spain, in the country of the Cohuixcas. Between this and Tcoiltylan is an entire mountain of loadstone.

CHILA'RE, a river of Italy, in the kingdom of Naples, which runs into the Candelaro.

CHIL'BLAINS, *s.* Sores made by frost.—Chilblains are occasioned by excessive cold stopping the motion of the blood in the capillary arteries. For the cure, see the article MEDICINE.

CHIL'CA, a town in the jurisdiction of Canette in Peru, South America, celebrated for its excellent saltpetre, of which gunpowder is made in the metropolis. It abounds with plenty of fish, fruits, pulse, and poultry, in which it carries on a considerable trade with Lima, ten leagues distant. Lat. 12. 31. S. lon. 76. 5. W.

CHILD, *s.* in the plural *children*; [cild, Sax.] An infant, or very young person.—The stroke of death is nothing: *children* endure it, and the greatest cowards find it no pain. *Wake.*—We should no more be kinder to one *child* than to another, than we are tender of one eye more than of the other. *L'Estrange.*

In age, to wish for youth is full as vain,
As for a youth to turn a *child* again. *Denham.*

One in the line of filiation, opposed to the parent:

He, in a fruitful wife's embraces old,
A long increase of *children's* children told. *Addison.*

The descendants of a man, how remote soever, are called *children*; as the *children* of Edom, the *children* of Israel. In the language of scripture: One weak in knowledge. 1 *Corinth.*—Such as are young in grace. 1 *John.*—Such as are humble and docile. *Matthew.*—The *children* of light, the *children* of darkness; who follow light, who remain in darkness. The elect, the blessed, are also called the *children* of God.—How is he numbered among the *children* of God, and his lot is among the saints! *Wisdom.*—In the New Testament, believers are commonly called *children* of God.—Ye are all the *children* of God, by faith in Jesus Christ. *Gal.* iii. 26.—Any thing the product or effect of another:

Macduff, this noble passion,
Child of integrity, hath from my soul
Wip'd the black scruples. *Shakespeare.*

"*Children* are certain cares, uncertain comforts." The truth of this proverb, it is to be feared, is but too well grounded.

To be with CHILD. To be pregnant:

If it must stand still, let wives *with child*
Pray that their burthen may not fall this day,
Lest that their hopes prodigiously be crost. *Shakes.*

To CHILD, *v. n.* To bring children:

The spring, the summer,
The *childing* autumn, angry winter, change
Their wonted liveries. *Shakespeare.*

Mr. Derham computes, that marriages, one with another, produce four children, not only in England, but upon the same average in every part of the world. In the genealogical history of Tuscany, wrote by Gamarini, mention is made of a nobleman of Sienna, named Pichi, who of three wives had 150 children; and that, being sent ambassador to the pope and the emperor, he had forty-eight of his sons in his retinue. In a monument in the churchyard of St. Innocent, at Paris, erected to a woman who died at eighty-eight years of age, it is recorded, that she might have seen 288 children directly issued from her. This exceeds what Hakewell relates of Mrs. Honeywood, a gentlewoman of Kent, born in 1527, and married at sixteen to her only husband R. Honeywood, of Charing, esq. and died in her ninety-third year. She had sixteen children of her own body; of which three died young, and a fourth had no issue: yet her grandchildren, in the second generation, amounted to 114; in the third, to 228; though, in the fourth, they fell to nine. The whole number she might have seen in her life-time, being 367. 16+114+228+9=367.

With regard to the duties of children to their parents, they arise from a principle of natural justice and retribution. To those who gave us existence, we naturally owe subjection and obedience during our minority, and honour and reverence ever after: they who protected the weakness of our infancy, are intitled to our protection in the infirmity of their age; they who, by sustenance and education, have enabled their offspring to prosper, ought, in return, to be supported by that offspring, in case they stand in need of assistance. Upon this principle proceed the duties of children to their parents, which are enjoined by all laws human and divine. As the vexations which parents too often receive from their children, hasten the approach of age, and double the force of years, so the comforts which they reap from them, are balm to all other sorrows, and disappoint the injuries of time. Parents repeat their lives in their offspring, and their concern for them is so sensible and acute, that they feel all their sufferings, and taste all their enjoyments. Hence arise the comforts and blessings which parents derive from dutiful and affectionate children!

CHILD'BEARING, *part. subs.* The act of bearing children.—The timorous and irresolute Sylvia has demurred till she is past *childbearing*. *Addison.*

CHILD'BED, *s.* The state of a woman bringing a child, or being in labour:

Yet these, tho' poor, the pain of *childbed* bear. *Dryden.*

CHILD'BIRTH, *s.* Travail; labour; the time of bringing forth; the act of bringing forth.—In the whole sex of women, God hath decreed the sharpest pains of *childbirth*; to shew, that there is no state exempt from sorrow. *Taylor.*

CHILD'ED, *adj.* Furnished with a child:

How light and portable my pain seems now,
When that which makes me bend, makes the king bow;
He *childed* as I father'd. *Shakespeare.*

CHIL'DERMAS DAY, *s.* The day of the week, throughout the year, answering to the day on which the feast of the Holy Innocents is solemnized, which weak and superstitious persons were wont to think an unlucky day.—To talk of hares, or such uncouth things, proves as ominous to the fisherman, as the beginning of a voyage on the day when *childermas-day* fell, doth to the mariner. *Carew.*

CHILD'HOOD, *s.* [cildhad, Sax.] The state of children; or, the time in which we are children: it includes infancy, but is continued to puberty.—The same authority that the actions of a man have with us in our *childhood*, the same, in every period of life, has the practice of all whom we regard as our superiors. *Rogers.*—The time of life between infancy and puberty.—Infancy and *childhood* demand thin, copious, nourishing, aliment. *Arbuthnot.*—The properties of a child:

Their love in early infancy began,
And rose as *childhood* ripen'd into man. *Dryden.*

CHILD'ISH, *adj.* Having the qualities of a child; trifling; ignorant; simple.—Learning hath its infancy, when it

it is but beginning and almost *childish*: then its youth, when it is luxuriant and juvenile. *Bacon.*—Becoming only children; trifling; puerile:

When I was yet a child, no *childish* play
To me was pleasing; all my mind was set
Serious to learn and know. *Milton.*

CHILD'ISHLY, *adv.* In a childish trifling way; like a child.—Some men are of excellent judgment in their own professions, but *childishly* unskilful in any thing besides. *Hayward.*

CHILD'ISHNESS, *s.* Puerility; triflingness.—The actions of *childishness*, and unfashionable carriage, time and age will of itself be sure to reform. *Locke.*—Harmlessness:

Speak, thou, boy;
Perhaps thy *childishness* will move him more
Than can our reasons. *Shakespeare.*

CHILD'LESS, *adj.* Without children; without offspring.—As thy sword hath made women *childless*, so shall thy mother be *childless* among women. 1 *Samuel.*

CHILD'LIKE, *adj.* Becoming or beseeming a child.—Who can owe no less than *childlike* obedience to her that hath more than motherly care. *Hooker.*

CHILD'WIT, *s.* [Sax.] A fine or penalty of a bondwoman unlawfully begotten with child. Cowel says, it signifieth a power to take a fine of your bond-woman gotten with child without your consent: and, within the manor of Writtle in Com. Essex, every reputed father of a base child pays to the lord for a fine three shillings and four-pence, where it seems to extend as well to free as to bond-women; and the custom is there called *childwit* to to this day. See BASTARD.

CHI'LI, an extensive country of South America, extending from Peru on the north, to the country of Magellan on the south; bounded on the east by immense deserts, which divide it from Paraguay and other parts of South America, and on the west by the Pacific Ocean. The incas of Peru had prevailed upon great part of the inhabitants of that vast region to submit to their laws, and were preparing to subdue the whole, when it became their lot to be invaded and conquered by the Spaniards; by whom it was afterwards left to invade and explore the country of the Chilesians.

The first attempt of the Spaniards upon this country, was made by Don Diego d'Almagro, in 1535, after he and Pizaro had completed the conquest of Peru. He set out on his expedition to Chili with a considerable body of Spaniards and auxiliary Indians. For 200 leagues he was well accommodated with every necessary by the Indians, who had been subjects of the incas of Peru: but, reaching the barren country of Charcas, his troops became disheartened through the hardships they suffered; which determined d'Almagro to climb the Cordilleras, in order to get the sooner into Chili; being ignorant of the invaluable mines of Potosi, contained in the province of Charcas, where he then was. The Cordilleras were covered with snow, the depth of which often obliged him to dig his way through. The cold made such an impression on his naked Indians, that it is computed no less than 10,000 of them perished on the mountains, 150 of the Spaniards sharing the same fate; while many of the survivors lost their fingers and toes through the excess of cold. At last, after encountering incredible difficulties, d'Amalgro reached a temperate and fertile plain, on the opposite side of the Cordilleras, where he was received with great kindness by the natives. These poor savages, taking the Spaniards for deputies of their god Virachoca, immediately collected for them an offering of gold and silver worth 290,000 ducats: and soon after brought a present to d'Almagro worth 300,000 more. These offerings only determined him to conquer the whole country as soon as possible. The Indians, among whom he now was, had acknowledged the authority of the Peruvian incas, or emperors, and consequently gave d'Almagro no trouble. He therefore marched against those who had never been conquered by the Peruvians, and who inhabited the southern parts of Chili. These savages fought with great resolution, and disputed every inch of ground: yet in five months the Spaniards had made such progress, that they must have reduced the whole province in a very little time, had not d'Almagro returned to Peru, in consequence of orders sent him from Spain.

In 1540, Pizaro having overcome and put d'Almagro to death, sent into Chili, Baldivia or Valdivia, who had learned the rudiments of war in Italy, and was reckoned one of the best officers in the Spanish service. As he penetrated southwards, he met with much opposition; the confederated caziques frequently gave him battle, and displayed great courage and resolution; but could not prevent him from penetrating to the valley of Masiocho, which he found fertile and populous. Here he founded the city of St. Jago; and, finding gold mines in the neighbourhood, he forced the Indians to work in them; at the same time building a castle for the safety and protection of his new colony. The natives, exasperated at this slavery, took up arms and attacked the fort. They set fire to the outworks, which contained all the provisions of the Spaniards. Nor were they discouraged, though they were defeated, but still continued to carry on the war with vigour. At last, Valdivia, having overcome them in many battles, forced the inhabitants of the vale to submit; upon which he again set them to work in the mines of Quilotta. This redoubled the fury of those who remained at liberty. Their utmost efforts, however, were as yet unable to stop Valdivia's progress. Having crossed the large rivers Maulle and Hata, he traversed a vast tract of country, and founded the city La Conception on the South Sea coast. He erected fortresses in several parts of the country, in order to keep the natives in awe; and built the city called *Imperial*, about forty leagues to the southward of Conception. The Spanish writers say, that the neighbouring valley contained 80,000 inhabitants of a peaceable disposition, who suffered Valdivia to parcel out their lands among his followers. About sixteen leagues to the eastward of Imperial, the Spanish general laid the foundations of the city *Villa Rica*, so called on account of the gold mines he found there. But his ambition and avarice had now involved him in difficulties from which he could never be extricated: he had extended his conquests beyond what his strength was capable of maintaining. The Chilesians were still as desirous as ever of recovering their liberties. The horses, fire-arms, and armour, of the Spaniards, at first appeared dreadful to them; but in the course of the war they had discovered, that Spaniards were vulnerable and mortal men like themselves; they hoped, therefore, by dint of their superiority in numbers, to be able to expel the usurpers. They rose to a man, and chose Capaulican, a renowned chief, for their leader. Valdivia received notice of their revolt sooner than they intended he should; but, before he could march to oppose them, 14,000 of the Chilesians were assembled under Capaulican. He attacked them with his cavalry, and forced them to retreat into the woods; but could not obtain a complete victory, as they kept continually sallying out and harassing his rear. At last Capaulican, having observed that fighting with such a number of undisciplined troops only served to contribute to the defeat and confusion of the whole, he divided his forces into bodies of 1000 each. These he directed to attack the enemy by turns; and, though he did not expect that a single thousand would put them to flight, yet he enjoined them to make as long a stand as they could; when they were to be relieved and supported by another body; and thus the Spaniards would be at last wearied out and overcome. The event fully answered his expectations. The Chilesians maintained a fight for seven or eight hours, until the Spaniards, growing faint, retired precipitately.

precipitately. Valdivia ordered them to possess a pass at some distance from the field, to stop the pursuit; but, this design being discovered to the Chilesians, the Spaniards were surrounded on all sides, and cut in pieces. Valdivia was taken and put to death; some say he had melted gold poured down his throat; and the Indians made flutes and other instruments of his bones, and preserved his skull as a monument of their victory, which they celebrated by an annual festival. The city of Conception, being now abandoned by the Spaniards, was taken and destroyed: but the Indians were forced to raise the siege of Imperial; and their progress was at length stopped by Garcia de Mendoza, who defeated Capaulican, took him prisoner, and put him to death. No defeats, however, could dispirit the Chilesians. They continued the war for fifty years; and to this day they remain unconquered.

Their most irreconcileable enemies are the inhabitants of Arauco and Tucapel, those to the south of the river Bobio, or who extend towards the Cordilleras. Their manners, which bear a greater resemblance to those of the savages of North America than to those of the Peruvians their neighbours, render them consequently more formidable. When they go to war, they carry nothing with them, and want neither tents nor baggage. The same trees from which they gather their food, supply them with lances and darts. As they are sure of finding in one place what they had in another, they willingly resign any country which they are unable to defend. All places are equally indifferent to them. Their troops, being free from all incumbrance of provisions and ammunition, march with surprising agility. They expose their lives like men who set little value on them; and, if they lose the field of battle, they are not at a loss for magazines and encampments wherever there is ground covered with fruits. They sometimes invite their neighbours to join them to attack the common enemy, and this they call throwing the arrow, because this call flies as swiftly and silently as an arrow from one habitation to another. A certain night is immediately fixed upon, in the dead of which, the time they always chuse for the commencement of hostilities, they fall upon the next village where there are Spaniards, and from thence proceed to others. They murder all the inhabitants, except the white women, whom they always carry off. Before the enemy has time to collect his forces, they all unite in one body. Their army, though more formidable from their numbers than from their discipline, is not afraid of attacking the posts that are most strongly fortified. This fury often succeeds, because they are so constantly supplied with reinforcements that they are not sensible of their losses. If these are so considerable as to oblige them to desist, they retire to the distance of a few leagues, and five or six days after fall upon some other place. These Indians never think they are beaten unless they are surrounded. If they can take possession of a place difficult of access, they think they are conquerors. The head of one Spaniard, which they carry off in triumph, comforts them for the death of a hundred Indians. The country is of such considerable extent, that, when they find themselves in danger from the enemy, they forsake their possessions, and remove into some impenetrable forest. Recruited by other Indians, they soon return into the parts they had before inhabited; and this alternate succession of flight and resistance, of boldness and fear, is the circumstance that renders them unconquerable. War is to them a kind of amusement. As it is neither expensive nor inconvenient to them, they have nothing to apprehend from its continuance; and it is a constant rule with them never to sue for peace. The pride of Spain must always condescend to make the first overtures. When these are favourably received, a conference is held. The governor of Chili and the Indian general, attended by the most distinguished captains on both sides, settle the terms of accommodation at a convivial meeting. The Spaniards are always obliged to purchase peace by some presents, and, after a variety of fruitless attempts, they have been forced to give up all thoughts of extending their conquest, and reduced to cover their frontiers by erecting forts at proper distances. These precautions are taken to prevent the Indians, who have submitted, from joining the independent savages, and likewise to repel the inroads of the latter into the colonies.

These colonies are dispersed on the borders of the South Sea; they are parted from Peru by a desert that measures eighty leagues, and bounded by the island of Chiloe, at the extremity next the Straits of Magellan. On that great length of coast there are no settlements, except those of Valdivia, Conception, Valparaiso, and Coquimbo, or La Serena, which are all sea-ports. In the inland country St. Jago is the capital. There is no culture or habitation at any distance from these towns. The buildings are all very low, made of unburnt brick, and mostly thatched. This practice is observed on account of the frequent earthquakes, and is properly adapted to the nature of the climate, as well as the indolence of the inhabitants. They are robust and well-shaped men, but few in number. In all that large settlement there are not 20,000 white men, and not more than 60,000 negroes, or Indians, able to bear arms. The military establishment amounted formerly to 2000 men; but the maintaining of them was found too expensive, and they are now reduced to 500. If Chili is uninhabited, it is not owing to the climate, which is one of the most wholesome in the world. The vicinity of the Cordilleras gives it such a delightful temperature, as could not otherwise be expected in that latitude. There is not a more pleasant province in all the mother country. The gold was formerly brought over in bullion; but, ever since the year 1749, it is coined in the mint set up at St. Jago. The excellent copper mines of Coquimbo supply the whole kingdom of Peru. A more certain source of wealth, though less pleasing to the possessors, is the prodigious fertility of the soil. The horses and mules of Chili are in great esteem, particularly the former. Prodigious numbers of oxen, goats, and sheep, are fattened in the luxuriant pastures of this province; and, indeed, it is the only part of husbandry to which the inhabitants pay any considerable attention. An ox well fattened may be purchased for four dollars. Turkeys, geese, and all kinds of poultry, are found here in the same profusion. The coasts abound with many excellent fish; there are also vast numbers of whales and sea-wolves. The European fruit-trees are obliged to be propped to enable them to sustain the weight of the fruit. Orange-trees are in bloom, and bear fruit, throughout the year. Olives also, and almond-trees, thrive exceedingly well; and the inhabitants press a kind of muscadine wine from the grapes, which far exceeds any of the kind made in Spain. Mines of gold, silver, copper, tin, quicksilver, iron, and lead, abound in this country. Vast quantities of gold are washed down from the mountains by brooks and torrents; the annual amount of which, when manufactured, is estimated at no less than 8,000,000 dollars. The corn-harvest is reckoned a bad one when it does not yield a hundred fold. With all these advantages, Chili has no direct intercourse with the mother-country. Their whole trade is confined to Peru, Paraguay, and the Indians on their own frontiers. The inhabitants of Chili sell their most ordinary and less valuable commodities to these savages for oxen, horses, and their own children, whom they are ready to part with for the most trifling things. Spirituous liquors were sold, till the year 1724, to these people, who, like most other savages, are excessively fond of them. When they were intoxicated, they used to take up arms, massacre all the Spaniards they met with, and suddenly attack the forts and ravage the country near their dwellings. These outrages were so often repeated, that it was found necessary strictly to forbid this dangerous traffic. The good effects of the prohibition are daily felt. The commotions of these people are less frequent and

and less dangerous, and their peaceable behaviour has brought on a visible increase of intercourse with them. Chili supplies Peru with great plenty of hides, dried fruit, copper, salt-meat, horses, hemp, lard, wheat, and gold. In exchange for these articles, Peru sends tobacco, sugar, cocoa, earthen ware, woollen cloth, linen, hats made at Quito, and every article of luxury that is brought from Europe. The ships sent from Callao on this traffic were formerly bound for Conception bay, but now come to Valparaiso. Chili sends to Paraguay some woollen stuffs called *ponchos*, which are used for cloaks. It also sends wines, brandy, oil, and chiefly gold; and receives in return wax, a kind of tallow fit to make soap, the herb of Paraguay, European goods, and as many negroes as Buenos Ayres can furnish. Chili is a state entirely distinct from Peru, and is governed by a chief, who is absolute in all political, civil, and military, affairs, and independent of the viceroy, who has no authority, except when a governor dies, to appoint one in his room for a time, till the mother-country names a successor.

CHI'LIAD, *s.* [from χιλιας.] A thousand; a collection or sum containing a thousand; whence tables of logarithms are called *chiliads*.—We make cycles and periods of years, as decads, centuries, *chiliads*, for the use of computation in history. *Holder.*

CHILIAE'DRON, *s.* [χιλια, a thousand, and εδρα, base.] A figure of a thousand sides.—In a man, who speaks of a *chiliaedron*, or a body of a thousand sides, the idea of the figure may be very confused, though that of the number be very distinct. *Locke.*

CHI'LIARCH, *s.* [χιλιαρχος, of χιλιας and αρχος, Gr.] a governor, a commander of a thousand men, a colonel.

CHILI'ASTS, in church-history. See MILLENARIANS.

CHILI'FACTIVE, *adj.* That which makes chile.—Whether this be not effected by some way of corrosion, rather than any proper digestion, *chilifactive* mutation, or alimental conversion. *Brown.*

CHILIFAC'TORY, *adj.* That which has the quality of making chile.—We should rather rely upon a *chilifactory* menstruum, or digestive preparation drawn from species or individuals, whose stomachs peculiarly dissolve lapideous bodies. *Brown.*

CHILIFICA'TION, *s.* The act of making chile.—Nor will we affirm that iron is indigested in the stomach of the ostrich; but we suspect this effect to proceed not from any liquid reduction, or tendence to *chilification*, by the power of natural heat. *Brown.*

CHILISQUA'QUE, a town of the American States, on Susquehannah river, in Pennsylvania.

CHIL'KA, a lake of Hindoostan, on the sea-coast of the province of Cattack, on the north-west side of the bay of Bengal. This lake seems the effect of a breach of the sea over a flat sandy shore, extending about thirty-six miles in length, and from ten to thirteen in breadth, with many inhabited islands in it. It is called the Great Lake, and affords a most agreeable prospect, diversified with woods, islands, and mountains, and small vessels perpetually in motion. It forms the division between the circars and the province of Cattack, the most southern in the kingdom of Orissa. Here begins the wildest part of the vast forests which spread along the back of the circar mountains, and the unknown parts of Berar.

CHILL, *adj.* [cele, Sax.] Cold; that which is cold to the touch:

And all my plants I save from nightly ill
Of noisome winds and blasting vapours *chill*. *Milton.*

Cold; having the sensation of cold; shivering with cold:

My heart and my *chill* veins freeze with despair. *Rowe.*

Dull; not warm; not forward: as, a *chill* reception. Depressed; dejected; discouraged. Unaffectionate; cold of temper.

CHILL, *s.* Chilness: cold.—I very well know one to have a sort of *chill* about his præcordia and head. *Derb.*

To CHILL, *v. a.* To make cold:

Now no more the drum
Provokes to arms; or trumpet's clangor shrill
Affrights the wives, or *chills* the virgin's blood. *Philips.*

To depress; to deject; to discourage.—Every thought on God *chills* the gaiety of his spirits, and awakens terrors which he cannot bear. *Rogers.*—To blast with cold:

The fruits perish on the ground,
Or soon decay, by snows immod'rate *chill'd*,
By winds are blasted, or by lightning kill'd. *Blackmore.*

CHIL'LAKOTHE, an Indian town on the Great Miami, which was destroyed in 1782 by a body of militia from Kentucky. General Harmar supposes this to be the English Tawixtwi, in Hutchins's map. Here are the ruins of an old fort, and on both sides of the river are extensive meadows. This name is applied to many different places, in honour of an influential chief who formerly headed the Shawanoes. See TAWIXTWI.

CHIL'LAN, or CHILAN, a town of South America, in the country of Chili, and capital of a district; it is chiefly inhabited by Indians: seventy-five miles north-east of Conception.

CHILLEI'ROS, a town of Portugal, in the province of Estramadura: four leagues and a half north-west of Lisbon.

CHILLEU'RS, a town of France, in the department of the Loiret, and chief place of a canton, in the district of Neuville-aux-Bois: fourteen miles north-east of Orleans.

CHIL'LINESS, *s.* A sensation of shivering cold.—If the patient survives three days, the acuteness of the pain abates, and a *chilliness* or shivering affects the body. *Arbuth.*

CHIL'LINGWORTH (William), an eminent divine of the church of England, born at Oxford in 1602, and bred there. He made early proficiency in his studies, being of a very quick genius. He was an expert mathematician, an able divine, and a good poet. Study and conversation at the university turning upon the controversy between the church of England and that of Rome, on account of the king's marriage with Henrietta, daughter to Henry IV. king of France, Mr. Chillingworth forsook the church of England, and embraced the Romish religion. After a short trial of a few months, in the seminary at Douay, Mr. Chillingworth was again tormented with religious scruples: he returned home, resumed his studies, unravelled his mistakes, and delivered his mind from the yoke of superstition. His new creed was built on the principle, that the Bible is our sole judge, and private reason our sole interpreter; and he ably maintains this principle in the Religion of a Protestant, a book which, after startling the doctors of Oxford, is still esteemed the most solid defence of the reformation. The learning, the virtue, the recent merits, of the author, now entitled him to preferment. Sir Thomas Coventry, lord-keeper of the great-seal, therefore promoted him to the chancellorship of the diocese of Salisbury, with the prebend of Brixworth, in Northamptonshire, annexed. Mr. Chillingworth was zealously attached to the royal cause; and, in August 1643, was present in the royal army at the siege of Gloucester, where he advised and directed the making certain engines for assaulting the town. Soon after, having accompanied lord Hopton, general of the king's forces in the west, to Arundel castle in Sussex, he was there taken prisoner by the parliamentary forces under the command of sir William Waller, who obliged the castle to surrender. But his illness increasing, he obtained leave to be conveyed to Chichester, where he was lodged at the bishop's palace; and, after a short sickness, died in 1644. He left several excellent works behind him.

CHILLO'AS, a jurisdiction in the bishopric of Truxillo, in South America.

CHIL'LON, a town of Swisserland, in the canton of Bern: five miles east-south-east of Vevai.

CHIL'LY, *adj.* Somewhat cold:

A *chilly*

A *chilly* ſweat bedews
My ſhudd'ring limbs. *Philips.*

CHILLY, a town of France, in the department of the Jura, and chief place of a canton, in the diſtrict of Lons le Saunier: one league ſouth-weſt of Lons le Saunier.

CHIL'MARK, a town in the American ſtates, on Martha's Vineyard Iſle, Duke's county, Maſſachuſetts, containing 771 inhabitants: ninety-nine miles ſouth by eaſt of Boſton.

CHIL'MARY, a town of Hindooſtan, in the country of Bengal: 110 miles north-eaſt of Moorſhedabad.

CHIL'MINAR. See PERSEPOLIS.

CHIL'NESS, *ſ.* Coldneſs; want of warmth:

This while he thinks, he lifts aloft his dart,
A generous *chilneſs* ſeizes ev'ry part,
The veins pour back the blood, and fortify the heart.
Dryden.

CHI'LO, a Spartan philoſopher, who has been called one of the ſeven wiſe men of Greece. He died through exceſs of joy, in the arms of his ſon, who had obtained a victory at Olympia, B. C. 597.

CHI'LOE, a conſiderable iſland in the South Pacific Ocean, on the coaſt of Chili. The ſouth part of it is divided from the continent by a narrow ſea, which forms a bay. This coaſt is ſubject to tempeſtuous weather, eſpecially in March, when winter begins. The Spaniards have but one little fort in this iſland called Chacao, and the town of Caſtro. This iſland produces all neceſſary refreſhments and proviſions, except wine; and much ambergris is found here. About this iſland are many more, all which together form a juriſdiction called the Juriſdiction of Chiloe. The iſlands of Chiloe are reputed barren; but their ſoil is not really ſo. The nature of the climate is ſuch, that it rains almoſt all the year; ſo that only maize, or other ſuch grains, can ripen, that want not much ſun. The diet of the natives is moſtly of a root called *papayas*, which grows bigger in this iſland than in any other place. The cedar trees grow to an amazing ſize. Lat. 43. S.

CHI'LOK, a river of Siberia, which runs into the Selenga, near Selenginſk.

CHIL'QUES, a juriſdiction of South America, in Peru, ſubject to the biſhop of Cuſco, eight leagues ſouth-eaſt from that city. Its commerce conſiſts in woollen manufactures, grain of all kinds, cows, ſheep, &c.

CHIL'TERN, a ridge of hills, which croſſes the county of Bucks, a little to the ſouth of the center, reaching from Tring, in Hertfordſhire, to Henley, in the county of Oxford. To theſe hills, called the Chiltern hundreds, is annexed the nominal office of ſteward under the crown, the acceptance of which, of conſequence, enables a member of the Britiſh parliament to vacate his ſeat.

CHIMÆ'RA, in fabulous hiſtory, a celebrated monſter, ſprung from Echidna and Typhon, which had three heads, that of a lion, a goat, and a dragon, and continually vomited flames. The fore parts of its body were thoſe of a lion, the middle was that of a goat, and the hinder parts were thoſe of a dragon. It generally lived in Lycia, about the reign of Jobates, by whoſe orders Bellerophon, mounted on the horſe Pegaſus, overcame it. This fabulous tradition is explained by the recollection that there was a burning mountain in Lycia, whoſe top was the reſort of lions, on account of its deſolate wildneſs; the middle, which was fruitful, was covered with goats; and at the bottom the marſhy ground abounded with ſerpents. Bellerophon is ſaid to have conquered the Chimæra, becauſe he firſt made his habitation on that mountain. Plutarch ſays, that it is the captain of ſome pirates, who adorned their ſhip with the images of a lion, a goat, and a dragon.

CHIMÆ'RA, *ſ.* in ichthyology, the *chimera*, a genus of fiſhes belonging to the order of Chondropterygii. The generic character is conſtituted by one ſpine on the back. The body is long; the head ends in a point; but the mouth is underneath, and each jaw has two cutting-teeth. There is one aperture on each ſide for reſpiration. The tail ends in a briſtle, like a ſmall painting-bruſh, and is longer than all the reſt of the body. There are only two ſpecies, called by La Cepede, (Hiſt. Nat. des Poiſſons, 1798.) the *arctic* and *antarctic*, names expreſſive of the part of the globe which they inhabit; and it is worthy of remark, that the only two ſpecies perhaps which reſemble each other in ſhape and habits of this extraordinary nature, ſhould be ſeparated by the greateſt poſſible diſtance; the one inhabiting the midſt of thoſe ſeas which environ the north pole, while the other is found only in the waters about the antarctic circle, and particularly in that part of the ſouth ſea which lies neareſt to that pole. Theſe fiſhes ſeem to have divided the freezing zones between them; as they very rarely approach the temperate climes; but appear to delight in mountains of ice, and in thoſe tempeſtuous hurricanes, frightful to mankind, which almoſt conſtantly blow in the polar regions. If the antarctic chimera advances through the waves of the ſouth ſea much nearer the tropics than does the arctic one amid the rough waves of the north ſea, it muſt be remembered that the ſouthern hemiſphere furniſhes a colder temperature at an equal diſtance from the equatorial line; and that the antarctic chimera finds in that hemiſphere, though nearer to the torrid zone, the ſame degree of cold, the ſame kind and plenty of food, and the ſame conveniences for the fecundation of her ova, as in the northern hemiſphere.

1. Chimæra monſtroſa, the arctic chimera; the ſpecific character of which is, the porous wrinkles or tubercles about the ſnout. The remarkable conformation of this fiſh has gained it the name of *chimera*, to which *monſtroſa* has been added by Linnæus; and, from its manners and habits, Geſner, Johnſton, and Ruyſch, called it *ſimia marina*, the ſea-ape. The agility and wantonneſs of its motions, the flexibility of its long thin tail, its manner of ſhewing its teeth, and contracting its muzzle into diſtortion, have brought to the mind of the obſerver the geſtures and grimaces of thoſe monkeys which are more commonly known. On the other hand, every one knows that the ancients beſtowed on the formidable animal they called *chimera*, the head of a lion, and the tail of a ſerpent. Now the long tail of this fiſh may eaſily call to mind that of a reptile; and the ſituation as well as place of the firſt rays of the dorſal fin might repreſent, though imperfectly, a kind of mane behind the head, which is very large, as in the lion: and a tuft of thin filaments riſes upon the head of the male: this tuft or crown occaſioned the peaſants of Norway to call it "the king of fiſhes." Daubenton, in the Encyclopedie methodique, lately publiſhed, calls it "king of the herrings," probably becauſe it feeds on herrings. The different parts of this animal exhibit proportions very rarely found among other fiſhes, and give it, at firſt ſight, the appearance of a monſter. At a diſtance it looks like a ſhark. The body is long, and laterally compreſſed. The head is broad, and ends ſomewhat in the ſhape of a noſe; with ſeveral foramina, from which a viſcous matter is expreſſed. The mouth opens acroſs, and underneath; it is ſmall, with two large cutting-teeth in each jaw. At the upper jaw there are ſome raiſed lines, ſeemingly compoſed of dots; the upper lip is divided like a hare's. The noſtrils are directly over the mouth; the ſkin of the head is wrinkled or plaited. The eyes are large; the pupil ſea-green, the iris white, and they ſhine like cats eyes, which in ſome countries has gained them the name of *ſea-cat*. Below and above the eye is a curved line, which unites with the lateral line. The lateral line is continued from the head quite to the end of the tail; it is white with a black border on each ſide; and, being very ſtriking to the eye like that of the haddock, the peaſants of the north account it a variety of that fiſh, and accordingly call it *ſpiel-ſtrenglyſe*; but it is to be obſerved, that the Norwegians have not leſs than twelve or fourteen different

ent names for this chimera, which occasions much confusion in the accounts of various authors. It is of a clear silver colour on the belly, clouded or mottled with brown on the back and sides, which has gained it the name of silver-fish among the Norwegians; they call it also gold-fish, silver sea-dog, gold haddock, &c. The anus lies between the ventral fins; the tail is as long as the body, and as it ends very taper and thin, it has occasioned another appellation among the Norwegians, namely, *sea-rat*. The pectoral fins are large, the ventrals small; the second and third dorsals narrow; the first dorsal is of a triangular shape, secured by a very strong spine, which is serrated inwards, and forms the generic character: the second begins near to the first, and is very long; the third is opposite to the anal fin. All the fins are of a brown colour. La Cepede observes, that the intervals between the three dorsal fins are so very small as sometimes not to be susceptible, so that he considers this species as having properly but one dorsal fin.

This species is found in the North Sea; four feet in length, and one in circumference, are the usual dimensions; it lives mostly on shell-fish, which are found triturated in the stomach. It is caught in nets when fishing for the cod; but it is not used for food, because the flesh is rank and hard. The Norwegians make cakes with the eggs; and they extract oil from the liver, which they use in disorders of the eyes, and as a balsam for wounds. This extraordinary animal rarely approaches the shore; the season of coupling is almost the only time it quits the main ocean; it generally remains in deep water, and seldom rises to the surface but by night, as its large tender eyes cannot endure the light of the day reflected from mountains of ice. Yet it has been seen to attack and pursue the innumerable shoals of herrings which appear in the North Sea at certain seasons of the year, and to devour numbers of them.

The stomach is long and round, and the intestinal canal short and broad. Inside the navel, in the females, there is an aperture to each matrix; the matrices communicate with the ovaries by means of the oviducts. Before the ventral fins in the males are two appendices, or claspers, with nails, to confine the female in the act of copulation. The chimera couples therefore like the sharks and the rays; the eggs are fecundated in the body of the female, and are probably most frequently hatched there, as in those fish: but what is most worthy of remark, and which shews the connection between this class of fishes and the serpent-kind, is, that, differing from all the finny race hitherto known, eggs appear to be fecundated during actual and close contact, and by real intromission. Several authors have written that the male has a kind of double penis; and certain it is that the female has a double aperture within the navel, which communicate with a double matrix, and separate oviducts: if this double aperture should have any other office than that of receiving the male organ, it will shew that this extraordinary animal is still farther removed from the usual conformation of the female of fishes in general.

2. Chimera callorhinchus, the antarctic chimera; the specific character of which is a long appendage to the muzzle. This species, which inhabits the southern hemisphere, particularly the seas round the coast of Chili and of New Holland, has much resemblance, in its habits and conformation, to the preceding species; yet it differs in many particulars, as appears from an individual which was a female brought from South America by Dombey. The filament of the tail is shorter, and the three dorsal fins are quite distinct. The lateral line is but just discernible; and the branches from it which run about the head, are not hollowed out in furrows, nor disposed in the same manner as the preceding. But the principal and specific distinction is, that the end of the snout, or rather the upper lip, terminates in a cartilaginous appendage, which comes out in front, and then bends in towards the mouth. This production, which some have fancied to resemble a cock's comb, has gained it the name *cock-fish*; while others have compared it to a trunk, and hence named it the *elephant-fish*. This is wholly of a silvery colour, unclouded with any kind of stripes or spots. Its flesh is insipid, but it is sometimes eaten; it grows about three feet long.

CHIMAR'RHIS, *s.* [so named by Jacquin, απο του χειμαρρου, because it usually grows by torrents.] In botany, a genus of the class pentandria, order monogynia. The generic characters are—Calyx: perianth margin entire, crowning the germ, permanent. Corolla: one-petalled, funnel-form; tube very short; border five-cleft; segments lanceolate, concave, blunt, hirsute below with a longitudinal line running along the middle, and spreading. Stamina; filaments five, subulate, hirsute at the base, below the divisions of the border, the length of the corolla; anthers oval, erect. Pistillum: germ roundish, inferior; style filiform, the length of the stamens; stigma bifid, obtuse. Pericarpium: capsule subovate, obtuse, crowned, two-celled, two-valved; the valves bifid at the tip; seeds solitary.—*Essential Character*. Corolla: funnel-form, with a very short tube; capsule inferior, obtuse, two-celled, two-valved, the valves bifid at the tip; seed one in each cell.

But one species, chimarrhis cymosa. It is a lofty tree, with a handsome head, and the boughs spreading out horizontally. Leaves ovate, acuminate at both ends, quite entire, shining, petioled, opposite, a foot long, commonly eight or ten at the end of each twig. Flowers numerous, small, with white corollas, and without scent, disposed in cymose racemes half a foot in diameter; those in the axils opposite and solitary, those at the end usually four together. Capsules small. Wood white and used for beams, rafters, &c. It is called in Martinico, where it is common, *bois de riviere*.

CHIMAY', a town of the Netherlands, in the county of Hainaut, often ruined by wars, and as often rebuilt. It was ceded to France by the treaty of Ratisbon, in 1684, and restored to the Spaniards by the peace of Ryswick; near it are mines of iron, with founderies and forges: ten posts and a half east-north-east of Cambray, and fifteen and a half south-east of Lisle.

CHIM'BE, a town of South America, and capital of a jurisdiction, in the province of Quito. The town contains about eighty families, Spaniards and Indians, and the whole district about 800 inhabitants.

CHIMBORA'ZO, in the province of Quito, in South America, is the highest point of the Andes, and the highest mountain as yet known in the world; being, according to Condamine, 19,200 feet; according to others, 20,608 feet, above the level of the sea. It lies nearly under the line, being in 1. 41. 40. S. lat. yet its summit is covered with ice and snow, and the country is often pierced with intolerable cold and cutting winds.

CHIME, *s.* [*kime*, Dutch.] The end of a barrel or tub.

CHIME, *s.* [The original of this word is doubtful. Junius and Minshew suppose it corrupted from *cimbal*; Skinner from *gamme*, or *gamut*; Henshaw from *chiamare*, to call, because the chime calls to church. Perhaps it is only softened from *chirme* or *churm*, an old word for the sound of many voices, or instruments making a noise together.] The consonant or harmonic sound of many correspondent instruments:

The sound
Of instruments, that made melodious *chime*,
Was heard of harp and organ. *Milton.*

The correspondence of sound:

Love first invented verse, and form'd the rhyme,
The motion measur'd, harmoniz'd the *chime*. *Dryden.*

The sound of bells, not rung by ropes, but struck with hammers. In this sense it is always used in the plural, *chimes*. See the article CLOCK.

To

CHIMÆRA.

1. The Antarctic Chimera. 2. The Arctic Chimera. 3. The Chermes Insect of the Fig Tree, magnified.

To CHIME, *v. n.* To found in harmony or confonance:

To make the rough recital aptly *chime*,
Or bring the fum of Gallia's lofs to rhime. *Prior.*

To correfpond in relation or proportion.—Father and fon, hufband and wife, and fuch other correlative terms, do belong one to another; and, through cuftom, do readily *chime*, and anfwer one another, in people's memories. *Locke.*—To agree; to fall in with.—He not only fat quietly and heard his father railed at, but often *chimed* in with the difcourfe. *Arbuthnot.*—To fuit with, to agree.—Any fect, whofe reafonings, interpretation, and language, I have been ufed to, will, of courfe, make all *chime* that way. *Locke.*—To jingle; to clatter.

But with the meaner tribe I'm forc'd to *chime*,
And, wanting ftrength to rife, defcend to rhyme. *Smith.*

To CHIME, *v. a.* To ftrike a bell with a hammer. To move, or ftrike, or caufe to found harmonically, or with juft confonancy:

With lifted arms they order ev'ry blow,
And *chime* their founding hammers in a row:
With labour'd anvils Ætna groans below. *Dryden.*

CHIMEPANIPES'TICK, a river of Canada, which runs into the river St. Laurence. Lat. 50. 5. N. lon. 61. 25. W. Greenwich.

CHIME'RA, *f.* [*Chimæra*, Lat.] A vain and wild fancy, as remote from reality as the exiftence of the poetical Chimæra, above defcribed:

In fhort, the force of dreams is of a piece,
Chimeras all, and more abfurd, or lefs. *Dryden.*

CHIME'RA, a town and fortrefs of European Turkey, capital of a diftrict, in the province of Abania, fituated on a rock near the fea coaft, oppofite the ifland of Corfu: eighteen miles fouth of Valona. Lat. 40. N. lon. 36. 48. E. Ferro.

CHIME'RICAL, *adj.* [from *chimera.*] Imaginary; fanciful; wildly, vainly, or fantaftically, conceived; fantaftic.—Notwithftanding the finenefs of this allegory may atone for it in fome meafure, I cannot think that perfons of fuch a *chimerical* exiftence are proper actors in an epic poem. *Spectator.*

CHIME'RICALLY, *adv.* [from *chimerical.*] Vainly; wildly; fantaftically.

CHI'MIN, *f.* [*chemin*, Fr.] In law, road or way; which is of two forts; the king's highway, and a private way. The king's highway, (*chiminus regius,*) is that in which the king's fubjects, and all others under his protection, have free liberty to pafs; though the property of the foil where the way lies belongs to fome private perfon. A private way is that in which one man or more have liberty to pafs, through the ground of another, by prefcription or charter; and this is divided into chimin in grofs, and chimin appendant. Chimin in grofs, is where a perfon holds a way principally and folely in itfelf. Chimin appendant, is that way which a man hath as appurtenant to fome other thing: as if he rent a clofe or pafture, with covenant for ingrefs and egrefs through fome other ground in which otherwife he might not pafs. *Kitch.* 117. *Co. Lit.* 56. See HIGHWAY, TRESPASS, &c.

CHI'MINAGE, *f.* [*chiminagium*, Lat.] Toll due by cuftom for having a way through a foreft; and in ancient records it is fometimes called *pedagium*. *Co. Lit.* 56.

CHIM'NEY, *f.* [*cheminée*, Fr.] The paffage through which the fmoke afcends from the fire in houfes:

Chimnies with fcorn rejecting fmoke. *Swift.*

The turret raifed above the roof of the houfe, for conveyance of the fmoke:

The night has been unruly; where we lay,
Our *chimnies* were blown down. *Shakefpeare.*

The fire-place.—The fire, which the Chaldeans worfhipped for a god, is crept into every man's *chimney*. *Raleigh.*

Notwithftanding the high perfection to which the Greeks and Romans had carried their improvements in architecture, it does not appear, from the refearches of profeffor Beckmann, that either of thefe claffical nations were acquainted with the conftruction of chimneys. This valuable improvement in the comforts and conveniences of dwelling-houfes, did not take place much earlier than the thirteenth century. Previous to that time, it feems that the fmoke iffued from rooms wherein fires were kindled, either through pipes or apertures in the roofs or walls; and which, from the fimilarity of their ufe, appear to have been confounded with the more modern term *chimney*. It fhould feem that both the Greek and Roman kitchens were ufually detached from their dwelling-houfes, and were conftructed either fquare or round, with covered roofs, terminating in a hole or flue in the centre, and fometimes with holes or flues in the walls all round; fo that the fmoke might be carried off in whatever direction the wind blew. The fire-place was in the centre, in the fame manner as in the military or camp kitchens, admitting of many diftinct fires, round which the fervants and cooks could walk without difficulty or impediment. Hence the directions we find given by Columella, to build their kitchens fo high that the roofs may not catch fire, was a precaution of the utmoft importance. Had there been chimneys in the Roman houfes, Vitruvius certainly would not have failed to defcribe their conftruction, which is fometimes attended with confiderable difficulties, and which is intimately connected with the regulation of the plan of the whole edifice. He does not, however, fay a word on this fubject; neither does Julius Pollux, who has collected with great care the Greek names of every part of a dwelling-houfe; and Grapaldus, who in latter times made a like collection of the Latin terms, has not given a Latin word expreffive of a modern chimney. And we might add, that in the late elegant and elaborate work of Stuart and Revett, there is not, among all their collections of the remains of the ancient buildings at Athens, the fmalleft traces or mention of a chimney.

The complaints often made by the ancients refpecting fmoke, ferve alfo to confirm the opinion that they had no chimneys. Vitruvius, where he fpeaks of ornamenting and fitting-up apartments, fays exprefsly, that there ought to be no carved work or mouldings, but plain cornices, in rooms where fire is made and many lights burned, becaufe they will foon be covered with foot, and will therefore require to be often cleaned. On the other hand, he allows carving in fummer apartments, where the effects of fmoke are not to be apprehended. And, however imperfect may be the information which can be collected from the Greek and Roman authors refpecting the manner in which the ancients warmed their apartments, it neverthelefs fhews that they commonly ufed for that purpofe a large brazier or portable ftove, in which they kindled their fires, or filled them with live coals. As in Perfia, and other countries of the eaft, no ftoves made in the European manner are ufed at prefent; and as it is certain that the manners, cuftoms, and furniture, of the early ages have been retained there almoft without variation, we have reafon to fuppofe that the methods employed by the inhabitants for warming themfelves, are the fame as thofe ufed by the ancients. They agree perfectly with the defcriptions given by the Greek and Roman authors, and ferve in fome meafure to illuftrate them. We fhall therefore infert the account given by De la Valle, as it is the cleareft and moft to the purpofe.

"The Perfians," fays he, "make fires in their apartments, not in chimneys as we do, but in ftoves in the earth, which they call *tennor*. Thefe ftoves confift of a fquare or round hole, two fpans or a little more in depth, and in fhape not unlike an Italian cafk. That this hole may throw out heat fooner, and with more ftrength, there is placed in it an iron veffel of the fame fize, which is either filled with burning coals, or a fire of wood and

other inflammable substances is made in it. When this is done, they place over the hole or stove a wooden top, like a small low table, and spread above it a large coverlet quilted with cotton, which hangs down on all sides to the floor. This covering condenses the heat, and causes it to warm the whole apartment. The people who eat or converse there, and some who sleep in it, lie down on the floor above the carpet, and lean, with their shoulders against the wall, on square cushions, upon which they sometimes also sit; for the tennor is constructed in a place equally distant from the walls on both sides. Those who are not very cold only put their feet under the table or covering; but those who require more heat can put their hands under it, or creep under it altogether. By these means the stove diffuses over the whole body, without causing uneasiness to the head, so penetrating and agreeable a warmth, that I never in winter experienced anything more pleasant. Those, however, who require less heat let the coverlet hang down on their side to the floor, and enjoy, without any inconvenience from the stove, the moderately heated air of the apartment. They have a method also of stirring up or blowing the fire when necessary, by means of a small pipe united with the tennor or stove under the earth, and made to project above the floor as high as one chooses, so that the wind when a person blows into it, because it has no other vent, acts immediately upon the fire like a pair of bellows. When there is no longer occasion to use this stove, both holes are closed up, that is to say, the mouth of the stove and that of the pipe which conveys the air to it, by a flat stone made for that purpose. Scarcely any appearance of them is then to be perceived, nor do they occasion inconvenience, especially in a country where it is always customary to cover the floor with a carpet, and where the walls are plaistered. In many parts these ovens are used to cook victuals, by placing kettles over them. They are employed also to bake bread, and for this purpose they are covered with a large broad metal plate, on which the cake is laid: but if the bread is thick and requires more heat, it is put into the stove itself." We may add, that the Jews used such stoves in their houses, and the priests had them also in the temple. That the Greeks and Romans adopted a similar method, is extremely probable; for it is certain that no traces of chimneys were found in the newly discovered city of Herculaneum, as described by the abbé Winckelmann.

That there were no chimneys in the twelfth and thirteenth centuries, seems to be proved by the *ignitegium*, or *pyritegium*, the curfeu-bell of the English, and *couvre-feu* of the French. In the middle ages, as they are termed, people made fires in their houses in a hole or pit in the centre of the floor, under an opening formed in the roof; and when the fire was burnt out, or the family went to bed at night, the hole was shut by a *cover* of wood. In those periods a law was almost every where established, that the fire should be extinguished at a certain time in the evening; that the cover should be put over the fire-place; and that all the family should retire to rest, or at least be at home. The time when this ought to be done was signified by the ringing of a bell. William the Conqueror introduced this law into England in 1068, and fixed the ignitegium at seven in the evening, in order to prevent nocturnal assemblies; but this law was abolished by Henry I. in 1100. The oldest certain account of chimneys, occurs in 1347, in an inscription still existing at Venice, which relates, that at the above period a great many chimneys *(molti camini)* were thrown down by an earthquake. This circumstance is confirmed by John Villani, the historian, who died at Florence in 1348, and who calls the chimneys *fumajuoli*. Galeazzo Gataro, who in the Dictionary of Learned Men is named De Gataris, and who died of the plague in 1405, says in his History of Padua, that Francesco da Carraro, lord of Padua, came to Rome in 1368, and finding no chimneys at the inn where he lodged, because at that time fire was kindled in a hole in the middle of the floor, he caused two chimneys, like those which had been long used at Padua, to be constructed, and arched by masons and carpenters whom he had brought along with him. Over these chimneys, *the first ever seen at Rome*, he affixed his arms, which were still remaining in the time of Gataro. An evident and satisfactory proof that chimneys are but of modern date.

Of the great inconveniences which the ancients laboured under for want of this accommodation, those will best judge who are annoyed with smoky chimnies. Modern invention, however, and the progress of the arts, seem to have overcome this defect. Sir Benjamin Thompson, now count Romford, by detecting the cause, appears to have found a radical cure. One of the philosophical principles, on which this improvement is founded, is a distinction in the form under which heat generated by combustion exists. This the count asserts to have at least two perfectly distinct modifications: viz. that of heat combined with the smoke and vapour flying off from the fuel; and that of heat uncombined, or at least combined only with light, which he calls radiant heat. It is on the conversion of the greatest part of the former into the latter, that he depends for the improvements which he suggests. Practically, his contrivances chiefly consist in narrowing the throat of the chimney, and in constructing the sides of the fire-place in such a manner as to throw forwards, by reflection, as many as possible of the rays of heat and light. We need only add that their efficacy has been proved in the alterations that have been made, under the count's direction, in the fire-places of many houses of persons of distinction in and near London, insomuch that almost every mason, aware of its great utility, is now qualified to alter chimneys, and set grates, upon count Rumford's plan. This circumstance has induced several ingenious persons to co-operate in the views of the above able philosopher, by constructing grates, with an apparatus of vents and tubes, adapted to the principles laid down by the count for curing smoky chimnies. Some of these are the invention of Mr. James Burns, of Glasgow, sanctioned by letters patent, dated November 3, 1799, the plan and properties of which the reader will find under the article GRATE. An improvement of a similar nature, protected likewise by letters patent, has been lately made to the kitchen-range and stove, by Mr. George Stratton, of Cheapside, London; as well to save fuel, as to cure smoky chimnies. We think, however, that smoky chimneys might in general be prevented, by twisting or bending the flue in an oblique or zigzac direction, when they are first constructed. Many able architects, with whom we have conferred on this subject, assure us, that not one stack of chimnies which they have had erected with twisted flues, have been ever known to smoke. The reason is obviously this; that as the parallel line is broken, the weight of the incumbent atmosphere loses its pressure, and the smoke is not impeded in issuing from the aperture of the chimney. For the construction and proportion of chimneys, see ARCHITECTURE, vol. ii. p. 107.

A theory of chimneys and fire-places, has been lately published, by Mr. Dauforth, of the Harvard University, at Cambridge, in America, which possesses great improvements on count Rumford's plan; with a mechanism, whereby in cases of fire, either in ships or in dwelling-houses, the same may be speedily got under and extinguished, with certainty and ease. This proposed improvement seems to be no other than the well-known expedient of establishing a communication by a tube or flue, between the external air and the back part of the fire place. The proposed mode of extinguishing fires depends on a system of tubes carried from an outside wall, to each apartment in the dwelling-house, and terminating in the centre of the ceiling, in a hollow globe pierced full of holes, whereby a stream of water might

be


CHINESE TARTARY
MONGOLS
ORTOS
CALMUCKS
SHENSI
HONAN
PECHELI
WHANG HAY or YELLOW SEA
SEA OF COREA
COREA
GULF OF NANKIN
EASTERN OCEAN
Nankin
Liqueo I
FORMOSA
GULF OF TONKIN
HAINAN
TONKIN
Kesho
LAOS
SIAM
PEGU
THIBET
NIMO

CHINA.

be sent by an engine directly to the spot on which it is wanted, or where the flames are most violent, and thrown in the form of a copious shower on the burning matter. This is confessedly an ingenious device, but not likely, we conceive, to be put in practice.

CHIM'NEY, a town of the island of Ceylon: ninety-four miles south-east of Canda.

CHIM'NEY-MONEY, otherwise called *hearth-money*, A duty to the crown imposed by stat. 14 *Car.* 2. *cap* 2. of 2s. for every hearth in a house; but long since repealed.

CHIM'NEY-PIECE, *s.* The ornamental piece of wood or stone, that is set round or over the fire-place.

CHIM'NEY-SWEEPER, *s.* One whose trade it is to clean foul chimneys of the soot:

The little *chimney-sweeper* stalks along,
And marks with sooty stains the heedless throng. *Gay.*

Our present existing laws with respect to chimney-sweepers, are as follow: By stat. 28 *Geo.* 3. c. 48. churchwardens and overseers, with the consent of two justices, may bind boys of eight years old or upwards; and who, themselves or their parents are chargeable to the parish, or who shall beg; or with the consent of their parents; to be apprentices to chimney-sweepers until they are sixteen years old. The form of the indenture is settled by a schedule annexed to the statute. In that the master covenants to find the boy with decent cloathing; to permit him to attend public worship; and to observe the statute in the several particulars mentioned. All other indentures and agreements are delared void; and any chimney-sweeper keeping an apprentice under eight years old is to forfeit not more than 10l. nor less than 5l. for each. One justice is authorised to settle all complaints of ill usage by the masters, or ill behaviour in the boys. No chimney-sweeper shall keep more than six apprentices at once; the master's name and place of abode are to be inscribed on a brass plate in the front of a leathern cap to be provided by the master for each apprentice, to be worn by the boy when on duty. For every apprentice above six, and for neglecting to provide their caps, the master is to forfeit not exceeding 10l. nor less than 5l. If the master shall mis-use or evil-treat his apprentice, or be guilty of the breach of any of the covenants in his indenture, he shall forfeit, not more than 10l. nor less than 5l. The statute containing the foregoing and other humane regulations, was obtained by the exertions of the benevolent Mr. Jonas Hanway; to whom the public and the poor are indebted for many laudable charities.

CHIMPAN'ZEE, *s.* a species of ape. See SIMIA.

CHIN, *s.* [cinne, Sax. *kinn*, Germ.] The part of the face beneath the under lip.—All the words I could get of her, was wrything her waist, and thrusting out her *chin. Sydney.*

CHI'NA, the most powerful and extensive empire on the continent of Asia, called by the Chinese *Tchong-koue*, or The Middle Kingdom. The Western Moguls called it *Catay*; the Mantchew Tartars, *Nican-courou*; the Japanese, *Thau*; and the people of Cochin-china and Siam, *Cin*. It is probably from this last appellation that the word *China* is derived. The Chinese history relates, that the first imperial family who carried their arms towards the west, assumed the name of Tsin, or Tai-tsin. The armament, which the emperor Tsin-chi-hoang sent as far as Bengal, must have made the people of India acquainted with the name of Tsin, whose formidable power had been felt at so great a distance. This name, passing afterwards from India to Persia and Egypt, might perhaps reach Europe. This is the most probable account we can give of the origin of the name by which this vast empire is generally known. China, properly so called, comprehends from north to south eighteen degrees; its extent from east to west is somewhat less. The adjacent countries subjected to the Chinese government, such as the islands of Hainan and Formosa, Leatong and Tartary, are not included in this estimation; for, if we reckon from the most southern point of the island of Hainan, to the northern extremity of Tartary, which is under the dominion of the emperor of China, we shall find that the territories of this prince are more than 900 leagues in extent from north to south, and about 1500 from east to west, reckoning from the Eastern Sea as far as the country of Casghar, conquered by the Chinese in 1759. China is bounded on the north by Tartary, from which it is separated by the great wall, 500 leagues in length; on the east by the Indian ocean; on the west by lofty mountains and deserts; and towards the south by the ocean, the kingdoms or Tong-king, Laos, and Cochin-china. It is divided into fifteen provinces; which are Pe-tcheli, Kiang-nan, Kiang-si, Fo-kien, Tche-kiang, Hou-quang, Ho-nan, Chan-tong, Chan-si, Shen-si, Se-tchuen, Quang-tong, Quang si, Yun-nan, and Koei-tchou. Each of these provinces is described, from the latest accounts of them, under its respective name, in the alphabetical arrangement of this work.

The Chinese empire is of such antiquity and extent, the laws and customs of the people so singular, and the populousness of the country so great, that ever since the 13th century, when it was visited by Marco Paulo the Venetian traveller, it has deservedly attracted the notice and enquiry of many eminent European historians. Every nation seems more or less inclined to assume to itself too high an antiquity; but in this respect the Chinese have exceeded all reasonable bounds, contending that their first emperor was the first human being created upon the earth, and that from his progenitors the whole world was peopled. It seems indeed admitted, that no nation is more exact in keeping records of every memorable transaction, than that of the Chinese; yet such is the genius of this people for superstition and fable, that they have converted every legendary tale of their ancestors into religious tenets, which they hold in the highest veneration. What contributes most to the uncertainty of their early history is, that about 213 years before Christ, the then reigning emperor caused all the books in the empire to be burnt, except those written by lawyers and physicians. And the more effectually to destroy the memory of every thing contained in them, he commanded a great number of learned men to be buried alive, lest from their memories, they should commit to writing something of the true origin of the empire. The inaccuracy of the Chinese annals is complained of even by their most respected author Confucius, who also affirms, that before his time many of the oldest records had been destroyed.

According to the legendary accounts of the Chinese historians, the first monarch of China was called *Puon-ku*. This, according to some, signifies the first man; but according to Bayer and Menzelius, two very able critics in Chinese literature, the term implies simply *the highest antiquity*. Puon-ku was succeeded by *Tiene-hoang*, which denotes *the emperor of heaven*. They call him also the intelligent heaven, the supreme king of the middle heaven, &c. According to some of their historians, he was the inventor of letters, and of the cyclic characters by which they determine the place of the year, and calculate their time. Tiene-hoang was succeeded by Ti-hoang (the emperor of the earth), who first divided the day and night, appointed thirty days to make one moon, and fixed the winter solstice to the 11th moon. Ti-hoang was succeeded by Gine-hoang (sovereign of men), who with his nine brothers shared the government among them. They built cities, and surrounded them with walls; made a distinction between the sovereign and subjects; instituted marriage, &c. The reigns of these four emperors make up one of what the Chinese called *ki*, ages or periods, of which there were nine before Fohi, whom their most learned people acknowledge to be the founder of their empire.

The history of the second *ki* contradicts almost every thing said of the first; for though we have but just now been told that Gine hoang and his brethren built cities surrounded

surrounded with walls; yet, in the succeeding age, the people dwelt in caves, or perched upon trees as it were in nests. Of the third *ki* we hear nothing; and in the fourth we are told that men were then only taught to retire into the hollows of rocks. Of the fifth and sixth we have no accounts. These six periods, according, to some writers, contained 90,000 years: according to others, 1,100,750. In the seventh and eighth *ki*, they tell us over again what they had said of the first; namely, that men began to leave their caves and dwell in houses, and were taught to prepare clothes. Tchine-fang, the first monarch of the eighth *ki*, taught his subjects to take off the hair from skins with rollers of wood, and cover themselves with the skins so prepared. He taught them also to make a kind of web of their hair, to serve as a covering to their heads against rain. They obeyed his orders with joy, and he called his subjects *people clothed with skins*. His reign lasted 350 years; that of one of his successors, also, named Yeou-tsao-chi, lasted more than 300; and his family continued for 12 or 18,000 years. But what is very surprising, all these thousands of years had elapsed without mankind having any knowledge of fire. This was not discovered till towards the close of this period, by one Souigine. After so useful a discovery, he taught the people to dress their victuals; whereas before, they devoured the flesh of animals quite raw, drank their blood, and swallowed even their hair and feathers. In the ninth period we find the invention, or at least the origin, of letters, attributed to Tsang-hie, who received them from a divine tortoise that carried them on his shell, and delivered them into the hands of Tsang-hie. During this period also, music, money, carriages, merchandize, commerce, &c. were introduced. There are various calculations of the length of these *ki* or periods. Some make the time from Puan-ku to Confucius, who flourished about 479 years before Christ, to contain 279,000 years; others, 2,276,000; some, 2,759,860 years; others, 3,276,000; and some no less than 96,961,740 years. These extravagant accounts are thought by some to contain obscure and imperfect hints concerning the cosmogony and creation of the world. Puon-ku, the first emperor, they think, represents eternity preceding the duration of the world. The succeeding ones, Tiene-hoang, Ti-hoang, and Gine-hoang, they imagine signify the creation of the heavens and earth, and the formation of man. The ten *ki*, or ages, nine of which preceded Fo-hi, mean the ten generations preceding Noah. This may very possibly be the case; for about 300 years before Christ, some Jews travelled into China, who might have made the Mosaic writings known there.

What we have now related, contains the substance of that part of the Chinese history which is entirely fabulous. After the nine *ki*, or ages above-mentioned, the tenth commenced with Fo-hi; and the history, though still obscure and fabulous, begins to grow somewhat more consistent and intelligible. Fo-hi was born in the province of Shen-si. His mother, walking upon the bank of a lake in that province, saw a very large print of a man's foot in the sand; and, being surrounded by an iris or rainbow, became impregnated. The child was named *Fo-hi*; and, when he grew up, was by his countrymen elected king, on account of his superior merit, and styled *Tyent-tse*, "the son of heaven." He invented the eight *qua*, or symbols, consisting of three lines each, which, differently combined, formed sixty-four characters that were made use of to express every thing. To give these the greater credit, he pretended that he had seen them inscribed on the back of a dragon-horse (an animal shaped like a horse, with the wings and scales of a dragon), which arose from the bottom of a lake. Having gained great reputation among his countrymen by this prodigy, he is said to have created mandarins or officers, under the name of *dragons*. Hence we may assign a reason why the emperors of China have always borne a dragon in their banners. Having established a prime minister, he divided the government of his dominions among four mandarins, and died after a reign of 115 years. After Fo-hi, followed a succession of emperors, of whom nothing remarkable is recorded, except that in the reign of *Yau*, the seventh after Fo-hi, the sun did not set for ten days, so that the Chinese were afraid of a general conflagration. This event the compilers of the Universal History take to be the same with that mentioned in the book of Joshua, when the sun and moon stood still for about the space of a day. Fo-hi they will have to be the same with Noah. They imagine, that after the deluge, this patriarch continued some time at the head of his descendants; but on their combination to build the tower of Babel, he separated himself from them, with as many as he could persuade to go along with him; and that, still travelling eastward, he at length entered the fertile country of China, and laid the foundation of that vast empire. In refutation of this fabled detail of the origin of the Chinese empire, the late learned and accomplished writer, Sir William Jones, appears to have taken infinite pains, by investigating the earliest records of the Asiatic languages and literature. He allows the Chinese empire to be very ancient, when compared with the oldest European state, yet he is decidedly of opinion, that it was not founded at an earlier period than the 12th century before the Christian era; and that the people, so far from being Aborigines, are a mixed race of Tartars and Hindoos. He begins his investigations with asking, "Whence came the singular people who long had governed China, before they were conquered by the Tartars? On this problem, says he, four opinions have been advanced, and all rather peremptorily asserted, than supported by argument and evidence. By a few writers, it has been urged, that the *Chinese* are an original race, who have dwelt for ages, if not from eternity, in the land which they now possess. By others, and chiefly by the missionaries, it is insisted that they sprung from the same stock with the *Hebrews* and the *Arabs*. A third assertion is that of the Arabs themselves, and of M. Pauw, who hold it indubitable, that they were originally *Tartars*, descending in wild clans from the steeps of Imaus: and a fourth, that of the Brahmans, who decide, that the *Chinas* (for so they are named in Sanscrit) were Hindoos of the military cast, who, abandoning the privileges of their tribe, rambled in different bodies to the north-east of Bengal; and, forgetting by degrees the rites and the religion of their ancestors, established separate principalities, which were afterwards united in the plains and vallies which are now possessed by them. Of these opinions, Sir William having refuted the first three, proceeds to establish the fourth, which he considers interesting as well as new in Europe. In the Sanscrit institutes of civil and religious duties, revealed, as the Hindoos believe, by Menu the son of Brahma, we find, says he, the following curious passage: 'Many families of the military class, having gradually abandoned the ordinances of the Veda, and the company of Brahmans, lived in a state of degradation; as the people of Pundraca and Odra, those of Dravira and Camboja, the Yavanas and Sacas, the Paradas and Pahlavas, the *Chinas*, and some other nations.' This record would in a great measure decide the question, could we be sure that the word *China* signifies a *Chinese*. Of this fact Sir William Jones took the very best methods to be satisfied. He consulted a number of Pandits separately, who all assured him that the word *China* has no other signification in Sanscrit; that the *Chinas* of Menu settled in a fine country to the north-east of Gaur, and to the east of Camarup and Napal; that they had long been, and still are, famed as ingenious artificers; and that they had themselves seen old Chinese idols, which bore a manifest relation to the primitive religion of India. He then laid before one of the best informed pandits a map of Asia; and, when his own country was pointed out to him, the pandit immediately

diately placed his finger on the north-western provinces of China, as the place where he said the *Chinas* of Menu first established themselves.

In the opinion of Sir William Jones, this is complete evidence that the Chinese are really descended from an Indian race; but he does not believe that the Chinese empire, as we now consider it, was formed when the laws of Menu were first collected. By an accurate comparison of ancient Sanscrit writings, he has been able to fix the period of the compilation of those laws at between 1000 and 1500 years before Christ; but by the evidence of Confucius, he proves, that, if the Chinese empire was then formed, it could be only in its cradle in the 12th century before our era. In the second part of the work, intitled *Lún Yú*, Confucius declares, that "although he, like other men, could relate, as mere lessons of morality, the histories of the first and second imperial houses, yet, *for want of evidence*, he could give no certain account of them." Now, says Sir William, if the Chinese themselves do not pretend that any historical monument existed in the age of Confucius preceding the rise of their third dynasty, about 1100 years before the Christian epoch, we may justly conclude, that their empire was then in its infancy, and did not grow to maturity till some ages afterwards. Nay, he is inclined to bring its origin still lower down. It was not, says he, till the eighth century before the birth of our Saviour, that a small kingdom was erected in the province of Schen-si, the capital of which stood nearly in the 35th degree of northern latitude, and about five degrees to the west of Si-gan. That country and its metropolis were both called *Chin*; and the dominion of its princes was gradually extended to the east and west. The territory of *Chin*, so called by the old Hindoos, by the Persians, and by the Chinese, gave its name to a race of emperors, whose tyranny made their memory so unpopular, that the modern inhabitants of China hold the word in abhorrence, and speak of themselves as the people of a milder and more virtuous dynasty: but it is highly probable, that the whole nation descended from the *Chinas* of Menu, and mixing with the *Tartars*, by whom the plains of *Honan* and the more southern provinces were thinly inhabited, formed by degrees the race of men whom we now see in possession of the noblest empire in Asia.

In support of this opinion, which the accomplished author offers as the result of long and anxious inquiries, he observes, that the Chinese have no ancient monuments from which their origin can be traced, even by plausible conjecture; that their sciences are wholly exotic; that their mechanic arts have nothing in them which any set of men, in a country so highly favoured by nature, might not have discovered and improved; that their philosophy seems yet in so rude a state as hardly to deserve the appellation; and that their popular religion was imported from India in an age comparatively modern. He then institutes a comparison between the mythology of the Chinese and that of the Hindoos; of which the result is, that the former people had an ancient system of ceremonies and superstitions, which has an apparent affinity with some parts of the oldest Indian worship. "They believed in the agency of genii or tutelary spirits, presiding over the stars and the clouds; over lakes and rivers, mountains, valleys, and woods; over certain regions and towns; over all the elements, of which, like the Hindoos, they reckoned five; and particularly over fire, the most brilliant of them. To those deities they offered victims on high places. And the following passage from one of their sacred books, says Sir William, is very much in the style of the Brahmans: 'Even they who perform a sacrifice with due reverence, cannot perfectly assure themselves that the divine spirits accept their oblations; and far less can they, who adore the gods with langour and oscitancy, clearly perceive their sacred illapses.' These (continues the president) are imperfect traces indeed, but they are traces, of an affinity between the religion of Menu and that of the *Chinas*, whom he names among the apostates from it; and besides them, we discover many other very singular marks of relation between the Chinese and the old Hindoos. This relation, he thinks, appears in the remarkable period of 432,000, and the cycle of sixty years; in the predilection for the mystical number *nine*; in many similar fasts and great festivals, especially at the solstices and equinoxes; in the obsequies, consisting of rice and fruits offered to the manes of their ancestors; in the dread of dying childless, lest such offerings should be intermitted; and perhaps in their common abhorrence of *red* objects, which the Indians carried so far, that Menu himself, where he allows a Brahman to trade, if he cannot otherwise support life, absolutely forbids his trading in any sort of *red* cloths, whether linen, or woollen, or made of woven bark. In a word, says Sir William Jones, all the circumstances which have been mentioned seem to prove (as far as such a question admits proof), that the Chinese and Hindoos were originally the same people; but having been separated near 4000 years, they have retained few strong features of their ancient consanguinity, especially as the Hindoos have preserved their old language and ritual, while the Chinese very soon lost both; and the Hindoos have constantly intermarried among themselves, while the Chinese, by a mixture of Tartarian blood from the time of their first establishment, have at length formed a race distinct in appearance both from Indians and Tartars."

Sir George Staunton, who accompanied the earl of Macartney on his late embassy to China, does not indeed directly controvert this reasoning; yet he gives to the Chinese a much higher antiquity than Sir William Jones is inclined to allow them. Taking it for granted that their *cycle* is *their own*, and that it is not the offspring of astronomical science, but of repeated observations, he seems to give credit to many of those annals of the empire, which some other writers have considered as fabulous. "Next to the studies which teach the economy of life, the Chinese, says he, value most the history of the events of their own country, which is, to them, the globe; and of the celestial movements which they had an opportunity of observing at the same time." In regard to the former, he tells us, that "from about *three* centuries before the Christian era, the transactions of the Chinese empire have been regularly, and without any intervening chasm, recorded both in official documents and by private contemporary writers. Nowhere had history become so much an object of public attention, and nowhere more the occupation of learned individuals. Every considerable town throughout the empire was a kind of university, in which degrees were conferred on the proficient in the history and government of the state. Historical works were multiplied throughout. The accounts of *recent* events were exposed to the correction of the witnesses of the facts, and compilations of former transactions to the criticisms of rival writers." In regard to the latter, the movements of the heavenly bodies, he thinks that in no country are there stronger inducements or better opportunities to watch them than in China; and hence he infers, that the cycle of sixty years is of Chinese formation. "In a climate (says he) favourable to astronomy, the balance of hours beyond the number of days during which the sun appeared to return opposite to, and to obscure, or to mix among, the same fixed stars, might be ascertained in a short time; and occasioned the addition of a day to every 4th year, in order to maintain regularity in the computation of time, in regard to the return of the seasons; but many ages must have passed before a period could have been discovered, in which the unequal returns of the sun and moon were so accurately adjusted, that at its termination the new and full moons should return, not only to the same day, but within an hour and a half of the time they had happened, when the period commenced. The knowledge of such a period or cycle could be obtained only by a multiplicity of careful and accu-

rate observations. Many revolutions of those great luminaries must have been completed, and numberless conjunctions have passed over, before their returns could be ascertained to happen in the same day, at the end of nineteen years. The small difference of time between the returning periods of this cycle, was partly lessened by the intervention of another of sixty years, or of 720 revolutions of the moon, which, with the settled intercalations of twenty-two lunations, were at first supposed to bring a perfect coincidence of the relative positions of the sun and moon: but even according to this period, every new year was made constantly to recede, in a very small degree, which the Chinese corrected afterwards from time to time. This cycle answered a double purpose, one as an era for chronological reckoning, and the other as a regulating period for a luni-solar year. Each year of the cycle is distinguished by the union of two characters, taken from such an arrangement of an unequal number of words placed in opposite columns, that the same two characters cannot be found again together for sixty years. The first column contains a series of ten words, the other twelve; which last are, in fact, the same that denote the twelve hours or divisions of the day, each being double the European hour. The first word or character of the first series or column of ten words, joined to the first word of the second series or column of twelve, marks the first year of the cycle; and so on until the first series is exhausted, when the eleventh word of the second series, combined with the first of the first series, marks the eleventh year of the cycle; and the twelfth or last of the second series, joined with the second of the first series, serves for denoting the twelfth year. The third of the first series becomes united in regular progression with the first of the second series, to mark the thirteenth year; and proceeding by this rule, the first character in the first and in the second series cannot come again together for sixty years, or until the first year of the second cycle. The Christian year 1797, answers to the 54th year of the 68th Chinese cycle, which ascertains its commencement to have been 2277 years before the birth of Christ; unless it be supposed that the official records and public annals of the empire, which bear testimony to it, should all be falsified, and that the cycle when first established should have been antidated; which is indeed as little probable as that the period, for example, of the Olympiads should be asserted to have commenced many ages prior to the first Olympic games."

This is a very strong argument against the opinion of a man whose talents and knowledge of oriental learning, were such as to give to his decisions on such subjects the greatest weight. If the statements and reasonings of Sir George Staunton be accurate, the Chinese empire must have subsisted at least 3000 years before the Christian era; for he says expresly, that *many ages* must have elapsed before the commencement of that cycle, which, according to him, commenced 2277 years before the birth of Christ. Upon evidence so equally supported, and by men of such superior ability, we by no means think ourselves qualified to decide. The question will probably remain for ever at issue, unless some very decisive documents should be hereafter discovered, whereby these two arguments might be reconciled; or the one or other of them proved to be in fact, what they now only appear to be in conjecture. We therefore proceed to give that part of the Chinese history which, stands upon a surer basis. The whole of the Chinese emperors abstracting from those who are said to have reigned in the fabulous times, are comprehended in twenty-two dynasties, viz.

	Emperors.	Before Christ.
1. Hya, containing	17	2207
2. Shang, or Ing	28	1766
3. Chew	35	1122
4. Tsin	4	248
5. Han	25	206

	Emperors.	After Christ.
6. Hew-han	2	220
7. Tsin	15	465
8. Song	8	220
9. Tsi	5	479
10. Lyang	4	502
11. Chin	4	557
12. Swi	3	
13. Twang	20	618
14. Hew-lyang	2	907
15. Hew-tang	4	923
16. Hew-tsin	2	936
17. Hew-han	2	947
18. Hew-chew	3	951
19. Song	18	960
20. Iwen	9	1280
21. Ming	16	1368
22. Tsing		1645

This table is formed according to the accounts of Du Halde, and is commonly reckoned to be the most authentic; but according to the hypothesis of the compilers of the Universal History, who make *Yau* contemporary with Joshua, the dynasty of *Hya* did not commence till the year before Christ 1557; and, to accommodate the history to their hypothesis, great alterations must be made in the duration of the dynasties.

The most interesting particulars of the Chinese history relate only to the incursions of the Tartars, who finally conquered the whole empire, and who still continue to hold the sovereignty; though by transferring the seat of the empire to Peking, and adopting the Chinese language, manners, &c. Tartary would seem rather to have been conquered by China, than China by Tartary.

In the tenth century of the Christian era, the Kitan Tartars first got a footing in China. The Kitan were a people of eastern Tartary, who dwelt to the north and north-east of the province of Pecheli in China, lying without the great wall. These people having subdued the country between Korea and Kashgar, became much more troublesome to the Chinese than all the other Tartars. Their empire commenced about 916 of the Christian era, and in the fourth year of the 14th Chinese dynasty, called *Hew-lyang*. In 946, Mingt-song, second emperor of the 15th dynasty, being dead, Sheking-tang his son-in-law rebelled against Mingt-song, his son and successor, whom he deprived of his crown and life. This he accomplished by means of an army of 50,000 men, furnished by the Kitan Tartars. Fi-ti, the son of Mingt-song, being unable to resist the usurper, fled to the city Ghey-chew; where shutting himself up with his family and all his valuable effects, he set fire to the palace, and was burnt to ashes. On his death, Sheking-tang assumed the title of emperor; founded the 16th dynasty; and changed his name to that of *Kaut-su*. But the Kitan general refusing to acknowledge him, he was obliged to purchase a peace, by yielding up to the Tartars sixteen cities in the province of Pe-tche-li, besides a yearly present of 300,000 pieces of silk. This submission served only to inflame the avarice and ambition of the Kitan Tartars. In 959, they broke the treaty, invaded the empire, and continued their incursions from time to time with various success, until the year 1117, when Whey-tsong, at that time emperor, being able neither to bear their ravages, nor to put a stop to them, resolved upon a remedy, which seems to have proved worse than the disease. This was to call in the Eastern Tartars, or Nu-che, to destroy the kingdom of the Kitan. From this he was dissuaded by most of his own ministers; but, disregarding their advice, he joined his forces to those of the Nu-che. The Kitans were now every where defeated; and reduced to such extremity, that those who remained were obliged to fly to the mountains of the west. Thus the empire of the Kitan was totally destroyed, but not to the advantage of the Chinese; for the Tartar general, elated with

with his conquest, gave the name of *Kin* to his new dominion, and assumed the title of emperor. He then invaded the provinces of Pe-tche-li and Shen-si, and made himself master of the greater part of them. Whey tsong, finding himself in danger of losing his dominions, made several proposals to the Tartar; who, seeming to comply with them, invited him to come and settle matters by a personal conference. The Chinese monarch complied; but, on his arrival, he was seized by the Tartar, and kept a prisoner during the remaining part of his life, which ended in 1126, in the desert of Shamo, having nominated his eldest son Kin-tsong to succeed him.

The Kin Tartars in the mean time pursued their conquests without opposition: they crossed the Yellow River, and marching directly towards the imperial city, took and plundered it. Then seizing the emperor and his consort, they carried them away captives: but many of the principal inhabitants, preferring death to an ignominious bondage, killed themselves. The Kin being informed by the empress *Meng* that she had been divorced, they left her behind. This proved the means of saving the empire; for, by her wisdom and prudence, she got the crown placed on the head of Kau-tsong, ninth son of the late emperor. Kau-tsong fixed his court at Nanking, but soon after was obliged to remove it. He made several efforts to recover some of his provinces from the Kin, but without effect. Ili-tsong, the Kin monarch, in the mean time endeavoured to gain the esteem of his new Chinese subjects, by paying a regard to learning and learned men, and honouring the memory of Confucius. Some time after, he advanced to Nanking, and took it: but receiving advice that the general of the southern Chinese was advancing to the relief of that city, they set fire to the palace, and retired northward. In a few years afterwards the Chinese emperor submitted to become tributary to the Kin Tartars, and concluded a peace with them.

From this time to the year 1210, nothing remarkable occurs in the Chinese History; but this year the famous Jenghiz-khan, chief of the western Tartars or *Moguls*, quarrelled with Yong-tsi, emperor of the Kin; and at the same time the king of Hya, disgusted at being refused assistance against Jenghiz-khan, threatened him with an invasion on the western side. Yong-tsi prepared for his defence; but, in 1211, receiving news that Jenghiz-khan was advancing southward with his whole army, he was seized with fear, and made proposals of peace, which were rejected. In 1212, the Mogul generals forced the great wall; or, according to some writers, had one of the gates treacherously opened to them, and made incursions as far as Peking, the capital of the Kin empire. In autumn they laid siege to the city of Tay-tong-fu, where Jenghiz-khan met with considerable resistance. Having lost a number of men, and being himself wounded by an arrow, he was obliged to raise the siege and retire into Tartary, after which the Kin re-took several cities. The next year, however, Jenghiz-khan re-entered China; retook the cities which the Kin had reduced the year before; and overthrew their armies in two desperate battles, in one of which the ground was strewed with dead bodies for upwards of four leagues.

In 1224, the Kin emperor died; and was succeeded by his son Shew, who made peace with the king of Hya: but next year that kingdom was entirely destroyed by Jenghiz-khan. In 1226, Oktay, son to Jenghiz-khan, marched into Honan, and besieged Kay-fong-fu, capital of the Kin empire; but was obliged to withdraw into Shen-si, where he took several cities, and cut in pieces an army of 30,000 men. In 1227, Jenghiz-khan died, after having desired his sons, Oktay and Toley, to pursue his conquests. After the death of that great emperor, the war was carried on with various success; but though the Moguls took above sixty important posts in the province of Shen-si, they found it impossible to force Ton-quan, which it was necessary for them to do, in order to penetrate into Honan. In April, 1231, they took the capital of Shen-si, and defeated the Kin army which came to its relief. Here one of the officers desired prince Toley to demand a passage from the Song through the country of Han-chong-fu. This proposal Toley communicated to his brother Oktay, who approved of it as being conformable to the dying advice of their father. Hereupon Toley, having assembled all his forces, sent a messenger to the Song generals to demand a passage through their territories. This they not only refused, but put the messenger to death; which so enraged Toley, that he forced the passages, and put to the sword the inhabitants of two cities in the district of Han-chong-fu. Then having cut down rocks to fill up deep abysses, and made roads through places almost inaccessible, he at length came and besieged the city of Han-chong-fu. The inhabitants fled to the mountains on his approach, and more than 100,000 of them perished. After this, Toley divided his forces, consisting of 30,000 horse, into two bodies. One of these went westward to Myen-chew; from thence, after opening the passages of the mountains, they arrived at the river Kyaling. This they crossed on rafts; and then, marching along its banks, destroyed more than 140 cities, towns, or fortresses, before they returned to the army. On the other side, Oktay advanced towards Pu-chew, a city of Shan-si; which being taken after a vigorous defence, he prepared to pass the Yellow River. Toley, after surmounting incredible difficulties, arrived on the borders of Honan, and made a shew as if he designed to attack the capital of the Kin empire. On his appearance in Honan, through a passage so little suspected, every body was filled with terror and consternation; so that he proceeded for some time without opposition. At last the emperor ordered his generals, Hota, Ilapua, and others, to march against him. Toley boldly attacked them; but was obliged to retire, which he did in good order.

In January 1232, Oktay encamped in the district of Kay-fong-fu, capital of the Kin empire, and sent his general Suputay to besiege the city. At that time the place was near thirty miles in circumference: but having only 40,000 soldiers to defend it, as many more from the neighbouring cities, and 20,000 peasants, were ordered into it; while the emperor published an affecting declaration, animating the people to defend it to the last extremity. Oktay, having heard with joy of his brother Toley's entrance into Honan, ordered him to send succours to Suputay. On the other hand, the Kin generals advanced with 150,000 men to relieve the city; but being obliged to divide their forces in order to avoid in part the great road which Toley had obstructed with trees, they were attacked by that prince at a disadvantage, and after a faint resistance, defeated with great slaughter, and the loss of both their generals, one killed and the other taken. The emperor now ordered the army at all the fortified places to march to the relief of Kay-fong-fu. They assembled accordingly, to the number of 110,000 foot and 15,000 horse; and were followed by vast numbers of people, who expected by their means to be protected from the enemy. But many of these troops having deserted, and the rest being enfeebled by the fatigues of their march, they dispersed on the approach of their pursuers, who killed all they found in the highways. After this the Moguls took Ton-quan, and some other considerable posts; but were obliged to raise the siege of Loyang, by the bravery of the governor. Kyang-shin, governor of Loyang, had only three or 4000 soldiers under him, while his enemies were 30,000 strong. He placed his worst soldiers on the walls, putting himself at the head of 400 brave men; whom he ordered to go naked, and whom he led to all dangerous attacks. He invented engines to cast large stones, which required but few hands to play them, and aimed so true as to hit at 100 paces distance. When their arrows failed, he cut those shot by the enemy into four pieces; pointed them with pieces

of

of brass coin; and discharged them from wooden tubes with almost as much force as bullets from a musket. Thus he harassed the Moguls for three months so grievously, that they were obliged, notwithstanding their numbers, to abandon the enterprize.

Oktay, at last, notwithstanding his successes, resolved to return to Tartary; and offered the Kin emperor peace, provided he became tributary, and delivered up to him twenty-seven families which he named. These offers were very agreeable to the emperor, and a peace was concluded. But, in a short time, two unlucky accidents occasioned a renewal of the war, which put an end to the empire of the Kin Tartars. Gan-yong, a young Mogul lord, having assumed the government of some cities in Kyang-nan, and killed the officer sent to take possession of them, declared for the Kin. The emperor unwarily took Gan-yong into his service, and gave him the title of Prince. Upon this Oktay sent an envoy, attended by thirty other persons, to inquire into the affair; but the Kin officers killed them all, without being punished by the emperor. Suputay, having informed his master of all these proceedings, was ordered to continue the war in Honan. Shew-su now commanded his officers to unite their troops for the defence of the capital; but, before his orders could be obeyed, they were attacked and defeated by the Moguls. This obliged him to raise soldiers from among the peasants, for whose subsistence the people were taxed three-tenths of the rice they possessed. The city began now to be distressed for want of provisions; and as it was but in a bad posture of defence, the emperor marched with an army against the Moguls. His expedition proved unfortunate; for, sending part of his army to besiege a city called Whychew, it was totally cut in pieces, and Suputay a second time sat down before the capital, which was soon after delivered up by treachery, and Suputay put all the males of the imperial race to death; but, by the express command of Oktay, he spared the inhabitants, who are said to have amounted to 1,400,000 families. The unhappy monarch now retired to Juning-fu, a city in the southern part of Honan, attended only by 400 persons. Here he flattered himself with the vain hopes of being in safety; but the enemy's army soon arrived before the city, and invested it. The garrison were terrified at their approach; but were encouraged by the emperor, and his brave general Hu-sye-hu, to hold out to the last. As there was not in the city a sufficient number of men, the women, dressed in men's clothes, were employed to carry wood, stones, and other necessary materials, to the walls. All their efforts, however, were ineffectual. They were reduced to such extremities, that for three months they fed on human flesh; killing the old and feeble, as well as many prisoners, for food. This being known to the Moguls, they made a general assault in January 1234. The attack continued from morning till night, when the assailants were repulsed. In this action, however, the Kin lost all their best officers; upon which the emperor resigned the crown to Cheng-lin, a prince of the blood. Next morning, while the ceremony of investing the new emperor was performing, the enemy mounted the walls, and attacked the interior city. They were opposed by Hu-sye-hu; who, with 1000 soldiers continued to fight with amazing intrepidity. In the mean time Shew-su, seeing every thing irreparably lost, lodged the seal of the empire in an apartment of the palace, and then causing sheaves of straw to be set round it, ordered it to be set on fire as soon as he was dead. After giving this order he hanged himself, and his commands were executed by his domestics. Hu-sye-hu, who still continued fighting with great bravery, no sooner heard of the tragical death of the emperor, than he drowned himself in the river, as did also 500 of his most resolute soldiers. The same day the new emperor, Cheng-lin, was slain; and thus a total end was put to the dominion of the Kin Tartars in China.

The empire of China was now to be shared between the Song, or southern Chinese, and the Moguls. It had been agreed upon, that the province of Honan should be delivered up to the Song as soon as the war was finished. But, the Chinese, without waiting for the expiration of the term, or giving Oktay notice of their proceedings, introduced their troops into Kay-fong-fu, Lo-yang, and other considerable cities. On this the Mogul general resolved to attack them; and repassing the Yellow river, cut in pieces part of the garrison of Lo-yang, while they were out in search of provisions. In 1236, the Moguls still made great progress, took several cities, and put vast numbers to the sword. Prince Kotovan forced the passages into the district of Hang-chong-fu, in the province of Shen-si, which he entered with an army of 500,000 men. Here a terrible battle was fought between the vast army of the Moguls and the Chinese troops, who had been driven from the passages they defended. The latter consisting only of 10,000 horse and foot, were almost entirely cut off; and the Moguls lost such a number of men, that the blood is said to have run for two leagues together. After this victory the Moguls entered Se-chwen, which they almost entirely reduced, committing such barbarities, that, in one city, 40,000 people chose rather to put an end to their existence, than submit to such cruel conquerors. In 1237, the Moguls received a considerable check before the city of Gantong in Kyang-nan, the siege of which they were obliged to raise with loss. In 1238, they besieged Lu-chew, another city in the same province. They surrounded it with a rampart of earth and a double ditch; but the Chinese general ordered their intrenchments to be filled with immense quantities of herbs steeped in oil, and then set on fire, while he showered down stones upon them from a tower seven stories high. At the same time a vigorous sally was made; and the Mogul army, being thrown into the utmost disorder, were obliged finally to abandon the siege, and retire northwards. In 1255, they re-entered the province of Se-chwen; but still met with vigorous opposition.

In 1259, they undertook the siege of Ho-chew, a strong city to the west of Peking, defended by Vang-kyen, an able officer, who commanded a numerous garrison. The siege continued from February till August: during which time the Moguls lost an immense number of men. On the 10th of August they made a general assault in the night. They mounted the walls before the governor had intelligence; but were repulsed with the utmost fury. The Mogul emperor, Meng-ko, himself came to the scalade; but his presence was not sufficient to overcome the valour of Vang-kyen. At the same time the scaling-ladders of the Moguls were blown down by a storm; upon which a terrible slaughter ensued, and amongst the rest fell the emperor himself. Upon this disaster the Mogul generals raised the siege, and retired towards Shen-si.

On the death of Meng-ko, Hupilay, who succeeded him, laid siege to Vu-chang-fu, a city not far distant from the capital of the Song empire. At this the Chinese emperor being greatly alarmed, distributed immense sums among his troops; and, having raised a formidable army, marched to the relief of Vu-chang-fu. Unfortunately the command of this army was committed to the care of Kya-tse-tau, a man without courage or integrity; who being overcome with fear, and not daring to take any effectual step for its relief, made proposals of peace. A treaty was accordingly concluded, by which Kya-tse-tau engaged to pay an annual tribute of about 50,000l. sterling, and as much in silk; acknowledging likewise the sovereignty of the Moguls over the Song empire. In consequence of this treaty, the Moguls repassed the Ky-ang; but, 170 of them having staid on this side of the river, were put to death by Kya-tse-tau. This wicked minister totally concealed from the emperor his having made such a shameful treaty with the Moguls; and the 170 soldiers massacred by his order, gave occasion to a report that the enemy had been defeated; so that the Song court believed that they had been compelled to retreat by the superior valour

valour and wisdom of Kya-tse-tau. This proved the subversion of the empire; for, in 1260, the Mogul emperor sent Hauking to the Chinese court to execute the treaty, according to the terms agreed on with Kya-tse-tau. The minister, dreading the arrival of this envoy, imprisoned him near Nanking; and took all possible care that neither Hupilay, nor Li-tsong, the Chinese emperor, should ever hear any thing of him. It was impossible such treacherous conduct could fail to produce a new war. Hupilay's courtiers incessantly pressed him to revenge himself on the Song; and he soon published a manifesto against them, which was followed by a renewal of hostilities in 1268. The Mogul army amounted to 300,000 men; but, notwithstanding their numbers, little progress was made till the year 1271. Syan-yang and Fan-ching, cities in the province of Se-chew, had been long besieged ineffectually; but this year an *Igur* lord advised Hupilay to send for some engineers from the west, who knew how to cast stones of 150 pounds weight out of their engines, and which made excavations in the strongest walls. Two of these engineers were accordingly sent for; and, after giving a specimen of their art before Hupilay, were sent to the army in 1272. In the beginning of 1273, they planted their catapultas against the city of Fan-ching, and presently made a breach in the walls. After a bloody conflict the suburbs were taken; and soon after the Moguls made themselves masters of the gates of the city. Nevertheless, a Chinese officer, with only 100 soldiers, resolved to fight from street to street. This he did with the greatest obstinacy, killing vast numbers of the Moguls; and both parties are said to have been so much overcome with thirst, that they drank human blood to quench it. The Chinese set fire to the houses, that the great beams, falling down, might embarrass the way of their pursuers; until wearied out, and filled with despair, they put an end to their own lives. After the taking of Fan-ching, all the materials which had served at the siege were transported to Seyen-yang. The two engineers posted themselves against a wooden retrenchment raised on the ramparts. This they quickly demolished; and the besieged were so intimidated by the noise and havock made by the stones cast from their engines, that they immediately surrendered.

Notwithstanding the progress of the Moguls, vast territories still remained to be subdued before they could become masters of the Chinese empire. On the death of Twon-tsong, the Chinese emperor, the mandarins raised to the throne his brother, named Te-ping, at that time but eight years of age. His army consisted of 200,000 men; but being void of discipline, and ignorant of war, they were defeated by 20,000 Mogul troops. Nor was the fleet more successful; for being put in confusion by that of the Moguls, and the emperor in danger of falling into their hands, one of the officers taking him on his shoulders, jumped with him into the sea, where they were both drowned. Most of the mandarins followed this example, as did also the empress and minister, all the ladies and maids of honour, and multitudes of others, insomuch that 100,000 people are said to have perished on that day. Thus ended the Chinese race of emperors; and the Mogul reign, or dynasty, known by the name of *Ywen*, commenced.

Though no race of men that ever existed, were more remarkable for cruelty and barbarity than the Moguls; yet it doth not appear that the emperors of the Ywen dynasty were in any respect worse than their predecessors. On the contrary, Hupilay, by the Chinese called *Shi-tsu*, found the art of reconciling the people to his government, and even of endearing himself to them so much, that the reign of his family was stiled by the Chinese, *the wise government*. On his first accession to the crown, he fixed his residence at Tay-ywen-fu, the capital of Shen-si; but he afterwards removed it to Peking. Here, being informed that the barks which brought to court the tribute of the southern provinces, and carried on the trade of the empire, were obliged to come by sea, and often suffered shipwreck, he caused that immense canal to be made, which is one of the wonders of the Chinese empire. By this canal above 9000 imperial barks transport with ease, and at small expence, the tribute of grain, rice, silks, &c. which is annually paid to the court. In the third year of his reign he formed a design of reducing the islands of Japan, and the kingdoms of Tonkquin and Cochin-china. Both these enterprises ended unfortunately, but the first remarkably so; for out of 100,000 persons employed in it, only four or five escaped with the melancholy news of the destruction of the rest, who all perished by shipwreck. Shi-tsu reigned fifteen years, died in the eightieth year of his age, and was succeeded by his grandson. The throne continued in the Ywen family till 1367, when Shud-ti, the last of that dynasty, was driven out by a Chinese named Chu. During this period the Tartars had become enervated by long prosperity; and the Chinese had been roused into valour by their subjection. Shun-ti, the reigning prince, was sunk in sloth and debauchery; and the empire was oppressed by a wicked minister named Ama. In June 1355, Chu, who was a Chinese of mean extraction, and the head of a small party, set out from How-chew, passed the Kyang, and took Tay-ping. He then associated with some other malcontents, at the head of whom he reduced the town of Tu-chew. Soon after he made himself master of Nanking, having defeated the Moguls who came to its relief. In December 1356, he was able to raise 100,000 men, at the head of whom he took the city U-chew; and here, assembling his generals, it was resolved neither to commit violence, nor to plunder. The most formidable enemy he had was *Chen-yew-lyang*, stiled "emperor of the Han." This prince being grieved at the progress made by Chu, equipped a fleet, and raised a formidable army, in order to reduce Nan-chang-fu, which his antagonist had lately made himself master of. The governor, however, found means to inform Chu of his danger; upon which that chief caused a fleet to be fitted out at Nanking, in which he embarked 200,000 soldiers. As soon as Chen-yew-lyang was informed of his enemy's approach, he raised the siege of Nan-chang-fu, and gave orders for attacking Chu's naval force. An engagement ensued between a part of the fleets, in which Chu was victorious; and next day, all the squadrons having come to a general engagement, Chu gained a second victory, and burnt 100 of the enemy's vessels. A third and fourth engagement followed, in all of which Chu came off victorious. Chen-yew-lyang was killed, his son taken prisoner, and his generals obliged to surrender at discretion.

In January 1364, Chu's generals proposed to have him proclaimed emperor; but this he declined, and contented himself with the title of king of *U*. In February he made himself master of Vu-chang-fu; where, with his usual humanity, he relieved those in distress, encouraged the literati, and would allow his troops neither to plunder nor destroy. This wise conduct procured him an easy conquest both of Kyang-si and Hu-quang. The Chinese readily submitted to him, and professed the greatest veneration for his person and government. All this time Shun-ti, with an unaccountable negligence, never thought of exerting himself against Chu, but continued to employ his forces against the rebels who had taken up arms in various parts of the empire; so that now Chu thought himself in a condition to assume the title of emperor. This he chose to do at Nanking, on the first day of the year 1368. After this his troops entered the province of Honan, which they presently reduced. In the third month, Chu, who had now taken the title of *Hong-vu*, or *Tay-tsu*, reduced the fortress of Tong-quan; after which his troops entered Pe-tcheli from Honan on the one side, and Shan-tong on the other. Here his generals defeated one of Shun-ti's armies; after which they took the city of Tong-chew, and then prepared to attack the capital, from which they were now but twelve miles

miles distant. On their approach the emperor fled with all his family beyond the great wall, and this put an end to the dynasty of Ywen. In 1370 he died, and was succeeded by his son, whom the successor of Hong-vu drove beyond the Kobi or Great Desert, which separates China from Tartary.

The 21st dynasty of Chinese emperors, founded in 1368 by Chu, continued till the year 1644, when they were again expelled by the Tartars. The last Chinese emperor was named Whay-tsong, and ascended the throne in 1628. He was a great lover of the sciences, and a favourer of the Christians; though much addicted to the superstitions of the Bonzes. He was engaged in a war with the Tartars, and with a number of rebels in different provinces.

In 1636, the Tartars and rebels above-mentioned composed four great armies, commanded by as many generals; which armies, however, were soon reduced to two, commanded by Li and Chang. These two generals agreed to divide the empire between them; Chang taking the western provinces, and Li the eastern. The latter seized on part of Shen-si, and then of Honan, whose capital, named Kay-fong-fu, he laid siege to, but was repulsed with loss. He renewed it six months after, but without success; the besieged chusing rather to feed on human flesh than surrender. The Imperial forces coming soon after to its assistance, the general made no doubt of being able to destroy the rebels at once, by breaking down the banks of the Yellow River; but they escaped to the mountains, while the city was rapidly overflowed, and 300,000 of the inhabitants perished. After this disaster, Li marched into the provinces of Shen-si and Honan; where he put to death numbers of the mandarins, exacted great sums from the officers in place, and shewed no favour to any but the populace, whom he freed from all taxes: by this means he drew so many to his interest, that he thought himself strong enough to assume the title of emperor. He then advanced towards the capital, which, though well garrisoned, was divided by factions. Li had taken care to introduce before hand, a number of his men in disguise, and by these the gates were opened to him the third day after his arrival. He entered the city in triumph at the head of 300,000 men; whilst the emperor kept himself shut up in his palace, busied only with his superstitions. It was not long, however, before he found himself betrayed: and, under the greatest consternation, made an effort to get out of the palace, attended by about 600 of his guards. He was still more surprised to see himself treacherously abandoned by them, and deprived of all hopes of escaping the insults of his subjects. Upon this, preferring death to the disgrace of falling alive into the hands of his enemies, he retired with his empress, whom he tenderly loved, and the princess her daughter, into a private part of the garden. His grief was so great that he was not able to utter a word; but she soon understood his meaning, and, after a few silent embraces, hanged herself on a tree in a silken string. Her husband staid only to write these words on the border of his vest: "I have been basely deserted by my subjects; do what you will with me, but spare my people." He then cut off the young princess's head with his scymitar, and hanged himself on another tree, in the seventeenth year of his reign, and thirty-sixth of his age. His ministers, women, and eunuchs, followed his example; and thus ended the Chinese monarchy usurped by Chu, to give place to that of the Tartars, which hath continued ever since.

It was some time before the body of the unfortunate monarch was found. At last it was brought before Li, and used with the utmost indignity; after which he caused two of Whey-tsong's sons to be beheaded; but his eldest son escaped by flight. The whole empire now submitted to the authority of Li, except prince U-san-ghey, who commanded the imperial forces in the province of Lyau-tong. This brave prince, finding himself unable to cope with Li, invited the Tartars to his assistance; and Tsong-te their king immediately joined him with 80,000 men. Upon this Li marched to Peking; but not thinking himself safe there, he plundered and burnt the palace, and then fled with the immense treasure he had collected. What became of him afterwards we are not told; but the young Tartar monarch was immediately declared emperor of China, his father Tsong-te having died almost as soon as he set his foot in that empire. This new emperor, named *Shun-chi*, or *Xun-chi*, the first of the Man-choo Tartar race, began his reign with rewarding U-san-ghey, by conferring upon him the title of King; and assigned him the city of Si-gnan-fu, capital of Shen-si, for his residence. This, however, did not hinder U-san-ghey from repenting of his error in calling in the Tartars, or, as he himself used to phrase it, "in sending for lions to drive away dogs." In 1674, he formed a strong alliance against them, and would probably have prevailed, if his allies had been faithful; but they treacherously deserted him, which broke his heart, and he died soon after. In 1681 Hong-wha, son to U-san-ghey, who continued his efforts against the Tartars, was reduced to such distress, that he put an end to his own life.

During this space, there had been some resistance made to the Tartars in many of the provinces. Two princes of Chinese extraction had at different times been proclaimed emperors; but both of them were defeated and put to death. In 1682, the whole fifteen provinces were so effectually subdued, that the emperor Kang-hi, successor to Shun-chi, determined to visit his native dominions of Tartary. He was accompanied by an army of 70,000 men, to attend him in taking the diversion of hunting. This he continued to do for some years; and in his journies took father Verbeist, the jesuit missionary, along with him; by which means we have a better description of these countries than could possibly have been otherwise obtained. This prince was a great encourager of learning, and of the Christian religion; in favour of which he published a decree, dated in 1692. In 1716, however, he revived some obsolete laws against the Christians; nor could the missionaries, at least for a time, preserve the footing they had got in China. The cause of this hasty persecuting spirit in so good and wise a prince, has been variously represented by different authors. The true cause, was the jealousy of the bonzes or priests of Fo, who, working on the prejudices and passions of some of the mandarins in their interest; they, in their turn, imposed on the emperor, by misrepresentations of the pursuits and practices of the Christian converts, which not only led to the revival of edicts against them, but against the movers of all new sects, or novel doctrines, lest they should effect the tranquillity of the state. Many of the missionaries were however restored, and suffered to penetrate through the different provinces of China, for some time before the death of Kaung-hi, which happened after a long and prosperous reign, in the year 1722. He was succeeded by his son Yong-tchien, who, though a moderate and peaceful emperor, not only gave no encouragement to the missionaries but persecuted all Christians, of what country or denomination soever. He at first limited the missionaries to the province of Quang-tong; but, in 1732, upon some misunderstanding or disturbance between the Europeans and Chinese in the city of Canton, they were finally banished to the island of Macao, which had been given to the Portuguese.

In 1736, Yong-tchien died, and was succeeded by his son Tchien-lung, surnamed the Great Emperor. It was to this prince, that the celebrated embassy under the direction of the earl of Macartney, was sent by his Britannic majesty; and it was during his reign, that the Chinese people and nation began to grow into high estimation with the commercial kingdoms of Europe. Tchien-lung soon after his accession to the throne, recalled the missionaries, and retained the most distinguished of

of them in his service, by giving them appointments of trust and confidence about his person and court at Pekin. He gave encouragement to artists and scientific emigrants from all countries, with a view to the general improvement of the Chinese empire. We shall not, in this place, enter into any further particulars of his reign, because these will be sufficiently shewn in our account of the embassy. After a calm and prosperous reign, extended to the unusual length of sixty-three years, he died in March 1799, in the ninetieth year of his age, and was succeeded by his son Ka-hing, the present reigning emperor; who, adopting the policy of his ancestors, appears, like them, averse to any foreign intercourse or connection.

The extensive country over which this monarch holds the absolute sway, is thus emphatically depicted by sir William Jones: "Though I do not pretend (says he) to set limits to this vast empire, yet I might consider it as embraced on two sides by Tartary and India, while the ocean separates its other sides from various Asiatic isles of great importance in the commercial system of Europe: annexed to the immense tract of land in China, is the peninsula of Corea, which a vast oval bason divides from Nifon or Japan, a celebrated and imperial island, bearing in arts and in arms, in advantage of situation, but not in felicity of government, a pre-eminence among eastern kingdoms, analogous to that of Britain among the nations of the west. So many climates are included in so prodigious an area, that, while the principal emporium of *China* lies nearly under the tropic, its metropolis enjoys the temperature of Samarkand; such, too, is the diversity of soil in its fifteen provinces, that, while some of them are exquisitely fertile, richly cultivated, and extremely populous, others are barren and rocky, dry and unfruitful, with plains as wild, or mountains as rugged, as any in *Scythia*, and those either wholly deserted, or peopled by savage hordes, who, if they be not still independent, have been but very lately subdued."

Although the term *China* be well known to that people, it is not the name by which they chuse to denominate their country: they call it sometimes *Chum-cue*, or the Central Kingdom; and, at other times, they distinguish it by the words *Tien-hia*, or, 'What is under Heaven,' meaning, 'All that is valuable on earth.' To an implicit confidence in which opinion, might be justly attributed that sovereign contempt in which they hold all other nations of the earth; and hence the cause of their declining the smallest intercourse with foreign powers. Their own country certainly produces all that is necessary to make a people rich and happy. Even some of their mountains are covered with forests of tall, straight, and large, trees, fit for building, for masts, and for ship-timber. The emperor sometimes procures from these mountains enormous trunks, which he causes to be transported to the distance of more than three hundred leagues, by land and water, to be employed in public works. Other mountains furnish quicksilver, iron, tin, copper, gold, silver, and precious stones. Political foresight has however prevented many of the latter from being opened. The chiefs of the early dynasties, aware that artificial riches could not form a solid basis for the happiness of states, were afraid of opening these sources of luxury, lest the people should be induced to neglect the natural riches of their soil, by applying to other labours than those of agriculture. About the commencement of the fifteenth century, the emperor Tching-tsou caused a mine of precious stones to be shut up, which had been opened by a private individual. "Useless labours," said he, "produce sterility; a mine of precious stones does not furnish corn."

The country of China derives every convenience of fertility and free intercourse with its own interior, by means of its abundant lakes, rivers, and canals. Its principal lakes are the Tong-ting-hou, situated in the province of Hou-quang, which is more than 240 miles in circumference; the Tai-hou, part of which extends into Kiang-nan; the Hong-tse, and the Kao-yeou, of the province of Kiang-nan; and the Poy-ang-hou, formed in Kiang-si, by the confluence of four considerable rivers, which, like the sea, is subject to tempests and storms. This last is near 300 miles in length. Among the rivers that water this vast kingdom, there are two particularly celebrated. The first is the Yang-tse-kiang, or Son of the Sea. It has its source in the province of Yun-nan, traverses Hou quang and Kiang nan, and, after having watered four provinces, through an extent of twelve hundred miles, it falls into the eastern sea, opposite the isle of Tsong-ming. This river, at the distance of more than ninety miles from its mouth, is a mile and a half broad. The navigation of it is dangerous, and numbers of vessels are lost in it. It flows with great rapidity, and forms in its course several islands, which are beneficial to the province, on account of the multitude of reeds, from ten to twelve feet in height, which they produce, and which are used for fuel in all the neighbouring cities. When this river is swelled by torrents from the mountains, it becomes so impetuous that it overflows and carries away part of these islands, and often forms others from their wrecks. Another great river of China is the Hoang-ho, or yellow river. the Chinese give it this name, because the clay and sand which it washes down, especially in time of rain, make its water appear of a yellow colour. It rises in the mountains which border the province of Te-tchuen on the west, and, after a course of nearly 1800 miles across Tartary and China, discharges itself into the eastern sea, not far from the mouth of the Yang-tse-kiang. It is very broad and rapid; but so shallow, that in some places it is scarcely navigable. It often, like the Nile, overflows, and buries whole villages; so that it has been found necessary to raise long and strong banks, in order to confine it. Superior to these rivers is the celebrated canal which reaches from Canton to Pekin, and which forms a communication between the southern and northern provinces. In this canal a number of others terminate, which stretch out into the country, and form a communication between the neighbouring cities, towns, and villages. Near to Chao-hing and Ning-po there are two canals, the waters of which do not communicate, and which differ ten or twelve feet in their level. To render this place passable for boats, they have constructed a double glacis of large stones, or rather, two inclined planes, which unite in an acute angle at their upper extremity, and extend on each side to the surface of the water. If the bark is in the lower canal, they draw it up the plane of the first glacis, by means of several capstans, until it is raised to the angle, when, by its own weight, it glides down the second glacis, and precipitates itself into the water of the higher canal, with a considerable velocity. This principle of the inclined plane, has been lately adopted in Europe. See the article CANAL, vol. iii. p. 699.

A great part of the gold which is procured in China, is collected from the sands of the rivers and torrents which fall from the mountains, situated on the western boundaries of the provinces of Se-tchuen and Yun-nan. As the Chinese gold is not coined, it is employed in commerce, and becomes merchandize. It is never used there but in gilding, or for slight ornaments: the emperor being the only person who possesses any quantity of gold plate. Iron, lead, and tin, mines are common, and these metals are sold at a low rate. The copper-mines of the provinces of Yun-nan and Koei-cheou have furnished, for a great number of years, all the small coin that is struck in the empire. The Chinese have a kind of copper which they call *pé-tong*, or *white copper*, so pure and fine, that in brilliancy it nearly approaches to silver. This copper is naturally white when taken from the mine; and when broken into grains, it is found still whiter in the interior part than on the surface. Quarries and coal-mines are abundant in every province. Lapis lazuli is found

found in several cantons of Yun-yan, in the province of Se-tchuen, and in a district of Chan-si, called Tai-tong-foo; it differs nothing from that imported into Europe. Chan-si furnishes a most beautiful kind of white jasper much resembling agate; it is transparent when polished, and sometimes diversified with spots; the Chinese call it *Yu-che*.

The most beautiful rock crystal of China is dug from the mountains of Tchang-tcheou-foo, and Tchang-pou-hein, in the province of Fo-kien. The artists of these two cities are very expert in cutting it, forming thereof buttons, seals, figures of animals, and other trinkets. Yun-nan furnishes some real rubies, but they are mostly small. Quarries of marble are very common in China, especially in the province of Fo-kien. There are also several kinds of sonorous stones, of which the Chinese make musical instruments. They differ considerably from one another in beauty and in the strength and duration of their tone; but what is very surprizing, this difference of tone cannot be discovered either by the different degrees of their hardness, weight, fineness of grain, or any other qualities which might be supposed to determine it. Some are remarkably hard, which are very sonorous; others exceedingly soft, yet have an excellent tone; some extremely heavy, emit a very melodious sound; and others, as light as pumice-stone, have also an agreeable sound. These stones have different names given them by the Chinese. They are chiefly found in channels made by torrents, and in the rivers which flow at the bottom of the mountains of Yu-nan, Koei-cheou, Shen-si, Y-ly and Yo-quen. See MINERALOGY.

The Chinese have lately discovered a new substance proper to be employed in the composition of porcelain. It is a species of chalk, called hoa-che, from which the physicians of China prepare a kind of draught, said to be detersive, aperient, and cooling. The manufacturers of porcelain have thought proper to employ this material instead of kao-lin. It is called *hoa*, because it is glutinous, and has a great resemblance to soap. Porcelain made with hoa-che, is much dearer than any other. It has an exceeding fine grain, and, with regard to the painting, if it be compared with that of the common porcelain, it appears to surpass it in a very considerable degree.

China produces most of the fruits which we have in Europe, as well as other kinds peculiar to that country. They have several kinds of olives, though they do not extract oil from them; on what account we know not, whether it be that this fruit in China is not proper for that purpose, or that they are ignorant of the art of making it. When they want to gather their olives, they bore a hole in the trunk of the tree, which, after having put some salt into it, they stop up, and, at the end of a few days, the fruit drops of itself. Oranges were first brought to Europe from China; for which we are indebted to the Portuguese. Of this fruit, the Chinese have a great number of kinds. They have also lemons and citrons in abundance: but, as roots and greens are the principal nourishment of the Chinese, they spare no labour to procure them good. They cultivate even the bottom of their waters; and the beds of their lakes, ponds and rivulets, produce crops that to us are unknown. Their industry has found out resources in a number of aquatic plants, several of which, as the pi-tsi, or water-chesnut, and the lien-wha, or NYMPHEA nelumbo of Linnæus, are the greatest delicacies of a Chinese table. The government has caused this latter plant to be cultivated in all the lakes, marshes, and waste grounds covered with water, which belong to the state. And the late emperor ordered all the canals which ornament his gardens, to be planted with it. It is exceedingly wholesome, and has a most delicate taste. It is given to sick people to chew, being very cooling for the mouth.

Among the most remarkable of the botanical productions of China, are the following: the tallow-tree, or CROTON sebiferum of Linnæus, from the pulp of the berries of which they prepare their tallow, and mould their candles. The varnish-tree, or RHUS, from which the Chinese procure that excellent varnish, which gives so much lustre and beauty to their manufactures. The iron-tree, or SIDEROXYLUM, which is so hard and heavy that it sinks in water, admits edged tools to be made of it, and from which the Chinese manufacture most of their anchors. The bamboo, or ARUNDO, a species of reed which grows to such a size, that of its trunk they make their pipes and shoots for conveying water; and with its leaves they cover the joinings of their tea-chests. The rose-wood, or GENISTA, with which the Chinese make all their elegant furniture. The camphor-tree, or LAURUS, from which they produce large quantities of camphor for commerce. The pine, the cedar, the cypress, and all the most famed oriental trees, grow here in the utmost perfection, and in immense forests; but the most valuable of all their vegetable productions, is the tea-tree, or THEA, from which they derive such an immense revenue, and which forms one of the most prominent articles of commerce of our East India company. Next to this in point of value is their cotton-tree, the GOSSYPIUM, which they cultivate in such quantities, as to render cotton the universal wear of both sexes of the common people throughout China. All the rich fruits, the most superb flowers and flowering shrubs, and most of the aromatic vegetables, are natives of China. The rhubarb or RHEUM; the ginseng, or PANAX; the comfrey, or SYMPHYTUM, with many other of the most valuable medical plants, abound here, insomuch that a pound of the best rhubarb in China is said to cost only two-pence. For particulars of all the forementioned trees and plants, see under their respective generic names, in this work.

The mountains and vast forests of China abound with every species of wild animals, such as the rhinoceros, elephants, leopards, tygers, bears, wolves, foxes, buffaloes, camels, wild horses, &c. but they have no lions. Beavers and ermines are found in the northern provinces; but the skins which they furnish are much inferior to those procured from Siberia. Game also abounds in China. The markets of Pekin, in winter, are filled with different heaps of volatile, terrestrial, and aquatic, animals, hardened by cold and perfectly secure against all corruption. Prodigious quantities of elks, stags, deer, goats, wild boars, hares, rabbits, squirrels, and wild rats, geese, ducks, partridges, pheasants, and quails, are seen there, as are also several kinds of game, not to be found in Europe.

The Chinese horses have neither the strength, beauty, nor swiftness of ours; and the inhabitants of the country have not the art of breaking them properly: but the Tartarian horses are in general high bred and very fine. Camels, both wild and domestic, are found in the north-east part of China; and the fat, which is produced from the bunches of the wild camels, and named *bunch-oil*, is much used in Chinese medicine.

There are several species of apes in China. A species of orang-outang, named *sin-sin*, differs from the rest in superiority of size, being equal to the bulk of an ordinary man. They walk with facility on their hind legs; and all their actions have a singular conformity to those of the human species. The most beautiful quadruped of China is a stag, which is about the size of an Italian grey-hound. It is probably the cervus guineensis. See CERVUS. The princes and mandarins buy them at an excessive price, and keep them as curiosities in their gardens. They have also another species, of a very superior size, which they call the *horse stag*. They have also the musk-deer, or as the Chinese call it, the *hiang-tchang-tse*.

The Jesuits inform us, that in the thick forests of Tartary, to the north of the great wall, there is found a species of flying-fox. They describe his wings as being only thin membranes, which extend from one foot to another,

another, and reach to his tail. This animal never flies but by darting from the top of one tree to another, which is lower: he has not the power of raising himself, and of flying as he mounts. A kind of flying rat they say is also seen near Keou-ouai: it is larger than a common rat, and has wings like those of the fox already mentioned; it is pretty evident that these are nothing more than flying squirrels.

China has birds of almost every genus: eagles, falcons, pelicans, birds of paradise, swans, storks, parrots, and paroquets, which are not inferior to those of the West-Indies, either in the variety or beauty of their plumage, or in the facility with which they learn to speak. Indeed we might with truth affirm, that the birds and flowers of China, seem abundantly to surpass those of all other climes, in richness and brilliancy of colours.

Insects of almost every kind are found in China, and the butterflies or rather moths found on the mountain Lo-feou-chan, situated in the province of Quang-tong, are so much prized, that they are sent to court. They are of a much greater size than those of Europe, their wings are much broader, their colours are variegated in an extraordinary manner, and they have a surprising brightness. These moths and butterflies remain motionless on the trees in the day-time, and they suffer themselves to be taken without difficulty. In the evening, they begin to flutter about, almost in the same manner as bats, which some of them equal in size. The Chinese boast much of the butterflies found on the mountains Si-chan, in the province of Pe-tcheli; but they are small, and not so much valued by naturalists as those of the mountain Lo-feou-chan.

The silk insects are found in great numbers on the trees and in the fields of the province of Chang-tung. They propagate in vast quantities, and feed indiscriminately on the leaves of the mulberry, and on those of other trees. They do not spin their silk circularly and in the same manner as common silk-worms, which form theirs into balls: they produce it in filaments and long threads, which, being carried away by the wind, are caught by the trees and bushes: the Chinese collect these threads, and make a kind of stuff of them, called *kien-tcheou*, inferior in lustre to those manufactured of common silk; it might be taken at first sight, for coarse woollen stuff or drugget: it is, however, much esteemed in China, and sold there sometimes for more than the richest sattin. This stuff is closely woven, it never cuts, endures long, washes like linen, and, when manufactured with care, is scarcely susceptible of being spotted, even with oil. The insects which produce this kind of silk are of two kinds; one larger and blacker than common silk-worms, called *tsouen-kien*; the other smaller, and known by the name of *tiao-kien*. The silk of the first species of these worms is of a reddish grey; that of the second is blacker, and the cloth made of them partakes of both these colours.

It is impossible to give a list of the different kinds of fish to be found in the lakes, rivers, and seas, of China. The missionaries, to whom we are indebted for the greater part of the knowledge we have concerning this empire, have not thrown sufficient light upon any one branch of natural history. They, however, assure us, that they observed in China most of the different kinds seen in Europe; besides which there is a fish called *tcha-kia-yu*, or the fish in armour, (the CATAPHRACTUS of Bloch,) which the Chinese esteem as food. They give it this name, because its body is defended by sharp scales, ranged in straight lines. The flesh is white, and tastes almost like veal. In certain seasons they catch another kind of fish, similar to the silver whiting, so extremely white, that it is called the *flour-fish*. It is, above all, remarkable for its black eye-balls, which appear as if set in two circles of the most brilliant silver. This fish is found in such abundance on the coast of the province of Liang-nan, that four hundred pounds weight of them are sometimes taken at one haul with a net. The coasts of the province of Tche-kiang swarm with a species of cod: an incredible quantity of them is consumed on the sea coast of Fo-kien, besides what are salted on the spot, to be transported to the interior parts of the country. They are taken from the nets, and stowed in the holds of the vessels, between layers of salt; and, notwithstanding the excessive heats, they are thus transported to the remotest provinces of the empire.

The well-known Chinese fish, called gold and silver fish, are kept for ornament in small ponds in their gardens and courts. In warm countries these fish multiply fast, provided care is taken to collect their spawn, which floats on the water, and which they will themselves devour. This spawn the Chinese put into a particular vessel exposed to the sun, and preserve there until vivified by the heat: gold fish, however, seldom multiply when they are kept in close vases, because they are then too much confined. To render them fruitful, they must be put into reservoirs of considerable depth, and constantly supplied with fresh water. At a certain time of the year, a prodigious number of barks are seen on the great river Yang-tse-kiang, which go thither to purchase the spawn of these fishes. Towards the month of May, the neighbouring inhabitants shut up the river in several places with mats and hurdles, and leave only a space in the middle sufficient for the passage of barks. The spawn of the fish, which the Chinese can distinguish at first sight, although a stranger could perceive no traces of it in the water, is stopped by these hurdles. The water mixed with the spawn is then drawn up; and, after it has been put into large vessels, it is sold to merchants, who convey it to every part of the empire, and dispose of it by measure to those who are desirous of stocking their ponds and reservoirs.

One of the most incredible facts relative to China, in the estimation of an European, is its astonishing population. Father Amiot took great pains to investigate this subject, and fixed the population of China, in 1743, at two hundred millions. By another enumeration, taken from the accounts of the tribunal of lands, received in France in 1779, the population of China, in 1761, was as follows:

Province of Pe-tcheli, including Leao-tong	15,891,792
Kiang-nan, two divisions -	45,922,439
Kiang-si - - - -	11,006,640
Fo-kien - - - -	8,063,671
Tche-kiang - - -	15,429,690
Hou-quang - - -	8,829,320
Ho-nan, two divisions - -	24,413,110
Chang-tong - - -	25,180,734
Chan-si - - - -	9,768,189
Chen-si, including Kan-sou -	14,699,457
Se-tchuen - - -	2,782,976
Quang-tong - - -	6,797,597
Quang-si - - - -	3,947,414
Yun-nan - - - -	2,078,802
Koei-tcheou - - -	3,402,722
Total -	198,214,553

This register was accompanied with a comparative statement of the population in the preceding year, 1760, in which the numbers were stated at 196,837,977; there was therefore an increase of 1,376,576, in the course of one year only. Upwards of thirty years elapsed from the epocha of this numeration to the date of that obtained by sir George Staunton in 1793, which is literally as follows:

Table of the Population and Extent of China Proper, within the Great Wall Taken in round Numbers from the Statements of Chow-ta-Zhin.

Provinces.	Population.	Square Miles.	Acres.
Pe-tcheli	38,000,000	58,949	37,727,360
Kiang-nan 2 districts	32,000,000	92,961	59,495,040
Kiang-si -	19,000,000	72,176	46,192,640
Tche-kiang -	21,000,000	39,150	25,056,000
Fo-kien -	15,000,000	53,480	34,227,200
Hou-pe			
Hou-nan	14,000,000	144,770	92,652,800
Hou-quang 2 districts	13,000,000		
Ho-nan -	25,000,000	65,104	41,666,560
Chan-tung -	24,000,000	65,104	41,666,560
Chan-si -	27,000,000	55,268	35,371,520
Shen-si	18,000,000	154,008	98,565,120
Kan-sou 2 districts	12,000,000		
Se-chuen -	27,000,000	166,800	106,752,000
Quang-tong -	21,000,000	79,456	50,851,840
Quang-si -	10,000,000	78,250	50,080,000
Yun-nan -	8,000,000	107,969	69,100,160
Koei-cheou -	9,000,000	64,554	41,314,560
	333,000,000	1,297,999	830,719,360

Over this immense tract of country, and over the lives and fortunes of such a multitude of subjects, no monarch in the world possesses so unlimited a controul as the emperor of China. All authority is vested in him alone; and no sentence of death, pronounced by any of the tribunals, can be executed without his consent. Every verdict in civil affairs is subject to the same revision; and no determination is of any force, until it has been confirmed by his assent. On the other hand, whatever sentence he passes is executed without delay. His edicts are respected throughout the whole empire, as though they proceeded from a divinity, and are published and registered without the least delay. This absolute power in the head of the Chinese empire, appears to be as ancient as the empire itself; and all the revolutions which have taken place have tended to confirm it.

The emperor alone has the disposal of all the offices of state; and those who hold them are wholly dependent on his pleasure. No employment is purchased in China; merit, for the most part, raises to preferment, and rank is attached to preferment only; thus, whatever may be the despotic power of the emperor, the government has an eminent advantage over most of the political systems of Europe: the offices and honours of which are, for the most part, as saleable as their mercantile commodities. On this principle, of merit only qualifying for office, the emperor has the right of choosing a successor either from among his own children, from the rest of his family, or from among any of his own subjects; thus Chun, prime minister of the emperor Yao, was chosen by that monarch to succeed him, on account of his superior abilities. Should the successor thus named by the emperor, be wanting in that respectful submission which he conceives is due to him, or manifest some natural weakness of which he was not before suspected, the same hand that made him heir apparent to the throne, can remove him from his exalted station. In such case another successor is chosen, and the former is entirely forgotten. The emperor Kaung-hi, grandfather of the emperor Tchien-lung, thus excluded his eldest son from the throne, though he had once nominated him his successor. Yet a prince of the blood is held in high esteem in China, notwithstanding the emperor can prevent those from assuming that title who have a natural right to it; and if they are permitted to enjoy their rank, they have neither influence nor power; they possess a revenue proportioned to their dignity, and have a palace, officers, and court; but they have less authority than the lowest of the mandarins.

The mandarins in China, compose exactly what are called in Europe the nobility. There are only two ranks in China, the nobility, and the people; but the former is not hereditary. These mandarins may, in cases of necessity, remonstrate with the emperor, either individually, or in a body, upon any action or omission on his part, which may be thought contrary to the interests of the empire. Their remonstrances are seldom ill received, but the emperor reserves to himself the right of paying that attention to them which he thinks they deserve. From this view of the sovereign authority, it is evident that nothing limits its power; but the emperors find, even in this extent of power, the strongest motives for not abusing it. Their private interest, and that of the nation, are inseparably united; and one cannot be consulted without the other. The Chinese consider their monarchy as a large family, of which the emperor, who ought to govern with parental affection, is the head. The prince himself, in his education, imbibes the same principles; and it must be admitted, that no country was ever ruled by more good princes, or ever produced fewer bad. Such are the fruits of the education they receive, and such is the lesson which this nation holds out to every monarchical form of government.

Huttner, who accompanied the British embassy in the character of preceptor to sir George Staunton's son, and who published a German account of it at Berlin, in 1797, defines the word *mandarin*, as follows: "Mandarin is a Portuguese word, from *mandare*; and denotes every public officer in the Chinese empire, whether his dignity be great or small, military or civil. This term, however, is never used by the people of China; their word for it is *quang*, or *quangfu*." The rank of the mandarinate is as various, as the various dignities in so extensive an empire must certainly be. The precedence, or scale of dignity, is known by the colour of the button or ball which the mandarins wear on the middle of their hat: red is the first or highest; then follows white, blue, and gilded. Red and blue have also subordinate distinctions, in opake, and transparent. China contains about fifteen thousand mandarins of letters, and a still greater number who aspire to that title. Their interest must be very powerful, since it triumphed over the Tartars, who conquered China, who submitted to the laws and customs, and, what is still more, adopted the character and genius, of the people whom they had subjected. To arrive at the degree of mandarin of letters, it is necessary to pass through several others; such as that of bachelor *(sie*, or *tsai,)* of licentiate *(kiu-gin,)* and of doctor, *(tsing-ssee.)* The two first, however, are only absolutely necessary; but even those on whom the third is conferred, obtain for a time only the government of a city of the second or third size or class.

There are eight orders of mandarins in China. The first is that of the *calao*. Their number is not fixed; but wholly depends on the will of the prince. Ministers of state, presidents of the supreme courts, and all the superior officers of the militia, are chosen from among this order, the chief of which is named *cheou-siang*, or the great calao, and is president or prime minister of the emperor's council. From the second order of the mandarins, called *te-hiose*, are selected the viceroys and presidents of the supreme councils of the different provinces. *Tchong chuco*, or *school of mandarins*, is the title given to the third order; one of the principal functions of which is to act as secretaries to the emperor. The mandarins of the fourth order, stiled *y-tchuen-tao*, when no particular government is entrusted to them, or when they belong to no fixed tribunal, have to keep in repair the harbours, royal palaces, and the barks of which the emperor is proprietor, in their districts. The fifth order, *ping-pi-tao*, have

have the inspection of the troops. The sixth, *tun-tien-tao*, have the care of the highways. The seventh, or *ho-tao*, have the superintendance of the rivers; and the eighth, stiled *hai-tao*, that of the sea-coasts. In short, the whole administration of the Chinese empire is entrusted to the mandarins of letters; from among whom are chosen the governors of provinces, of cities of the first, second, and third, class, and the presidents and members of all the tribunals. The homage which the people pay to every mandarin in office, is nearly equal to that paid to the emperor. For as it is the received opinion of the Chinese, that their monarch is the father of the whole empire, so it is their opinion that the governor of a province is the father of that province, and that the mandarin who is governor of a city, is also the father of that city.

The mandarins of arms are never indulged with the smallest share in the government of the state; even the inspection of the troops, as we have before observed, belongs to a class of the mandarins of letters: however, to be admitted to the rank of mandarine of arms, it is also necessary to have passed through three degrees. Strength of body, agility in performing the different military exercises, and a readiness in comprehending and executing orders, are all that is required; and in these consist the various examinations which candidates are obliged to undergo before they can be admitted to that rank. The mandarins of arms have also tribunals, the members of which are selected from among their own chiefs. The principal of these tribunals is fixed at Pekin, and is composed of five different classes. The first, named Heou-fou, formed from the mandarins of the rear-guard. The second, called Tsa-fou, formed of the mandarins of the left wing. The third, named Yeou-fou, formed of the mandarins of the right wing. The fourth, called Tchong-fou, composed of the mandarins of the advanced main-guard. The fifth, called Tsien-fou, consists of the mandarins of the advanced-guard. These are subordinate to a supreme tribunal of war, likewise established at Pekin, called Iong-tching-fou, the president of which is one of the great lords of the empire, whose authority extends over all the officers and soldiers of the army. This president has a mandarin of letters, who is a superintendant of arms, for an assessor. He has also for counsellors two inspectors named by the emperor. When these four persons have agreed upon any measure, their resolution must be submitted to the revision of another supreme court, called *Ping-pou*, which is entirely of a civil nature. And such is the jealousy occasioned by military power, that the Ping-pou has under its jurisdiction the whole militia of the empire.

The power of the chief mandarin of arms in the field is equivalent to that of our commanders in chief. Under him he has a certain number of others who act as lieutenant-generals; other mandarins discharge the duty of colonels; others that of captains; and others that of lieutenants and ensigns. There are reckoned in China between eighteen and twenty thousand mandarins of war: their number consequently is superior to that of the mandarins of letters; but the importance of the latter makes them considered as the peers or principal nobility of the empire.

The military establishment of China, according to sir George Staunton, amounts to a million of infantry, and eight hundred thousand cavalry. Of these troops, especially the cavalry, by far the greatest part are Tartars, who have a higher pay than their Chinese fellow soldiers. The principal officers of confidence in the army are Tartars also. None of either nation are received into the service, but such as are healthy, strong, and sightly. The pay and allowance of a Chinese horseman are three Chinese ounces, heavier than European ounces, and three-tenths of an ounce, of silver, and fifteen measures, or rations, (the weight not mentioned,) of rice every month. A Tartar horseman seven similar ounces of silver, and twenty measures of rice, for the same period. A Chinese foot-soldier has one ounce and six-tenths of an ounce of silver, and ten measures of rice; and a Tartar of the same description has two ounces of silver, and ten measures of rice, every lunar month. The emperor furnishes the arms, accoutrements, and the upper garment, to all the soldiers. Beside their ordinary pay and allowances, they also receive donations from the emperor on particular occasions; as, when they marry, and when they have male children born. On the death of their parents, they obtain "a gift of consolation;" as do their families when the soldiers themselves die. A military life seems much more the bent of a Tartar, than of a Chinese. The hardy education, the rough manners, the active spirit, the wandering disposition, the loose principles, the irregular conduct of the former, fit him better for the profession, practice, and pursuits, of war, than the calm, regulated, domestic, moral, habits of the latter. It was the striking contrast between the supineness and inactivity of a Chinese emperor, compared with the high spirit and intrepidity of the invader his country, which begat the proverb, that "he had caught a Tartar."

At every review their arms are carefully inspected; and if any of these are found in bad condition, or in the least rusted, the neglect is punished by thirty or forty blows with a stick, if the culprit be a Chinese: or with as many lashes, if he be a Tartar. Besides the superior officers of these troops, whom we have already mentioned, there are twenty-four captains-general, and as many colonels of horse, created by the Tartars, as a kind of inspectors appointed to watch over the conduct of the Chinese officers.

Though there is reason to believe that the invention of gunpowder and the use of artillery is very ancient in China, yet it appears to have been totally lost about the beginning of the seventeenth century. Three or four ancient cannons were to be seen at the gates of Nan-kin; but not a single Chinese at that period was to be found who knew how to use them. In 1621, when the Portuguese city of Macao made a present of three pieces of artillery to the emperor, it was found necessary to send three men also to load and fire them. The Chinese were then made sensible that artillery might be employed with great success against some Tartars, who, having advanced as far as the bottom of the great wall, had been quickly dispersed by the three cannons sent from Macao. The mandarins of arms therefore gave it as their opinion, that cannons were the best arms they could use against their enemies; but the difficulty was in procuring them, as the Chinese scarcely knew how to point and fire a great gun; and much less the art of casting them. F. Adam Schaal, a Jesuit missionary, however, rendered them this service. And some time after, father Verbiest, another Jesuit missionary, undertook, by order of the emperor, to cast a new set; and, it is said, that he raised the Chinese artillery to the number of three hundred and twenty pieces; he also taught them the method of fortifying towns, of constructing fortresses, and of erecting other edifices, according to the rules of modern architecture. The Jesuits, for the most part, were not only zealous missionaries, but their zeal was united with talents which procured them admission to the center of an empire, till that time shut against every stranger.

There are reckoned in China more than two thousand places of arms, divided into six different classes; viz. six hundred of the first; five hundred and upwards of the second; three hundred of the third; about an equal number of the fourth; an hundred and fifty of the fifth; and three hundred of the last. To these may be added about three thousand towers and castles, dispersed throughout the whole empire, all of which are defended by garrisons. The fortresses of China derive their principal strength from their situation, which, in general, is well chosen. They have, besides a rampart, a brick-wall, towers, and a ditch filled with water. Nature hath fortified a great

a great extent of the frontiers of this empire: the ſea borders ſix of the provinces; but it is ſo ſhallow towards the ſhore, that large veſſels cannot approach it: inacceſſible mountains cover it on the weſt, and the remaining part is defended by the great wall.

This ſtupendous monument of human art and induſtry, exceeds every thing that we read of in ancient or modern hiſtory. The pyramids of Egypt are little, when compared with a wall which covers three large provinces, ſtretches along an extent of fifteen hundred miles, and is of ſuch an enormous thickneſs, that ſix horſemen may ride a-breaſt upon it. It is flanked with towers, two bow-ſhots diſtant one from the other, which add to its ſtrength, and render it much eaſier to be defended. One-third part of the able-bodied men of China were employed in conſtructing this wall, and the workmen were ordered, under pain of death, to place the materials of which it is compoſed ſo cloſely, that the leaſt entrance might not be left for any inſtrument of pointed iron. This precaution contributed much to the ſolidity of the work, which is ſtill in a great meaſure entire, though built upwards of two thouſand years ago. This celebrated wall is not only carried through the low lands and valleys, but alſo over hills, and up and over the ſteep brows of the higheſt mountains. Sir George Staunton aſſures us, that one of the moſt elevated ridges, over which the great wall is carried, has been aſcertained to meaſure five thouſand two hundred and twenty-five feet. The execution of this work muſt have coſt immenſe labour, ſince it is often neceſſary to tranſport the materials through a deſert country, and to convey them to eminences inacceſſible to horſes or carriages. Father Martini, in his Chineſe Atlas, ſays that this wall begins at the gulf of Leao-tong, and reaches to the mountains near the city of Kin, on the Yellow River; and that, between theſe two places, it meets with no interruption, except to the north of the city of Suen, in the province of Pe-tcheli, where it is intercepted by a ridge of craggy inacceſſible mountains, to which it is cloſely united, and by the river Hoang-ho, which paſſes through it in its courſe to the ſea. He adds, that for other rivers of inferior ſize, arches have been conſtructed, like thoſe of a bridge, through which the waters, and their inland navigations, find a paſſage. It has no kind of ſupport but what is uſually given to ordinary walls, and it is almoſt of the ſame form, not only where it ſtretches acroſs plains, which are very rare in that country, but even where it is carried over high mountains. An intelligent traveller (Mr. Bell,) who, in 1719, accompanied captain Iſmail of in his embaſſy to Pekin, tells us, that it is carried acroſs rivers, and over the tops of the higheſt hills, without the leaſt interruption, keeping nearly along that circular ridge of barren rocks which incloſes the country; and, after running about twelve hundred miles, ends in impaſſable mountains and ſandy deſerts. According to his account, the foundation conſiſts of large blocks of ſquare ſtones laid in mortar; but all the reſt is conſtructed of brick. The whole is ſo ſtrong and well built, that with moderate repairs, in ſuch a dry climate, it may remain in nearly the ſame condition for many ages. When carried over ſteep rocks where no horſe can paſs, it is about fifteen or twenty feet high, and broad in proportion; but, when running through a valley, or croſſing a river, you behold a ſtrong wall, about thirty feet high, with ſquare towers at certain intervals, and embraſures at equal diſtances. The top of the wall is flat, and paved with cut ſtone; and where it riſes over a rock or eminence, there is an aſcent by eaſy ſtone ſtairs. He adds, "This wall was begun and completely finiſhed in the ſhort ſpace of five years; and it is reported the labourers ſtood ſo cloſe for many miles, that they could hand the materials from one to another. This I am the more inclined to believe, as the rugged rocks among which it is built muſt have prevented all uſe of carriages; and neither clay for making bricks, nor any kind of cement, could be found among them." This barrier, however, ſince the re-union of the Tartars and Chineſe, is almoſt become uſeleſs. Lord Macartney, in paſſing this great wall with the Britiſh embaſſy, on its journey from Pekin to Zhe-hol in Tartary, found it nearly in the ſtate of preſervation as deſcribed above.

The Tartars, who have now, perhaps, loſt ſome of their military ardour, ſtill form the ſtrongeſt and braveſt part of the Chineſe militia. Every Tartar born in the ordinary claſs, is enrolled from his cradle; and, when of age to carry arms, he muſt be ready to take the field on the ſhorteſt notice. The emperor's ſons, and every Tartar of diſtinction, muſt be acquainted with the management of a horſe, know how to handle a bow and arrow, and to perform, at leaſt, the elementary evolutions of the army.

The following is a liſt of the chief military officers of China, their number, rank, and ſalary, as lately given by ſir George Staunton.

A Liſt of the chief Military Officers of China, their Number, Rank, and Salaries.

RANK.	Tahels.	Tahels.
Eighteen tou-tous, each - -	4,000	= 72,000
Sixty-two zun-pings - -	2,400	148,800
One hundred and twenty-one fou-ziens	1,300	157,300
One hundred and ſixty-five tchou-ziens	800	132,000
Three hundred and ſeventy-three giou-zis	600	223,800
Four hundred and twenty-five tou-tzes	400	170,000
Eight hundred and twenty-five ſciou-fous	320	264,000
One thouſand ſix hundred and eighty zien-zuns - - - - -	160	268,800
Three thouſand ſix hundred and twenty-two pa-zuns - - - - -	130	470,870
Forty-four commiſſaries of corn and proviſions of the firſt rank, ſciou-zun -	320	14,080
Three hundred and thirty commiſſaries of corn and proviſions of the ſecond rank, zien-zun - - - -	160	52,800
		1,974,450

A rough Calculation of the total Military Eſtabliſhment of China.

1,000,000 infantry, at two ounces, or tahels of ſilver each per month, proviſions included - -	24,000,000	
800,000 cavalry, at four ounces each, proviſions included -	38,400,000	
If 800,000 horſes coſt, at twenty ounces each, = 16,000,000 oz. the annual wear and tear at ten per cent. will be - - -	1,600,000	
Uniforms for 1,800,000 men, once a year, at four ounces each -	7,200,000	
Yearly wear and tear of arms, accoutrements, contingencies, &c. at one ounce per man, 1,800,000 men - - - - - -	1,800,000	
		73,000,000
		74,974,450

The civil government of China conſiſts of a ſupreme tribunal, called the emperor's grand council; of ſix ſuperior judicial courts, and of three tribunals of equity; the heads or preſidents of all which, with the miniſters of ſtate, and ſecretaries of the emperor, conſtitute the members of the ſupreme or grand council. This grand council is never aſſembled but on affairs of the greateſt importance; for, in ordinary caſes, the emperor's private council is ſubſtituted for it.

The ſix other ſuperior courts of China are eſtabliſhed, like the preceding, at Pekin, under the general denomination of *leou-pou*. The firſt is called *lii-pou*. This tribunal furniſhes mandarins for the different provinces, watches

watches over their conduct, keeps a journal of their transactions, and informs the emperor of them; who punishes or rewards according to its report. This tribunal is subdivided into four others. The first has the care of selecting persons who, by their learning, talents, and morals, are proper for filling the different offices under government. The second has the examining of the conduct of the mandarins. The third affixes a seal to all public acts, gives to each of the mandarins the seals belonging to his dignity and employment, and examines the seals of the different dispatches addressed to the court. The fourth inquires into the merit and conduct of the grandees of the empire, as well princes of the imperial blood, as others on whom titles merely honorary are conferred. The principal object of the Chinese government in this establishment is, that the different departments be properly inspected, every transaction thoroughly investigated, suitable rewards given to the deserving, and punishment inflicted on the guilty adequate to their crimes.

Hou-pou is the name of the second court. This tribunal has the superintendance of all the finances of the state. It is the guardian of the treasures and domains of the emperor: it keeps an account of his revenues and expences, gives orders for the payment of pensions and salaries annexed to certain offices, and for the delivery of rice, pieces of silk, and money, which are distributed among the great lords, and mandarins of the empire. The coining of money, the management of public magazines and custom-houses, and the collection of the duties, are all under its inspection; it likewise keeps an exact register of the families that compose this vast empire. This court has to assist it fourteen other inferior courts, which are dispersed throughout the different provinces of China.

The third court, called *Li-pou*, is the court of ceremonies. Ceremonies form, in part, the basis of the Chinese government. It is the duty of this tribunal, therefore, to support and enforce the observance of them; the arts and sciences are also placed under its inspection, and it takes charge of the repairs of temples, regulates every thing that relates to the annual sacrifices offered up by the emperor, and even to the entertainments which the emperor gives: he also consults it when he is about to grant favours, or confer honours. This tribunal also receives, lodges, treats, and dismisses, ambassadors; and takes care to preserve tranquillity among the different religious sects tolerated in the empire. It has four subaltern tribunals to assist it.

The tribunal of arms, called *Ping-pou*, forms the fourth sovereign court. It comprehends in its jurisdiction the whole militia, and all the fortresses, arsenals, magazines, and storehouses of every kind; it inspects all the manufactories of arms, examines and appoints officers of every rank, and is composed of mandarins of letters only, as are the four tribunals dependent on it. The fifth superior tribunal, named *Hong-pou*, is the criminal bench, or general court for all the criminal affairs of the empire. Fourteen other tribunals are appointed for its assistance; but they are all subordinate, and under its inspection. The sixth sovereign court, named *Cong-pou*, or the tribunal of public works, has the charge of surveying and keeping in repair the palaces of the emperor, princes, and viceroys; the buildings where the tribunals are held, the temples, tombs of the sovereigns, and all other public monuments. It has, likewise, the superintendance of the streets, public highways, bridges, lakes, rivers, barks, and every thing that relates to navigation; and also of the towers deemed necessary for maintaining peace and safety in the interior parts of the empire. It has four inferior tribunals for assistants in the discharge of its duty. The first, forms designs and draws plans of public works; the second, has under its direction all the workshops in the different cities of the empire; the third, surveys causeways, roads, bridges, canals, rivers, &c. and the fourth, takes care of the emperor's palaces, gardens, and orchards, and receives their produce. The members which compose all these different inferior tribunals are half Chinese and half Tartars; and each has two presidents, one of which is always a Tartar born. None of these tribunals have absolute power in their own jurisdiction: the decisions of one can have no effect without the concurrence of some other tribunal, and sometimes of several. Thus the tribunal of war has under its direction the whole troops of the empire; the second is entrusted with the payment of them; and to the sixth belongs the care of the arms, tents, stores, &c. necessary for military operations. Nothing, therefore, that relates to any of these can be put in execution without the concurrence of those three tribunals.

Every superior tribunal has also its censor, an officer merely passive, who decides upon nothing, but watches over all. He assists at all assemblies, revises all their acts, and makes no mention to the tribunals of any irregularity he has observed, but immediately acquaints the emperor. He informs him also of the faults committed by the mandarins, either in the public administration of affairs, or in their private conduct. These censors hold their places for life; and this security gives them courage to speak out, when they observe any impropriety or abuse. Their accusation is sufficient to set on foot an enquiry, which generally leads to a proof; the accused is then discharged from his office, were he even one of the first men in the empire; and the commonest person is afterwards held in as much estimation as he. It is, however, something remarkable, that the complaints of these censors are referred to the very tribunals of which the accused are members.

These censors form a court or tribunal of equity, named Tou-che-yven, which has the inspection of the whole empire: its members have the power of remonstrating with the emperor, whenever the interest of the public, or that of the prince, renders it necessary. Their inspection extends also over all lawyers and military men in public employments, and over every class of citizens. In short, they are, strictly speaking, placed between the prince and the mandarins; between the mandarins and the people; between the people and families; between families and individuals; and they unite, generally speaking, to the importance of their office, the most uncorruptible probity and invincible courage. The sovereign may, if he proceeds to rigour, take away their lives; but many of them have patiently suffered death, rather than betray the cause of truth, or wink at abuses. It is not therefore sufficient to get rid of one, in order to gain a point; they must all be treated in the same manner, for the last would tread with the same resolution in the steps of those who had gone before him.

There is another tribunal of equity, which exists, we believe, no where but in China; it is the tribunal of princes, and is composed of princes only. Some of the ordinary mandarins, indeed, belong to it as subalterns, whose business it is to draw out cases and other writings necessary for determining any suit. The names of the children of the imperial family are inscribed, as soon as they are born, in the registers of this tribunal; and to it are consigned the dignities and titles which the emperor confers upon them. This tribunal is the only court where they can be tried; and, in cases of accusation, it absolves or punishes them, according to its pleasure.

All the privileges of princes of the blood, consist in certain rights of representation, and in being tried by their peers only. They cannot depend upon that distinction which is conferred by riches, or annexed to place. Every thing in this methodical empire is submitted to an examination. The yellow girdle only is what these princes inherit by birth; and this right belongs only to those who are descended in a right line from the reigning dynasty. The names of their children, whether girls or boys, the year, month, and day, of their birth, are inscribed in a large yellow book, particularly appropriated for this purpose. An orange girdle is the distinguishing mark

mark of collateral princes; and the names of their children are registered in a red book. The emperor alone determines the surnames of princes of the reigning branch. When the princes and princesses of the last class have attained to the age of fifteen, they present a petition to the emperor, requesting permission to marry. Princes of the direct line may omit this formula; but, if they are desirous of being connected by marriage with any of the Mogul or Kalka princes, they must first obtain the emperor's consent. The rank even of the emperor's sons, except of his immediate successor, diminishes one degree every generation. At the seventh, the eldest of these branches only has a title to wear the yellow girdle; the rest find themselves sunk to the rank of plain citizens. An hereditary sovereignty passes, with all its rights, from one eldest son to another, unless the possessor forfeits his title by being guilty of some crime. In such a case, the emperor appoints to the succession, either one of his younger brothers, or a cousin; but these must be chosen from the same branch, as the lawful branch cannot be deprived of this right, unless all those are condemned who compose it. Whoever insults any prince of the imperial family, who is decorated with the yellow girdle, is put to death without remission. But this is not the case if the prince has omitted or neglected to put on his yellow girdle: the affair then becomes a case between citizen and citizen; and the aggressor escapes with a bastinading.

Another equitable tribunal, no less peculiar to China than the two preceding, but better known than either is the Tribunal of History, *Han lin-yven*. It is composed of the greatest geniuses and of men of the most profound erudition in the empire; to this tribunal is entrusted the education of the heir apparent to the throne, and the compilation and arrangement of the general history of the empire. This last part of their office makes them formidable even to the emperor himself; for his attempts to oppress, or seduce them, would be consigned to history, in spite of all his efforts to the contrary. From this body are generally chosen the *calao*, or mandarins of the first class, and the presidents of the supreme tribunals.

The Chinese have taken most of their civil laws from their canonical books of morality, and filial piety is their basis. Some decrees of the emperors, respecting the observance of certain ceremonies, which custom has established, form the rest of the code. Every mandarin, who is a governor of a province or city, is obliged, twice a month, to instruct the people assembled round him, and to recommend to them the observance of the following articles. 1. You must put in practice the duties prescribed by filial piety, and observe that deference which is due from a younger to an elder brother. By these means only can you learn to set a proper value upon those obligations which nature imposes on all men. 2. You must always preserve a respectful remembrance of your ancestors; hence will result constant peace and union in your family. 3. Let harmony and concord reign throughout every village: by this, quarrels will be banished, and law-suits prevented. 4. Let those who cultivate the earth, and breed silk-worms, be esteemed and respected, you will then want neither grain for your nourishment, nor clothing to cover you. 5. Let frugality, temperance, modesty, and prudent economy, become the objects of your reflection, and regulate your conduct. 6. Let the public schools be carefully maintained; and, above all, let youth be instructed early in the duties of life, and formed to good morals. 7. Let every one attend to his own business, and to the duties of his office: they will then be better discharged. 8. Let religious enthusiasts be carefully extirpated as soon as they spring up: it might be too late afterwards. 9. Let the terror of the penal laws be often held up to the people. For rude and untractable minds can be restrained by fear only. 10. Endeavour to acquire a perfect knowledge of the rules of civility and politeness: these tend to maintain concord. 11. Let the education of children, and particularly of younger sons, be the principal object of your attention. 12. Avoid slander, and abstain from malicious accusations. 13. Conceal none of those criminals who, on account of their crimes, have been banished from society, and condemned to a wandering life; by concealing them, you become their accomplices. 14. Be punctual in paying the duties and taxes imposed by the prince: this will free you from the oppression of those who collect them, and from vexatious lawsuits. 15. Be careful to act in concert with the magistrates of the district to which you belong, and to second their efforts in discharging the duties of their office: by these means, they will be enabled to detect the guilty, and to prevent robbery and theft. 16. Restrain every sudden emotion of passion; and you will avoid many dangers. From the manner in which these ordinances are delivered, it is evident that the sovereigns of China give even to their laws and regulations the form of maxims and precepts. Every law in Europe is preceded by a preamble, setting forth the reason of enacting it; but in China the law invariably precedes the explanation of the motive.

Their laws concerning marriage, are very extensive. A Chinese can have only one lawful wife; and it is necessary that her rank and age should be nearly equal to his own; but he may have several concubines, without any formality whatever, except first paying to their parents, if they have any, a certain sum of money, and entering into a written engagement to treat their daughters well. These concubines are totally dependant on the lawful wife, their children are considered as hers; they address her as mother, and give this title to her only. After her death, they are obliged to wear mourning for three years, and to absent themselves from public examinations, but the death of their natural mother subjects them to the observance of none of these regulations. A widower, or a widow, may enter a second time into the matrimonial state without paying much attention to any of the preceding regulations.

A widow who has children becomes absolute mistress of herself: her parents can neither compel her to marry again or to remain in a state of widowhood. Widows do not enjoy the same privilege when they have no male children. The parents of their first husband can again place them in marriage, without their consent, or knowledge. They are authorised by the law to do this, to indemnify themselves for the money they have cost their former husbands. This, strictly speaking, is selling them: however, if they are left with child, this traffic is suspended; and it cannot take place if they bring forth a son. To this law there are two exceptions: the first when the parents of the widow assign her a proper maintenance, and reimburse those of the deceased husband; the other, when the widow embraces a religious life, and becomes a bonzess.

Divorces are granted in China, in cases of adultery, mutual dislike, incompatibility of tempers and dispositions, indiscretion, jealousy, absolute disobedience, sterility, or hereditary and infectious diseases. A husband cannot send away or sell his wife, until a divorce has been legally obtained. If this regulation is not strictly observed, the buyer and seller become equally culpable. If a wife, acknowledged as lawful, withdraws from her family, the husband sues; sentence is pronounced, and he may sell the fugitive, who by this sentence ceases to be his wife, and becomes his slave. The law protects also the wife who is abandoned by her husband. If he absents himself for three years, she is at liberty to lay her case before the mandarins, who can authorise her to take another husband, but if she anticipates their consent, she is exposed to the most rigorous punishment. If a young woman has been betrothed to a young man, and if presents have been given and received by the parents of the intended husband and wife, that young woman

man can have no other husband, and, if she marries another, the law declares such marriage null. If, in the room of a young woman shewn to the female confidant whose business is to make up the match, another be substituted; or if the daughter of a free man marry his slave; or if any one gives his slave to a free woman, and persuades her parents that he is his son or relation; the marriage is null and void; and all those who have had any share in carrying on the fraud are severely punished.

Every mandarin of letters is forbid to marry into any family residing in that province or city of which he is governor. The marriage is not valid if he trespasses against this law. It is unlawful for a Chinese youth to marry while he wears mourning either for a father or mother. If promises have been made prior to the death of his parent, every engagement ceases upon that event, and the man is obliged to give information of it to the parents of his intended bride. Marriage is also suspended when a family experiences any severe misfortune; such as a relation being thrown into prison; but this regulation may be set aside, provided he gives his consent. Two brothers cannot espouse two sisters; a widower is not at liberty to marry his son with the daughter of the widow whom he espouses, nor is he permitted to marry any of his own relations, however distant the degrees of consanguinity may be between them.

Every father of a family in China is responsible for the conduct of his children and domestics. All faults are imputed to him, which it was his duty to prevent. No mother in China has the right of making a will. Adoption is authorised by law, and the adopted child enters into all the rights of a lawful son, assumes the name of the person who has adopted him, wears mourning if he happens to die, becomes his heir, and has a share of his money and effects, if any are left, as well as the rest of his children: a right only is reserved to the father of making a few dispositions in their favour. Children, whether adopted or not, succeed to the estates of the father, but not to his dignity or titles: the emperor alone can continue or confer these.

Custom seems now to have rectified among citizens of the higher and middling classes, a law in China which authorized a father to sell his son; and the sale of children is at present rather tolerated than authorized among people of inferior rank, who are forbid to sell them to comedians, or to those of mean and profligate lives. A son is always a minor during the life of his father, who is absolute master of whatever he has inherited from his ancestors, or acquired by his own industry. A son is liable for the debts contracted by his father, those of gaming only excepted. A father's last will cannot be set aside on account of any error in the form.

Slavery is authorised in China in certain cases among themselves; inasmuch as a man may sell himself to discharge a debt to the crown, to assist a father in distress, or to bury his parent or relative in due form. If his conduct in servitude should be unimpeachable, he is entitled to his liberty at the end of twenty years; if otherwise, he continues a slave for life; as do his children, if he had included them in the original agreement. But the power of the master is entirely confined to what concerns his service. He would be punished with death, were it proved, that he had taken advantage of his power, to debauch the daughter or wife of his slave. And no husbandman can be harrassed for the payment of taxes, after he has begun to till the earth; that is from about the middle of spring, to the beginning of harvest. Such are, in general, the established laws in China, relative to civil affairs. With regard to certain temporary edicts issued by different emperors, it can only be said many of them have discovered wisdom and an attention to the public welfare; and others would certainly never have appeared, in a country where the persons most interested had possessed any share in the government.

The mode of procedure in criminal cases among the Chinese, is exceedingly slow; and this, as the accused person is kept constantly in prison during the whole process, is a great evil; yet this slowness becomes often the safeguard of those who are unjustly accused; and time frequently unveils the truth, which must always be unfavourable to the guilty. The Chinese prisons are not dungeons; they are spacious, and have a degree of convenience not generally found in such places. A mandarin is obliged to inspect them, and to see prisoners, when ill, properly treated, to send for physicians, and to supply them with remedies at the emperor's expence. If a prisoner dies, the mandarins must inform the emperor, who often orders some of the higher mandarins to examine whether he has faithfully discharged his duty.

The severity of the Chinese punishments is regulated by the different degrees of delinquency. Some of them however, are exceedingly rigorous. The slightest of all their punishments is the bastinado, used only for chastising trivial faults. The criminalty of the offender determines the number of blows which he receives, but the lowest number is twenty.

The emperor orders this punishment to be inflicted upon some of his courtiers; but this does not prevent them from being afterwards received into favour. The baton, or *pan-tsee*, used for this punishment, is a piece of bamboo, a little flatted, broad at the bottom, and polished at the upper extremity. Every mandarin has authority to use it at pleasure, when any one forgets to salute him, or when he administers public justice. On such occasions, he sits gravely behind a table, upon which is a bag filled with these bamboo sticks, while a number of petty officers stand round him, each furnished with some of these pan-tsees, and waiting only for his signal to make use of them. The mandarin takes from the bag one of those sticks which it contains, and throws it into the hall of audience. The culprit is then seized, and stretched out, with his belly towards the ground; his breeches are pulled down to his heels, and an athletic fellow applies five smart strokes with his pan-tsee; another succeeds, and bestows five more, if the mandarin draws another baton from the bag; and thus, by gradation, until he is pleased to make no more signals. The offender, who has undergone this chastisement, must then throw himself on his knees before the judge, incline his body three times to the earth, and thank him for the care which he takes of his education. It is difficult to conceive how a people, not the dupes of the most abject slavery and superstition, can be brought quietly to submit to this arbitrary exertion of power.

The punishment of the wooden collar is also used in China. This is composed of two pieces of wood, hollowed out in the middle, which when put together, leave sufficient room for the neck of the culprit. They are laid upon the shoulders of the criminal, and joined together in such a manner as to prevent his seeing his feet, or putting his hands to his mouth; he is thus rendered incapable of eating without the assistance of another, and is obliged to carry his burthen night and day. The weight of this collar is heavy or light, according to the magnitude of the crime. For robbery, having broken the peace, disturbed a family, or being a notorious gambler, the duration of this punishment is generally three months. The criminal is not at liberty to take shelter in his own house: he is stationed in some public square, at the gate of a city or temple, or of the tribunal in which he was condemned. When the term of his punishment is expired, he is taken before the mandarin, who exhorts him in a friendly manner to amend his life, and, after he has received twenty blows, he is discharged.

Other crimes, of an inferior nature to homicide, are punished by banishment into Tartary, by condemning the guilty to drag the royal barks for three years; or marking the cheeks with a hot iron. Robbery between relations is more severely punished than when committed on a stranger. If any one gives information against his father,

father, mother, grandfather, grandmother, uncle, or eldest brother, he is condemned to receive an hundred blows of the pan-tsee, and to be banished for three years, even if the accusation is just; but if it prove false, he is strangled.

Criminal intercourse between relations of different sexes, is punished in proportion to the degrees of consanguinity between them. Deficiency of duty to a father, mother, grandfather, or grandmother, is condemned by the law, and punished by an hundred blows of the pan-tsee; if abusive language is used, the offender is strangled; if he lifts his hand against his parent or progenitor, he is beheaded; and if he wounds or maims them, his flesh is torn from his bones with red-hot pincers. If a younger brother abuses his elder, he is condemned to receive an hundred blows of the pan-tsee. If he strike him, he is condemned to exile.

The burying-place of every family in China is sacred, unalienable, and cannot be seized. The trees growing upon it cannot, on pain of death, be cut, except when they are decayed; and even then, not until a mandarin has inspected them, and attested their condition. Robbery of these burying-places, even of the smallest of their ornaments, is punishable as sacrilege.

The man who in an accidental quarrel happens to kill his adversary, is strangled without remission. A rope, about six or seven feet in length, with a running noose, is thrown over the criminal's head; a couple of executioners belonging to the tribunal pull it in different directions, then on a sudden quit it; a few moments after, they give a second pull, which generally finishes the business. In certain parts of China, the operation is performed with a kind of bow. The criminal is placed on his knees, the string of the instrument is put round his neck, which being strongly compressed by the elasticity of the bow, he is instantly strangled when the executioner gives it a smart pull towards him. Beheading is considered by the Chinese as the most disgraceful of all punishments. It is reserved for the most desperate assassins only, or for those crimes equally atrocious as murder.

To be cut in a thousand pieces, is a punishment we believe unknown but in China. It is destined for state criminals, in cases of high treason, similar to our sentence of drawing apart or quartering the body, in England. The criminal is tied to a post; the executioner scalps the skin from his head, and pulls it over his eyes; he afterwards tears the flesh from different parts of his body, and never quits this horrid labour until fatigue renders him unable to proceed. He then abandons what remains of the body to the ferocity of the people, who finish what he has left undone. Much has been written in Europe against the torturing of criminals, either in the common or extraordinary manner; and the custom is in general happily suppressed; but they are both practised in China.

With respect to the internal police, every city in China is divided into different divisions. An officer is appointed for each division, who is answerable for every thing that passes contrary to good order; and if he neglects to make proper enquiry into any ito any irregularities, or to inform the mandarin governor, he is subjected to the same punishment as those who are refractory. Every city is furnished with gates, and all the streets are barricadoed as soon as night commences. Centinels are posted at proper intervals, who stop all those who walk abroad in the night-time; and a number of horsemen are generally stationed on the ramparts, who go the rounds for the same purpose. Seldom, however, do people of any character expose themselves to the danger of falling into the hands of the police. "Night," say the Chinese magistrates, "is designed for repose, and the day for labour." Watch is likewise kept in the day-time at every city, to observe those who enter: for this purpose a guard is stationed at each gate; passengers are carefully examined, and if they are discovered to be strangers, they are immediately carried before a mandarin, and detained until the will of the governor is known. The averseness of the Chinese to admit strangers among them, arises from a supposition, that in process of time, an alteration of manners, customs, and ceremonies, might result from such an intercourse, and give birth to quarrels, party disputes, and sedition, which may at length overturn the government.

None but military people are permitted to wear arms in public, and those only during actual war: at other times they must appear like plain citizens, except when they attend a review, mount guard, or accompany a mandarin. Prostitutes are not permitted to remain within the walls of any city, but they may reside in the suburbs, though they must not keep a house of their own. Some individual is expresly authorised to afford them lodging; he must watch over and observe their conduct; and if there arises any noise or quarrel in his house, he alone is responsible, and is punished for it.

Every city of China, and sometimes even an ordinary town, has an establishment, called by the Chinese *Tang-pou*, where money may be borrowed upon pledges. No preliminaries are necessary, the transaction is concealed, and the borrower may remain unknown. If he chuses to tell his name, it is written down; if he does not, no further questions are asked him. Those who belong to these offices take an exact description, when the case requires it, of the figure of the person, that they may be able, in any event, to give an account to the police. The usual interest of money in China is said to be thirty per cent. which is a proof that coin is very scarce. At this rate money may be borrowed at the Tang-pou. Every pledge is marked with a number when left at the office, and the office must be answerable for it; but it is forfeited the very day after the term mentioned in the note of agreement is expired.

The public roads in China are in general broad; they are paved in all the southern, and in some of the northern, provinces. Vallies have been filled up, and passages have been cut through rocks and mountains, in order to make highways, and to preserve them as nearly as possible on a level. On all the great roads covered seats are erected at proper distances, where the traveller may shelter himself from the inclemency of winter, or the heats of summer, which are often excessive. Temples and pagodas are also frequently to be met with, to which admittance is always granted in the day-time, though often refused in the night, the mandarins only having the right of resting in them as long as they think proper. The inns are spacious and sufficiently numerous on the principal roads; but they are badly supplied with provisions, and passengers who have no beds with them must sleep on a plain mat. The Chinese government has published an itinerary of the whole empire, which comprehends every road and canal from the city of Pekin to the remotest extremities of China.

On all the great roads there are towers, on the tops of which watch-boxes are constructed for the convenience of centinels, and flag-staffs raised in order that they may make certain signals in case of any alarm. These towers, which are square, and generally built of brick, seldom exceed twelve feet in height. They, however, have battlements when they are built upon any of the roads which conduct to court, and they are also provided with very large bells of cast iron. They serve also as post-houses, and the soldiers convey the letters on horseback from one to the other, guarded by six other horse soldiers. Conveyance of every kind is easy in China; and travellers find little difficulty in getting their baggage transported from one place to another. In every city there are numbers of porters associated under a common chief, who regulates their engagements, fixes the price of their labour, receives their hire, and is responsible for every thing they carry. This establishment is directed by the general police of the empire. On all the great roads the traveller finds in every city several offices of this kind, that have a settled

settled correspondence with the next through which he intends to pursue his route. Before his departure, he carries to one of these offices a list of those things he wants removed, which is immediately inscribed in a book; and if he has occasion for two, three, or four, hundred porters, he immediately obtains them. Every thing is weighed by the chief, and the hire is five-pence per hundred weight for one day's carriage. An exact register of every article is kept in the office, and the traveller pays the money in advance, after which he has no occasion to give himself any trouble; on his arrival at the next city he finds his baggage at the corresponding office, where it is delivered to him with the most scrupulous fidelity.

The following is the official statement of the permanent revenue of China, as given by sir George Staunton.

Account of Revenue received into the Imperial Treasury at Pekin, from the different Provinces of China Proper. Taken from the Statements of Chow-ta-Zhin.

Provinces.	Tahels, or Ounces, of Silver.	Total Tahels.	Measures of Rice and other Grain.
Pe-tcheli	2,520,000 Land 437,000 Salt 79,000 other Tax	3,036,000	None.
Kiang-nan	5,200,000 Land 2,100,000 Salt 910,000 Taxes	8,210,000	1,440,000
Kiang-si	1,900,000 Land 220,000 Taxes	2,120,000	795,000
Tche-kiang	3,100,000 Land 520,000 Salt 190,000 Taxes	3,810,000	780,000
Fo-kien	1,110,000 Land 87,000 Salt 80,000 Taxes	1,277,000	None.
Hou-pe	1,300,000 Land 10,000 Taxes	1,310,000	100,000
Hou-nan Hou-quang	1,310,000 Land 35,000 Taxes	1,345,000	100,000
Ho-nan	3,200,000 Land 13,000 Taxes	3,213,000	230,000
Chan-tung	3,440,000 Land 130,000 Salt 30,000 Taxes	3,600,000	360,000
Chan-si	3,100,000 Land 510,000 Salt 112,000 Taxes	3,722,000	None.
Shen-si	1,660,000 Land 40,000 Taxes	1,700,000	None.
Kan-sou	300,000 Land 40,000 Taxes	340,000	210,000
Se-chuen	640,000 Land 30,000 Taxes	670,000	None.
Quang-tong	1,280,000 Land 50,000 Salt 10,000 Taxes	1,340,000	None.
Quang-si	420,000 Land 50,000 Salt 30,000 Taxes	500,000	None.
Yun-nan	210,000 Land	210,000	220,000
Koei-cheou	120,000 Land 10,000 Salt 15,000 Taxes	145,000	None.
	Tahels -	36,548,000	4,245,000

The greater part of the taxes in China are paid in commodities. Those who breed silk-worms pay their taxes in silk, the husbandmen in grain, and the gardeners in fruits, &c. This mode of imposing taxes is far from detrimental to the government or the people; as in every province there are in its service numbers of mandarins, officers, soldiers, and pensioners, of different kinds, who are furnished with every necessary for food and clothing, so that the articles collected as taxes, are nearly all consumed in those provinces in which they are levied. If any thing remains, it is sold on account of the emperor, and the amount is deposited in the imperial treasury. The taxes paid in money, arise principally from the sale of salt, which belongs exclusively to the emperor; from the duties paid by vessels on entering any of the ports; from the customs and other imposts on various branches of manufacture. These excepted, the trader contributes little towards the exigencies of the state, and the mechanic still less. The weight of the permanent and personal taxes therefore falls on the husbandman.

The annual expences of government are immense, and the emperor directs them as he thinks proper: these expences, however, are regulated in such a manner as never to be augmented but in cases of the utmost necessity. Indeed, the administration often make great savings, which serves to increase the general treasures of the empire, and prevents the imposition of new taxes when war becomes unavoidable, or unforeseen calamities desolate the empire.

The current coin of China consists only of one kind; it is denominated a caxee, and is made of copper. It is of a round figure, and about nine-tenths of an inch in diameter, has a small square hole in the middle, and is inscribed with two Chinese words on the one side, and two Tartar words on the other. Silver has no proper figure, its value is regulated by weight only.

In this vast empire there is kept a register or general enumeration of all the people by families, districts, and provinces, comprehending every individual, without regard to age, sex, or rank. Besides this, there is a second, which is partial, containing only the lower classes of people, from sixteen to fifty. This last roll serves to regulate every thing relating to vassalage, to facilitate public surveys, and to assist the operations of the police, &c. By means of these registers, a speedy and certain method is always found of ascertaining the situation of families or individuals in all circumstances, in which government or private persons may be interested. They also enable the government to judge what number of people have perished by inundations or epidemical distempers; to determine what succours are necessary in years of scarcity; to know the state of agriculture; how far manufactures can be extended; and what number of military people each canton can furnish. The government has also an accurate and minute account of all the lands in each district, of their different degrees of fertility, and what is cultivated in them. Public magazines and granaries, furnished with every kind of provision necessary for relieving the distresses of the people, in case of public calamities, or unforeseen disasters, are erected in the different provinces. Administration are always provided against every event; and as they are acquainted with the minutest expence necessary to be incurred, every thing is done in proper season with dignity, and without embarrassment.

The Chinese government determines, in the minutest manner, the dress for each season, and likewise the price of those dresses for every age and condition. The emperor himself is not excepted in these regulations: his dresses of ceremony are more or less sumptuous according to the religious, political, or domestic, ceremonies, for which he uses them. The particular dress for each class is so accurately described in the sumptuary code, as to distinguish, on the first view, the rank and condition of those who wear it.

Of palaces the emperor has a great number. Each capital of a province contains one, which is made the residence

dence of the viceroy. There are some also in cities of inferior note, which are appropriated for the use of those mandarins who enjoy places under government. Bridges have been multiplied in China in proportion to the number of its canals and rivers: they consist of three, five, or seven, arches; the centre is from thirty to forty feet wide, and raised very high, that barks may easily pass without lowering their masts.

Agriculture is the principal resource of the Chinese, who consider it as the first and most honourable of all professions. The people are allowed to use a portion of the grain of every crop, for the purposes of brewing and distillation; but, if the harvest happens to be bad, an order is issued for the suspension of these operations. The Chinese emperors do not confine themselves to the publishing of regulations respecting agriculture, but they encourage it by their own example; of this the celebrated ceremony, in which the emperor tills the earth with his own hands, has been often mentioned, and may be considered as a proof. This ceremony is as follows: Spring begins in China always in the month of February, but not regularly on the same day. This epocha is determined by the tribunal of mathematics. That of ceremonies announces it to the emperor by a memorial, in which every thing necessary to be done by the prince on that occasion is mentioned with the most scrupulous minuteness. He first names twelve of the most illustrious persons in his court to accompany him, and to hold the plow after he has performed his part of the ceremony. These are always three princes of the blood, and nine presidents of supreme courts. This festival is preceded by a sacrifice which the sovereign offers up to the Chang-ti, or supreme being. The emperor prepares himself by three days fasting; and those who are to attend him submit to the same regulations. The place where the emperor offers up the spring sacrifice, is a small mount, within the city of Pekin, fifty feet in height, called *Sien-nong-tan*, or mount of agriculture; this elevation is expressly prescribed by the rules of the ceremony, and cannot be dispensed with. The emperor, who sacrifices under the title of sovereign pontiff, invokes the Chang-ti, and prays for abundance in favour of his people. He then descends, accompanied by the princes and presidents, who are to put their hands to the plow along with him. The ground set apart for this purpose is contiguous to the mount. Forty labourers are selected to yoke the oxen, and to prepare the seeds which the emperor must sow. These seeds are of five different kinds, and such as are considered as the most useful and necessary, viz. wheat, rice, millet, beans, and another species of millet, called by the Chinese *cao-leang*, or lofty corn. These are brought to the spot in magnificent boxes, carried by persons of the most distinguished rank. The emperor takes hold of the plow, and turns up several furrows. The princes do the same in succession, and after them the presidents. The sovereign then throws into the earth the five kinds of seed before-mentioned, after which four pieces of cotton-cloth, proper for making dresses, are distributed to each of the labourers who assisted in yoking the oxen, and who prepared the seeds. This ceremony certainly strikes the minds of the labouring people, and greatly contributes to encourage their industry.

We cannot judge of the Chinese peasantry from those of Europe; especially in what relates to the advantages acquired by education. Free-schools are very numerous in every province of China, and many of the villages are not destitute of this advantage. The sons of the poor are there received as readily as those of the rich, and their duties and studies are the same; the attention of the masters is equally divided between them; and from the most obscure source talents often spring, which afterwards make a conspicuous figure on the grand stage of life. Indeed, nothing is more common in China, than to see the son of a peasant governor of that province in which his father long toiled in cultivating only a few acres.

The Chinese have been severely reproached, and with just reason, for permitting new-born infants, at the will of those who gave them being, under a pretence that they cannot maintain them, to be consigned to a cruel and premature death, by leaving them in the streets and public highways, or by plunging them, as soon as they come from the womb, into the next adjoining river. Yet it seems that this savage custom was never sanctioned by law, though tolerated by the government. It must have been the most dire necessity which led to this unnatural and shocking act, when first it was committed. It is reconciled, by the idolatrous worshippers of Fo, as a sacrifice or holy offering to the spirit of the river in which the infant is thrown, usually with a gourd suspended from its neck, to keep it from immediate drowning. Female infants are, for the most part, chosen for this cruel sacrifice, because daughters are considered as more intimately belonging to those families into which they pass by marriage, while the sons usually continue the support and comfort of their own. These infants are usually exposed immediately on the birth, or before the features become so animated as to catch the affections rising in a parent's breast. A faint hope is generally entertained, that they may yet be preserved from untimely death, by the vigilance of those who are deputed by the government to look for and collect these miserable objects, for the purpose of providing for such as are found alive, and for burying those, at the emperor's expence, which might have expired. The missionaries are likewise zealous in this humane work. They hasten to baptize all they find alive, whom they provide for and educate at their own expence, and bring up in the Christian religion. One of those pious fathers, who was not inclined to exaggerate the evil, acknowledged to sir George Staunton, that, in the city of Pekin alone, about two thousand infants were annually exposed in this inhuman manner, and of which a great number unavoidably perished.

Nothing seems to be neglected in China that has any relation to government; even the gazette is an essential part of the political constitution. This gazette is printed at Pekin, and is circulated throughout every province of the empire. It contains an account of all those objects to which the attention of the government is directed; and administration enter into the minutest details; grant succour in proper season; reward with liberality; and punish with justice. Nothing is inserted in this gazette which has not been submitted to the emperor, or which has not come immediately from him; and inevitable death would be the consequence to any one who should insert any thing false in this ministerial paper.

No law, or sentence, as before observed, can be of any force until the emperor's seal is affixed to it. This seal is about eight inches square, of fine jasper, a precious stone highly valued in China. The sovereign only is entitled to have a seal of this substance. Those which he gives to princes are made of gold; those of the viceroys and great mandarins, of silver; and those of inferior mandarins, or magistrates, must be made of lead or copper; and their size is larger or smaller, according to the rank which they hold as mandarins, or in the tribunals. The authority of inspectors sent into any of the provinces, is confirmed also by the seal of the emperor. The duty of these deputies is to examine into the conduct of governors, magistrates, and private individuals; and if any of them think it his duty to summon the viceroy before his tribunal, this great man, with all his importance, is obliged to attend. Has a superior behaved ill to an inferior magistrate; the former becomes the prisoner of the inspector; and, until he has declared himself from every imputation, he is suspended from his office. The viceroy, on the contrary, his permitted to enjoy his, until the inspector's report is made to the emperor, which generally decides his fate.

The emperor himself sometimes thinks proper to discharge the duty of these inspectors in some of the provinces;

vinces; and Kaung-hi, one of the most celebrated of the Chinese monarchs, gave, in the like circumstance, a memorable example of severe justice. Having retired a little way from his attendants, he perceived an old man weeping bitterly: "What do you weep for?" said the emperor. "My lord," replied the old man, who did not know the person of his sovereign, "I had only one son, in whom all my hopes were centered, and who might have become the support of my family: a Tartar mandarin has torn him from me, and carried him away by force. I am now deprived of every assistance, and know not where to seek relief; for how can a poor feeble old man like me obtain justice from the governor against a powerful man!" "Your son will be restored," said the emperor, without making himself known: "conduct me to the house of the mandarin who has been guilty of this act of violence." The old man obeyed, and, after having travelled two hours, they arrived at the mandarin's house, who little expected such a visit. The emperor's retinue arrived almost at the same time as the prince; and the house of the mandarin was soon filled and surrounded. As he could not deny his guilt, the emperor immediately condemned him to lose his head; and this sentence was executed upon the spot. The emperor then turning towards the old man, with a grave tone, addressed him thus: "I appoint you to the office of the criminal whom I have now put to death; be careful to discharge the duties of it with more moderation than your predecessor, and take warning by his crime and punishment, lest you yourself become an example to others."

A singular regulation exists with respect to degraded mandarins in China; every mandarin who is removed to an inferior office, is obliged, at the head of all those precepts or warrants which he issues, to mention the number of steps he has lost, as follows: "I, such a mandarin, degraded three, four, or six, steps, according as the case may be, order and command," &c. The inspector of a province has a very extensive authority over these inferior mandarins. He can, by his own power, deprive them of their employments, if their offence be great; and he only consults the court in cases where immediate punishment is not necessary. The father, son, brother, uncle, and grandson, are never admitted together into any of the tribunals at Pekin; and relations in the fourth degree cannot have a seat at the same time in any of the provincial tribunals.

All mandarins, whether Tartars or Chinese, of arms, or of letters, are obliged, every three years, to give in an exact account of the faults they have committed in discharging the duties of their office. This confession is examined at court, if it comes from a mandarin belonging to any of the four first classes: but the confessions of the mandarins in the lower classes, must be laid before the provincial tribunal of the governor: government also makes private inquiry to discover whether in this confession strict regard has been paid to truth. These informations are addressed to the tribunal of mandarins, and are there carefully examined; the merits and demerits are carefully weighed in the balance of justice, and the names of the examined mandarins are afterwards formed into three classes. The first consisting of those for whom rewards and preferment are intended; the second, of those whose conduct deserves reprehension, and to whom gentle admonition, accompanied with a few oblique hints respecting their future conduct, will be given; and the third of those whom it is intended to suspend for a certain time, or to remove for ever from their employments.

The principal military offices are held by Tartars: this precaution is taken to maintain their conquest, independent of the superiority which they have over the Chinese, in point of warlike genius. In times of war an exact journal is kept of every military transaction, and those are particularly mentioned, who have given proofs of remarkable courage, or displayed examples of superior skill. Promotion is the consequence to those who have signalized themselves, if they survive; if not, the rewards which they have merited are conferred on their widows, children, or brothers. Neither the father of a numerous family, an only son, nor the son of an aged widow, is obliged to perform military service, unless the state be in great danger, or in cases of the most urgent necessity. Government then advances money to those who enlist; they also receive double pay; the first for themselves, and the second for their family; and this they enjoy till their return.

That esteem in which military men are held in time of danger, seems, in China, to cease, almost the instant that the danger is over. On these occasions government bestows, with a lavish hand, distinctions, rewards, and honours of every kind; and it extends its favours to the lowest military class. Does a common horse or foot soldier fall in battle, his hair, his bow, or his sabre, is transmitted to his family, to be interred, instead of his body, in the sepulchre of his ancestors. An eulogium, suited to what he has atchieved, is added, to be engraven on the tomb in which these relics are deposited. A still greater share of distinction is bestowed on officers who have fallen in defence of their country. Either their whole armour, their ashes, their bones, or their entire bodies, are conveyed to their relations. Their rank, or the manner in which they have distinguished themselves, generally serves as a rule upon these occasions: ceremonies are performed in commemoration of some, and monuments are erected to others. The body of an officer, or the hair of a common soldier, is thus often transported, to the distance of a thousand or fifteen hundred leagues. The latter, as well as the former, is mentioned with honour in the Gazette: his name thus passes before the eyes of the public, and thence into the general history of the empire.

The degradation, or dismission, of a superior officer in China, can neither fix a stigma on the character of his son, nor in the least impede his promotion. When the son is asked by the emperor respecting his family, he will reply, coolly, "My father was disgraced for a certain offence; my grandfather was beheaded for such a crime;" and yet, this acknowledgement is not in the least detrimental to the person who makes it.

To judge of the religious system of the Chinese, the ancient and permanent religion of the state must not be confounded with popular superstitions introduced in latter ages. The primitive worship of this people has continued nearly the same, even to the present time. And though, in religious opinions, men's minds are unfettered in China, every individual being at liberty to follow his own mode of worship; yet it should seem extraordinary, that, in so extensive an empire, and in such a long series of years as must have elapsed from its first establishment to the present time, there have sprung up only two dissenting sects, different from the ancient or established form: these are, the *sect of the Tao-ssé*; and the *sect of the god Fo*. With respect to their ancient or original form of worship, Pere Amiot, a missionary long resident in the country, assures us, that "it bears every characteristic mark of the primitive doctrine of the chosen people of Israel, cotemporary with Moses; and that it may be traced back from age to age, without interruption, to the renewal of the human race by the grandson of Noah." And it will appear, that this ancient or original form of worship, as well as their cycle of years, strongly supports the opinion of sir George Staunton, that China was never peopled by a colony from India. The canonical books of the Chinese every where impress the idea of a supreme being. They mention him under the names of *Tien*, or Heaven; *Chang-tien*, or Supreme Heaven; *Chang-ti*, or Supreme Lord: and of *Hoang-chan-ti*, or Sovereign and Supreme Lord. "This Supreme Being," say these books, "is the principle of every thing that exists, and the father of all living; he is eternal, immoveable, and independent; his power knows no bounds; his sight equally comprehends the past, the present, and the future,

ture, and penetrates even to the inmost recesses of the heart. Heaven and earth are under his controul: all events, all revolutions, are the consequences of his dispensations and his will. He is pure, holy, and impartial; wickedness offends his sight, but he beholds with an eye of complacency the virtuous actions of men. Severe, yet just, he punishes vice in an exemplary manner, even in princes and rulers, and often precipitates the guilty, to crown with honour the man who walks after his own heart, and whom he hath raised from obscurity. Good, merciful, and full of pity, he forgives on the repentance of the wicked; and public calamities, and the irregularity of the seasons, are only salutary warnings, which his fatherly goodness gives to men, to induce them to reform and amend." Such are the character and attributes of the Divinity, which are declared in almost every page of the *Chou-king*, and other canonical books. Hence it appears evident that the ancient Chinese worshipped only one Supreme God, whom they considered as a free and intelligent Being, and as an all-powerful, avenging, and rewarding, spirit.

This religious doctrine of the first emperors of China, has been partly supported and continued under the following reigns to the present time. All those revolutions which shake thrones, and change the face of empires, are by the Chinese constantly attributed to the supreme direction of the Sovereign Lord of Heaven. *Tcheou-kong* thus expresses himself in the xiv. chap. of the *Chou-king*: "Ye who have been ministers and officers under the dynasty of *Ing*, give ear, and listen. The *Chang-ti*, incensed against your dynasty, destroyed it; and, by an order full of affection for our family, he hath given us authority to exercise sovereign power in the kingdom of Ing: he was desirous that we might finish the work he had begun. What hath passed among the people, hath shewn us, how formidable the Lord of Heaven is. The king of the dynasty of Hya performed no action agreeable to his people; for this reason, the Lord of Heaven loaded him with calamities, to instruct him, and make him sensible of the error of his ways: but this prince was intractable; he uttered words full of pride, and gave himself up to every kind of evil. Heaven, therefore, shewed no farther regard for him: he was deprived of his kingdom, and punished. *Tchang-tang*, founder of your dynasty, was commissioned to execute the orders of Heaven; he destroyed the dynasty of Hya, and, in its stead, established a wise king, to govern the people of the empire. *Tcheou*, the last prince of your dynasty, neglected the laws of Heaven; he neither informed himself of the care which his ancestors took to preserve their family, nor did he imitate their zeal and diligence: for this reason, the Sovereign Lord abandoned him, and brought him to punishment. Heaven did not support him, because he deviated from the paths of equity and justice. No kingdom, great or small, can be destroyed, unless such be the will of Heaven."

Vou-vang, in the second year of his reign, was attacked with a malady, which threatened his life; his brother had recourse to the Chang-ti, to beg, that a prince might be spared, whose life was so necessary for the welfare and happiness of his people. His prayer is thus recorded. "Thou, O Lord! didst place him on the throne, and establish him the father of his people. Wilt thou then punish us by his loss? If a victim be necessary to satisfy thy justice, I offer thee my life; I will yield it up as a voluntary sacrifice, provided thou wilt preserve my brother, my master, and my sovereign."

The Chi-king informs us, what sentiments of gratitude the emperor Chao-vang entertained for the blessings bestowed upon him by the Chang-ti.—"Rejoice, my people," said he one day to the labourers; "it is now only the end of spring, and you are about to gather in the fruits of autumn; your fields, but lately sown, are already loaded with an abundant crop. Let thanks, therefore, be given to the Chang-ti, who enables us so soon to enjoy his beneficent gifts. For this reason, I will not wait until the end of autumn, to present myself before him, and to thank him for so sudden a fertility."

Bad princes certainly intervened amonst a succession of good emperors; and a Li-vang forgot the examples of his pious ancestors, and gave himself up to the caprice of his pride. The Chi-king observes, that "the silence of the Chang-ti appeared then to be an enigma, and it might have been said, that his Supreme Providence had belied itself; every thing prospered with this wicked prince; the people were intimidated: even the censors of the empire applauded his errors.—What, then, is there no longer justice in heaven? Shall the impious enjoy, peaceably, the fruit of their crimes? Attend, and you will soon see, that the Chang-ti keeps his arm so long at rest, in order only to strike with redoubled force: for the people, harrassed by oppression, rose up against that tyrant, killed the flatterers who surrounded his throne, and would have sacrificed the prince himself to their fury, had he not escaped by a precipitate flight."

The emperor Yon-tching, who succeeded Kaung-hi, in 1722, furnished abundant proofs, in his proclamations and decrees, that the same sentiments respecting the being of a God, were held in sacred veneration during his reign. And the late emperor Tchien-lung, who succeeded Yong-tchien in 1736, notwithstanding his encouragement of idolatry in the common people, seems, in truth, to have the same sentiments; so that this doctrine of the existence and attributes of a supreme being, and of the worship and homage due to him alone, has subsisted in China with little change from the remotest ages. Indeed, if we consult all the monuments and canonical works of this nation, and if we search the ancient part of its annals, we shall not discover the least vestige of idolatry, but what has been of a later date, and introduced by the above mentioned sects. The Chinese history, so minute in its details, and so particular in pointing out every innovation in established customs, makes no mention of any superstitious rite, contradictory to the belief and worship which we have attributed to the ancient Chinese: had there been any such, it would have undoubtedly spoken of them with the same exactness as that with which it relates the establishment of the sect of the Tao-ssee, and the introduction of the religion of the idol Fo. Yet it has been asserted, that Tchien-lung, towards the end of his long reign, had become so far lost to this sacred doctrine of a supreme being, that, in the celebration of his birth-day, he impiously assumed the name of the Deity, and even suffered his people to offer divine worship and adoration unto him; and in his absence, to his throne, as the symbol of himself. Let us charitably hope that those who have given us this account, not understanding sufficiently the true nature of the Chinese festivals, may have mistaken the tenor and drift of these external ceremonies.

The first sacrifices which the Chinese instituted in honour of the Chang-ti, were offered up on a *Tan*, or altar of stones, in the open fields, or on some mountain. Around the tan was raised a double fence, called *Kiao*, composed of turf and branches of trees. In the space left between the fences, were erected two smaller altars on the right and left, upon which, immediately after the sacrifice offered up in honour of the Tien, they sacrificed also to the Cheng, that is to say, to the superior spirits of every rank, and to their virtuous ancestors. The sovereign alone, whom they considered as the high priest of the empire, sacrificed on the tan. In the early ages, a single mountain was thought sufficient for sacrifices to the Chang-ti. But in process of time, the empire being considerably enlarged, Hoang-ti appointed four principal mountains, situated in the extremities of his states, and corresponding, like the pyramids of Egypt, with the four cardinal points, to be ever after places particularly consecrated, and set apart for the religious worship of the whole nation. In the course of every year, the prince went

went successively to offer up sacrifice upon each of these mountains, and thence took occasion to shew himself to his people, and to inform himself of their wants, that he might endeavour to relieve them.

Since the emperors Yao and Chun, different notions have been entertained respecting these sacrifices. We read in the Chou-king, and other fragments of the ancient Chinese history, that Chun ordained, 1st. That at the second moon, in which the vernal equinox fell, the sovereign should repair to the mountain Tai-chan, in the eastern part of China, and there offer sacrifices on a tan, within the fence of the kiao, to beg that Heaven would deign to watch over the seed of the earth, then beginning to spring up. 2dly, That at the fifth moon, in which the summer solstice happened, the sovereign should perform the same ceremonies on the southern mount, and implore Heaven to diffuse warmth through the bowels of the earth, to add vigour to its fostering power, and give effect to its nutritive qualities. 3dly, That at the eighth moon, at which time the autumnal equinox fell, sacrifice should be offered on the western mountain to procure an abundant crop, and to prevent insects or destructive vermin, drought, or excessive moisture, winds, and all injuries of the air, from destroying the rising hopes of the labourer. And lastly, That at the twelfth moon, after the winter solstice, sacrifice should be offered up on the northern mountain, to thank Heaven for all the blessings received in the course of the year, and to solicit a continuance of them through that which was about to commence. This custom subsisted a long time after Hoang-ti. The emperors of the dynasty of Tcheou added some other ceremonies, and a fifth mountain, which was supposed to form a centre to the other four. Since that time they have been called the five Yo, or mountains of sacrifice.

This institution, which subjected the emperor to regular journies, was however found to be attended with certain inconveniences, to obviate which, a spot was consecrated in the neighbourhood of his palace, and substituted for the Yo on all occasions, when it was inconvenient for the sovereign to repair to either of the mountains of sacrifice. At this place an edifice was erected, which at once represented the kiao, the tan, and the hall of ancestors, and in this the emperor offered the accustomed sacrifice. The hall of ancestors made part of this edifice, because it was necessary for those who offered sacrifice to the Chang-ti, to repair first to this hall, and acquaint their ancestors what they were about to perform. Thither also they returned after sacrificing, to thank them for the protection they had procured from the *Chang-ti*, who had not disdained to receive the homage of their vows. They then offered up a sacrifice of thanksgiving, and performed certain ceremonies, to shew their respect. This edifice received a different name and a new form under each of the three first dynasties. The Hya called it *Chéché, the House of Generations and Ages*—or, according to the interpretation of Father Amiot, *a Temple in honour of him who made generations and ages*. It contained within its circumference five separate halls appropriated for different purposes. These halls had neither paintings nor ornaments of any kind; they presented only four bare walls in which windows were constructed for the admission of light. The stair-case that conducted to the principal entrance consisted of nine steps. The offerings from the Levitical law of Moses, of the firstlings of the flocks and herds, and likewise of fowls, of oil, salt, flour, and incense, which sir George Staunton assures us are known and observed by the Chinese at the present day, together with their patriarchal mode of life, offers a fresh proof that their religion must have been that of the early patriarchs, though now so much debased.

Pekin contains at present two principal temples, the Tien-tan, or temple of the heavens, and the Ti-tan, or temple of the earth, in the construction of both which, the Chinese have displayed all the elegance and magnificence of their architecture. These temples are both dedicated to the Chang-ti; in the first, he is adored as the Eternal Spirit; in the second, as the Spirit that created and preserves the world. The ceremonies with which modern sacrifices are accompanied, are however greatly multiplied, and nothing can equal the splendour and magnificence with which the emperor is surrounded, when he performs this solemn and sacred duty. He alone, in quality of high priest, and head of the great family of the nation, has a right to offer up sacrifice to the Chang-ti; and it is in the name of all the people that he prays and sacrifices. Some time before the day fixed for this important ceremony, the monarch, the grandees of his court, the mandarins, and all those who by their employments are qualified to assist, prepare themselves by retirement, fasting, and continence. During that time the emperor gives no audience, and the tribunals are entirely shut. The mandarins of the Tribunal of Crimes, and every person who has been disgraced, is incapacitated from performing any office in these grand ceremonies. Marriages, funerals, rejoicings, entertainments, and festivals of every kind, are then forbidden. On the day appointed for the sacrifice, the emperor appears with all the pomp and magnificence of power. His train is composed of an innumerable crowd, a multitude of princes, lords, and officers, surround him, and his march towards the Tien-tan resembles a triumph; the magnificence of every thing in the temple corresponds to that of the sovereign; the vases and all the utensils employed in sacrificing are of gold, and even the instruments of music are of enormous magnitude, and are never used any where else. If the emperor however never displays more pomp and grandeur than when he walks in procession to the Tien-tan, he on the other hand never appears more humbled and dejected than during the time he is sacrificing. By the manner in which he performs his prostrations, rolls in the dust, and speaks of himself to the Chang-ti, it should seem that he assumes this pomp and splendour only for the purpose of declaring, in a sensible and striking manner, the infinite distance which is between the Supreme Being, and man. This remains of the ancient patriarchal faith, or confident belief in one only Supreme Being, seems now principally confined to the royal race, to the nobility, mandarins of letters, and those whose minds are better informed than the untaught multitude. Yet it is a most unaccountable fact, that every idea of a sabbath, or day of rest, is lost among them; no sabbath-day being observed throughout this vast empire!

The sect of the Tao-ssé, was founded by an enthusiast named *Lao-kiun*, or *Lao-tsé*, who came into the world 603 years before the Christian era. His father is represented as a poor peasant, who from his infancy lived in a rich family as an inferior domestic; he attained to the age of seventy without having made choice of a wife, but at length united himself to a woman of the same rank, who was then in her fortieth year. The wonderful destiny of the son was foretold, according to oral tradition, by many remarkable circumstances which attended his birth. His mother, who happened to be in a retired place, conceived on a sudden, being impressed by the vivifying virtue of heaven and earth. She carried the fruits of her womb for the space of eighty years, but the master she served, enraged at her going with child so long, drove her from his house, and reduced her to the necessity of wandering about the country. At length she brought forth a son, whose hair and eye-brows were entirely white. The people, struck with the whiteness of his hair, named him the *grey-haired child Lao-tsé*.

We have little account of this enthusiast during his infancy; he was appointed librarian to one of the emperors of the dynasty of Tcheou, and afterwards raised to the rank of an inferior mandarin. His first employment, which placed him amidst books, inspired him with an ardent desire for study, and to this he entirely gave himself

himself up, and acquired by close application a profound knowledge of history and of ancient ceremonies. He died at Ou in an advanced age. The principal work he left to his disciples is the book Tao-te, which is a collection of five thousand sentences. The morality of this philosopher has a resemblance to the doctrines of Epicurus. It consists principally in banishing vehement desires, and suppressing those impetuous passions, capable of disturbing the peace and tranquility of the soul. But the disciples of this philosopher afterwards changed the doctrine which he had left them. As that passive state and perfect tranquillity of mind to which they endeavoured to attain, was continually disturbed and interrupted by the fear of death, they declared that it was possible to discover a composition from which a drink might be made that would render mankind immortal. This absurd idea led them to the study of chemistry, afterwards to search for the philosopher's stone, till at length they gave themselves up to all wild extravagancies of magic.

The desire and hope of avoiding death by the discovery of so valuable a liquor, gained a number of proselytes to this new sect; wealthy individuals, especially those of the female sex, shewed the greatest eagerness to be instructed in the doctrine of the disciples of Lao-tsé. Magical practices, the invocation of spirits, and the foretelling future events by divination, made rapid progress throughout all the provinces of the empire. The credulity of some of the emperors gave an air of importance to the schism, and the court was filled with an innumerable train of these impostors, who were now honoured with the distinguished title of *tien-ssé*—celestial doctors. Vou-ti, fifth emperor of the dynasty of the Han, shewed a passionate desire for the study of these mysteries. Death had deprived him of a favourite mistress, whom he ardently loved, and one of these impostors, Tao-ssé, found means, by incantations, so to work on his imagination as to give him a fancied sight of the woman whom he so tenderly loved; and this fancied apparition attached him more and more to the extravagant notions of the new sect. Grieved at this infatuation, one of the grandees of the empire, being in the emperor's presence when the mysterious beverage was brought him, suddenly seized the cup, and drank up the whole liquor. Enraged at this act, the monarch caused him to be arrested, and gave orders for putting him to death. "Your order is of no avail," said the courtier, without any emotion; "it is not in your power to deprive me of life, since I have now rendered myself immortal: however, if I am still subject to the power of death, your majesty owes me much obligation, since you must thereby be convinced, that this liquor has not that virtue which is attributed to it, and that these impostors deceive you." This answer saved the courtier's life, but it did not reform the monarch. He often drank the liquor of immortality; but his health began to decline, and, after being made sensible of his mortality, he died, sadly deploring his own folly and credulity.

The death of this emperor did not retard the progress of the sect. Temples, consecrated to spirits, reared their idol heads in every corner of the empire; and two of the most celebrated of the Tao-ssé were authorised to maintain public worship there, after the form which had been appointed for them. They likewise distributed and sold to the people small images, upon which were represented that immense crowd, both of men and spirits, with which they had peopled the heavens, and which they named *Sien-gin*—Immortals. These were worshipped as so many distinct deities, independent of the Supreme Being: in like manner several of the ancient kings were metamorphosed into gods, and also invoked. Under the Tang, this superstition still continued. The founder of that dynasty erected and consecrated a magnificent temple to Lao-tse himself; and another emperor of the same family caused the statue of this philosopher to be placed with great pomp and solemnity in his palace. The priests Tao-ssé therefore increased in number, and became more powerful under the dynasty of Song. Every fraud and deceit that cunning could suggest, or ingenuity invent, were employed by these impostors, to increase the reputation of their doctrine, and to insinuate themselves into the confidence of princes. On a dark night, they suspended, at one of the gates of the imperial city, a book full of mystic characters, and magical figures. At break of day, they sent notice to the emperor of the sudden appearance of this book, and publicly declared that it had fallen from heaven. The credulous monarch, followed by a numerous train, immediately repaired, on foot, to the spot, in order to take possession of the precious volume; and, having received it into his hands, in the most respectful manner, he carried it in triumph to his palace, and shut it up in a golden box. The eighth emperor of the same dynasty carried his superstitious veneration for a favourite Tao-ssé so far, that he publicly ordered him to be worshipped under the name of Chang-ti. Until that epoch, the most zealous partisans of Lao-tse had always reserved this name for the Supreme Being only. This impiety therefore shocked and disgusted the whole sages of the nation; yet no decree was made against them.

The Toa-ssé, at present, offer up three different victims to the spirit which they invoke; a hog, a fowl, and a fish. The ceremonies which they use in their incantations are various, according to the imagination and address of the person who practises them. Some drive a sharp stake into the earth; others trace out fantastical figures on paper, and accompany each stroke of the pencil with grimaces and horrible cries, and others make a hideous and frightful noise with kettles and small drums. A great number of these Tao-ssé now pretend to be fortune-tellers. The chief of them is invested by government with the dignity of grand mandarin, and resides in a town of the province of Kiang-si, where he inhabits a sumptuous palace. The superstitious confidence reposed in him by the vulgar attracts an immense concourse of people, who flock thither from every part of the empire: some to seek a cure for their diseases; others, to consult respecting what may befal them, and to get an insight into futurity.

The sect of the god Foe, or Fo, is still more pernicious, and much wider diffused throughout China, than the preceding. It came originally from India. The doctors Tao-ssé had promised to a prince of the Tchou, and brother of the emperor Ming-ti, to make him enter into communion with spirits. This credulous and superstitious prince, having heard of a celebrated spirit in India, named Fo, prevailed on his brother to send an embassy to this foreign deity. The officer who was charged with this commission set out, accompanied by a train of seventeen persons. When he arrived at the place of his destination, he found only two Cha-men, or votaries of Fo, whom, not willing to fail in his errand, he carried with him to China. He collected, at the same time, several images of Fo, or Boudha, painted on fine chintz, with forty-two chapters of the canonical books of the Indians, which he placed, together with the images, upon a white horse. This embassy returned to the imperial city in the eighth year of the reign of Ming-ti, and the sixty-fifth of the Christian era. Thus was the doctrine and worship of Fo first introduced into the Chinese empire; and these ceremonies seem to be the principal traces of Indian customs in China brought in support of Sir William Jones's opinion, that China was peopled by the Hindoos.

We have no certain knowledge of the origin of this pretended god Fo; but his followers relate that he was born in one of the kingdoms of India, situated near the line, and that his father was a king. They assure us that his mother, who was named *Mo-ye*, brought him into the world by the left side, and that she expired soon after her delivery;

delivery; that at the time of her conception, she dreamed that she had swallowed an elephant, and that this strange dream gave birth to the particular veneration which the kings of India have always shewn for a white elephant. "As soon as this extraordinary child was born," add they, "he had strength enough to stand erect without assistance; he walked seven steps, and pointing with one hand to the heavens, and with the other to the earth, cried out, In the heavens and on earth there is no one but me who deserves to be honoured." The derivation of this idol god, given by Sir William Jones, in his Asiatic Researches, differs widely from the above, but does not appear to be so authentic.

The priests attached to the worship of Fo, are called *Talapoins* by the Siamese, *Lamas* by the Tartars, *Ho-chang* in China, *Bonzes* in Japan; and it is under the latter appellation that they are generally known by Europeans. One of the principal errors propagated by Fo, is the doctrine of the transmigration of souls, and of which he appears to have been the inventor; for he lived at least five hundred years before Pythagoras. This doctrine has given rise to that multitude of idols, which are reverenced in every place where the worship of Fo is established. Quadrupeds, birds, reptiles, and the vilest animals, had temples, and became objects of public veneration, because the soul of the god in his transmigrations and metamorphoses might have inhabited their bodies.

An infinitude of fables were spread concerning Fo, after his death. Some affirmed that he was still in life, that he had been already born eight thousand times, and that he had appeared successively under the figures of an ape, lion, dragon, elephant, &c. These fables occasioned much trouble and division among his disciples. Some continued firmly to maintain the original doctrine, while others, embracing a second, formed a sect of atheists. A third party, who were desirous of re-uniting the two former, gave rise to the celebrated distinction of the external and internal doctrine, one of which must naturally precede and dispose the mind for receiving the other. "The external doctrine," say they, "is to the internal what the mould is to an arch which the builder is about to raise; when the latter is constructed, the former is knocked down and becomes useless." The case is the same with the two laws, the external and internal; when we rise to a knowledge of the second, we ought to abandon the first. We shall not attempt to examine all the errors contained in this internal doctrine: its folly and absurdity will appear sufficiently evident, if we only mention the ideas upon which it is founded. "Nothing is the beginning and end of every thing that exists; from nothing our first parents derived their existence, and to nothing they returned after their death. All beings are the same, their only difference consists in their figure and qualities. This universal principle is extremely pure, exempt from all change, exceedingly subtle and simple; it remains continually in a state of rest; has neither virtue, power, nor intelligence; besides, its essence consists in being free from action, without knowledge, and without desires. To obtain happiness, we must endeavour, by continual meditation and frequent victories over ourselves, to acquire a likeness to this principle; and to obtain that end, we must accustom ourselves to do nothing, will nothing, feel nothing, desire nothing. When we have attained to this state of happy insensibility, we have nothing more to do with virtue or vice, punishments or rewards, providence or the immortality of the soul. The whole of holiness consists in ceasing to exist, in being confounded with nothing; the nearer man approaches to the nature of a stone or log, the nearer he is to perfection: in a word, it is in indolence and immobility, in the cessation of all desires and bodily motion, in the annihilation and suspension of all the faculties both of body and soul, that all virtue and happiness consist. The moment that man arrives at this degree of perfection, he has no longer occasion to dread changes, futurity, or transmigrations, because he hath ceased to exist, and is become perfectly like the god Fo." Extravagant and absurd as this philosophy appears, it found partisans in China, and the emperor Kao-tsong became so much infatuated with it, that he abdicated the throne, that he might be more at liberty to indulge himself in the practice of this extravagant doctrine, which entirely destroys morality, subverts society, and tends to annihilate that reciprocal relation which unites men together.

The external doctrine is better suited to the comprehension of the vulgar, and has, on that account, gained more followers. The following are the maxims and tenets preached up by the bonzes who profess this doctrine. They admit the distinction between good and evil; and that, after death, rewards will be bestowed on the good, and punishments inflicted on the wicked, in places destined for the souls of each; that the god Fo came upon earth to save mankind, and to bring back to the paths of salvation those who have strayed; that it is by him their sins are expiated, and that he alone can procure them a happy regeneration in the life to come. They enjoin the strict observance of the five following precepts: not to kill any living creature, of whatever nature it may be; not to take away the goods of another; not to pollute themselves by uncleanness; not to lie; and not to drink wine. They, above all, recommend the practice of certain acts of mercy; such as, to treat their bonzes well, to build monasteries and temples for them, and to supply them with every thing necessary, in order that they may be able, by the assistance of their prayers, and the penance which they impose, to merit forgiveness, and the remission of all their sins. "At the funeral of your parents, burn," say they, "paper gilt with gold or silver, dresses and silk stuffs: these substances will be changed into real gold and silver, and superb vestments, in the other world; and all these riches will be faithfully transmitted to your fathers. Woe unto you, if ye do not obey these holy precepts! your souls will be delivered over, after death, to the severest torments, and subjected to the most disgusting changes. Ye shall revive in the form of dogs, rats, serpents, horses, and mules; and ye shall be for ever exposed to the most dismal and wretched transmigrations." It is difficult to conceive the impression, these threats and denunciations respecting futurity, make upon the minds of the credulous Chinese; and therefore it is not surprising that the idolatrous worship of Fo has become almost universal among the common people of China; particularly as there is no established religion insisted upon by the government, which neither interferes with mere private opinions, nor prohibits any belief, which is not thought dangerous to the general tranquillity of society.

The bonzes, or priests of Fo, are perfect masters of all the resources of hypocrisy; they embrace every occasion for cringing and fawning, and they affect a meekness and modest civility, which at first deceives, and prepossesses persons in their favour. They often submit to the severest penances, and practise the most rigorous austerities. They are often seen in the squares, and other public places, exhibiting themselves as frightful spectacles of mortification. Some of them drag, with great pain, along the streets, large chains, thirty feet in length, which are fastened round their necks and legs, and some mangle their bodies, and make them appear all over blood, by slashing their flesh with a sharp flint. Notwithstanding all these infatuations, a bonze is generally despised by the better sort of people in China. To recruit and perpetuate their sect, they purchase young children, whom they initiate in all their mysteries; and these afterwards succeed them, and carefully transmit their art and knowledge to other young bonzes, whom they educate in the like manner.

The discovery of a Jewish synagogue in an empire so remote, is a circumstance too interesting to be omitted. This Israelitish colony appeared in China under the dynasty

nasty of the Han, who began to reign in the year 206 before Christ. It is reduced to a small number of families, who are established only at Cai-fong, the capital of the province of Ho-nan. These Jews neither kindle fire nor cook any victuals on Saturdays; but they prepare on Friday whatever may be necessary for the day following. When they read the Bible in their synagogue, they cover their faces with a transparent veil, in remembrance of Moses, who came down from the mountain with his face covered, and in that manner published the Decalogue.

The Mahometans seem to have multiplied much more in China than the Jews. It is above six hundred years since they first entered this empire, in which they have now formed different establishments. For a great number of years they were preserved only by marriages, and by the alliances which they contracted; but, for some time past, they seem to have been more particularly attentive to the propagation of their doctrine. The principal means which they apply for this purpose, are, to purchase, for a sum of money, a great number of children brought up in idolatry, whom their poor parents, compelled by necessity, readily part with. These they circumcise, and afterwards educate and instruct in the principles of their religion. During the time of a terrible famine, which desolated the province of Chang-tong, they purchased more than ten thousand of these children, for whom, when grown up, they procured wives, and built houses, and even formed whole villages of them. They insensibly increased, and are now become so numerous, that they endeavour to exclude from the places in which they reside, every inhabitant who does not believe in their prophet, and frequent a mosque.

Although the manners of the Chinese people have been variously represented, yet it is certain that they bear no kind of resemblance to those of any other known nation on the face of the earth; and what is equally remarkable, they have remained always nearly the same. Every custom formerly practised, is still preserved with little variation; whatever they formerly did, they seem to do at present, and nearly in the same manner. Public decency has also been always respected in China, and great care and attention have been employed to enforce it. Marriage, recommended and encouraged by all great legislators, is particularly protected in China. Whoever seduces the wife of another is put to death; and the same punishment is generally inflicted on the person who debauches a young woman. In both these circumstances, the precautions dictated by universal custom tend greatly to support the law, and often render it superfluous.

According to the abbe Grosier, "a Chinese enters into the married state often without ever having seen the woman whom he espouses: he knows nothing of her looks or person, but from the account of some female relation or confidant. The same matrons who negociate the marriage, determine the sum which the intended husband must pay to the parents of the bride; for, in China, a father does not give a dowry to his daughter; but the husband gives a dowry to his wife, or, we may say with more propriety, purchases her of her parents or friends. When the day appointed for the ceremony arrives, the bride is placed in a chair, or close palankin. Every thing that composes her portion is borne before or behind her by different persons of both sexes, while others surround her, carrying torches and flambeaux, even in the middle of the day. A troop of musicians, with fifes, drums, and hautboys, march before her chair, and her family follow it behind. The key of the chair in which she is shut up, is committed to the care of a trusty domestic, to be delivered to the husband only. The husband, richly dressed, waits at his gate for the arrival of the procession. As soon as it approaches, the key is put into his hands; he eagerly opens the chair, and at the first glance learns his fortune. It sometimes happens, that the husband, discontented with his intended spouse, suddenly shuts the chair, and sends her back to her relations. To get rid of her, it only costs him a sum equal to that which he gave to obtain her. If the husband is contented, she descends from her chair, and enters the house, followed by the relations of both, where the new-married couple salute the Tien four times in the hall, and afterwards the parents of the husband. The bride is then committed into the hands of the women who have been invited to the ceremony, and who, together with her, partake of an entertainment, which continues the whole day: the male part of the guests are treated in the like manner by the husband. The same form prevails among the Chinese at all their grand feasts: the women amuse themselves separately; and the men do the same in another apartment. The pomp increases according to the riches and rank of the parties, and diminishes also in the same proportion.

We have already noticed that a Chinese is permitted to have only one lawful wife; but that he may purchase several concubines. Every Chinese, who is desirous of embracing this privilege, and keeping on good terms with his wife, pretends to be actuated by some good motive, and he is particularly careful to let her know, that if he takes concubines, it is only with a view of procuring her a greater number of women to attend her. A widower raises sometimes his favourite concubine to the rank of lawful wife. He is not then obliged, as in the former case, to examine whether the rank of her whom he espouses approaches near to his own: and he is also freed from all preliminary formalities. These concubines are nearly all procured from the cities of Yang-tcheou, and Sou-tcheou, which are almost wholly engaged in this species of traffic, and where girls are educated, and taught singing, dancing, music, and every accomplishment suitable to women of quality, or which can render them agreeable and pleasing; and the greater part of them are purchased from other places, to be again disposed of.

The Chinese women, even of the greatest rank, seldom quit their apartment, and their book of ceremonies requires, that there should be two apartments in every house; the exterior for the husband, and the interior for his spouse. They must be separated by a partition or wall, and the door must be carefully guarded: the husband is not always at liberty to enter the inner apartment, nor must the wife quit it without leave, or a sufficient cause. "A wife," adds this book, "is not mistress of herself; she has nothing at her own disposal; she can give no orders but within the precincts of her own apartment, to which all her authority is confined." It seems, however, from the account with which we have been favoured by sir George Staunton, that the charge brought against parents and husbands, of binding up the feet of the Chinese females purposely to prevent their walking or gadding abroad, is a popular error; for that this ridiculous custom owes its origin to nothing more than an absurd fashion among the ladies of having small feet: We shall present the fact in sir George's own words: "Most of the Chinese women, even of the middle and lower classes, have their feet unnaturally small, or rather truncated. They appear as if the fore part of the foot had been accidentally cut off, leaving the remainder of the usual size, and bandaged like the stump of an amputated limb. They undergo, indeed, much torment, and cripple themselves, in a great measure, in imitation of ladies of higher rank, among whom it is the custom to stop, by pressure, the growth of the ancle as well as foot, from the earliest infancy. Leaving the great toe in its natural situation, they forcibly bend the others, and retain them under the foot, till at length they adhere to, and are buried in, the sole, and can no more be separated from it. Where these compresses are constantly and carefully kept on, the feet are symmetrically small. The young creatures are, indeed, obliged, for a considerable time, to be supported when they attempt to move; and ever afterwards they totter, and walk upon their heels. This artificial diminutiveness of the feet, though is does not entirely prevent their use, must

A Prince a Princess and a Mandarin
of the Empire of China

certainly cramp the general growth, and injure the constitution of those who have been subjected to it. Some of the lowest classes of the Chinese women, of a race confined chiefly to the mountains and remote places, have not adopted this unnatural custom; but the females of this class are held by the rest in the utmost contempt, and are employed only in the most menial domestic offices. So inveterate is the custom, that if of two sisters, otherwise every way equal, the one had thus been maimed, while nature was suffered to make its usual progress in the other, the latter would be considered as in an abject state, unworthy of associating with the rest of the family, doomed to perpetual obscurity, and to the drudgery of servitude."

With respect to education, the Chinese book of ceremonies directs, that at the age of six, if it be a male, he is to be made acquainted with the numbers most in use, and with the names of the principal parts of the world. At eight he is instructed in the rules of politeness. The calendar becomes his study at the age of nine, and at ten he is sent to a public school, where he learns to read, write, and calculate the Shwan-pan, or abacus of the Chinese, and by which they calculate nearly all their operations in arithmetic. From thirteen till fifteen he is taught music, and every thing which he sings consists of moral precepts. When boys have attained to the age of fifteen, they are taught to handle a bow and arrow, and to mount on horseback. At twenty they receive the first cap, if they are judged to deserve it, and they are permitted to wear silk dresses, ornamented with furs; before that period they have no right to wear any thing but cotton.

As it is considered of great advantage to the Chinese literati to be able to write their characters well, they on this account bestow particular pains in forming the hands of young people. A neatness in characters is made of the utmost consequence in those examinations, which students undergo before they are admitted to the first degree. A deficiency in this respect often occasions them to be rejected. Of this F. Du Halde gives the following instance: "A candidate for degrees, having, contrary to order, made use of an abbreviation in writing the character *ma*, which signifies horse, had the mortification of seeing his composition, though in other respects excellent, rejected merely on that account, besides being severely rallied by the mandarin, who told him that a horse could not walk unless he had all his legs." When a scholar is become master of a sufficient number of characters, he is permitted to compose. In this exercise a kind of competition is established. Twenty or thirty families, all of the same name, and who consequently have only one hall for the manes of their ancestors, agree to send their children to this hall twice a month in order to compose. Each head of a family in turn gives the subject of this literary contest, and adjudges the prize.

Europeans can scarcely conceive how far the sovereigns of China have carried their attention, in order to promote and encourage learning. In every city and town, and almost in every village, there are masters who keep schools for the purpose of teaching those sciences with which the Chinese are acquainted. Parents possessed of a certain fortune, provide preceptors for their children at home, who endeavour to form their minds to virtue, to initiate them in the rules of good breeding and the accustomed ceremonies; and, when their age admits, to make them acquainted with the laws and history of their country. The education of the females is confined to giving them a taste for solitude, and accustoming them to modesty, and even to silence. If their parents are rich, they are also instructed in such accomplishments as may render them agreeable and pleasing. The duties of women in China, as in other Asiatic countries, are merely of the passive kind.

With respect to the dress of the Chinese, it is almost the same among people of either sex; but certain appendages, or ornaments, distinguish the rank and dignity of those who wear them, and severe chastisement would be the consequence to any person who should venture to assume a dress not authorised by the law. The Chinese dress, in general, consists of a vest, which reaches to the ground, one part of which folds over the other, and is fastened by four or five gold or silver buttons. The sleeves terminate in the form of a horse-shoe, covering the hands, and leaving nothing to be seen but the ends of the fingers. Round their middle is tied a girdle of silk, the ends of which hang down to their knees. From this girdle is suspended a sheath, with a kind of knife, together with two small sticks, which they use at their meals. Under this robe both men and women wear a pair of drawers or trowsers, suited to the season. In summer they have their necks always bare, and in winter they wear a collar, made of silk, sable, or fox's skin, joined to their robe, which is then trimmed with sheep's skin, or quilted with silk and cotton. That of the mandarins and people of quality is lined throughout with sable brought from Tartary, or with fox's skin, trimmed with sable. In spring it is lined with ermine. Above their robe, they wear also a kind of surtout, with wide sleeves, but very short, which is lined in the same manner. The emperor and princes of the blood alone wear yellow; certain mandarins are permitted to wear sattin of a red ground, upon days of ceremony, but in general they are clothed in black, blue, or violet. The colour to which the common people are confined, is blue or black; and their dress is always composed of plain cotton cloth. In attending funerals, and for mourning, they wear white.

The Chinese shave their heads, but they have not been always accustomed to do this; they formerly employed great pains in preserving their hair; but the Tartars, who subdued them, compelled them to cut it after their manner. This revolution in dress was not effected without bloodshed; and it was necessary to employ force, before they could be induced to imitate the Tartars. It appears singular, that the conqueror of China should require this trifling mark of subjection, when he adopted their laws, their manners, and their constitution. The small portion of hair which the Chinese preserve on the tops of their heads, or behind, is all that is allowed by custom; it is generally very long, and they plait it in the form of a tail. In summer they wear on their heads a kind of pyramidical hat or cap, lined with sattin, and covered with ratan, or cane, neatly wrought. To the top they fix a large tuft of red hair, which falling down covers it to the brim. There is another kind of head-dress, which the mandarins and literati only have a right to wear: it is a cap of the same form as the preceding; but lined with red sattin, and covered on the outside with white. A large tuft of the finest red silk is fixed over it, which is suffered to hang down, or wave with the wind.

People of condition when they go abroad wear boots, of sattin, silk, or cotton, but always dyed. These boots have neither heel nor top, and they are made to fit the foot with the greatest exactness. When they travel on horseback, they have others, made of cow or horse leather, prepared in such a manner, that it is very soft and pliable. The boot-stockings which they wear in winter, are of quilted stuff, lined with cotton: they reach above the top of the boot, and are ornamented with a border of velvet or cloth. For summer they have a cooler kind; and in their houses they wear a sort of slippers, made of silk-stuff. The common people are contented with a kind of slippers, made of black cotton cloth. A Chinese, dressed according to rule, would consider it as great an omission to forget his fan, as it would be to forget his boots.

The dress of the Chinese women, in its shape and form, seems to have been dictated by modesty, seconded perhaps by jealousy. Their robes are close at top, and very long. With regard to the colour of their dresses, it is entirely arbitrary,

arbitrary, and depends upon choice; but black or violet are generally adopted by those advanced in life. Their general head-dress consists in arranging their hair in several curls, among which are interspersed small tufts of gold or silver flowers. Young ladies wear also a kind of crown or bonnet made of pasteboard covered with fine stuff or silk; the fore-part rises in a point above the forehead, and is covered with pearls, gold, diamonds, and other costly ornaments, in proportion to their rank and fortune. The rest of the head is decorated with flowers, either natural or artificial, among which are often interspersed small diamond pins.

The dress of a Tartar lady is somewhat different from that of a Chinese. The robe of the former is equally long; but the vest which covers it, does not descend so low. This robe is also close at the top; and the Tartar ladies wear, besides, upon their breasts, a very large band. Their usual head-dress is a hat, ornamented according to the fancy of the wearer.

The dress of a villager differs from that worn by those who live in towns. It consists of a coarse linen frock, over which is thrown a cotton vest, that descends to the middle of his thigh. He has a pair of large drawers, or trowsers, that rise to his girdle, and reach as far as the ancle, and his slippers, or rather wooden shoes, terminate at the toe in a sharp point, which is turned backwards. The dress of the females among the peasantry, is much like that of the men; they wear similar cane hats, a cotton vest, and large trowsers. They are much accustomed to spin; and, being subjected to the same labour with their husbands in tilling the ground and getting in the harvest, they appear equally coarse and ill attired.

The Chinese buildings, even public monuments, and the emperor's palaces, strike more by their extent than their magnificence. Many of the imperial palaces may be compared to cities, and those of the princes, principal madarins, and people of great fortune, are very extensive. The apartment where they entertain their intimate friends is plain, neat, and simple. With regard to those set apart for their women and children, they are inaccessible to every stranger, were he even the dearest and most intimate friend of the master of the house. Their gardens are laid out in such a manner, as to particularly attract the attention of an European. In these gardens are seen groves, ponds, mountains, natural or artificial rocks, and winding alleys, which conduct to different points of view, each of which presents a new object. When the ground is of sufficient extent, part of the garden is formed into a park, in which stags, does, and other wild animals, are kept. Fishes and aquatic birds are also bred in ponds and canals made for the purpose. The Chinese are fond of every thing gigantic. According to them the beauty of a column consists in its size and height; and that of a hall, in its great extent. Its ornaments consist of large lanterns, made of painted silk, which are suspended from the ceiling; also tables, cabinets, screens, chairs, and abundance of vases of porcelain. The furniture is covered with varnish so transparent, that the veins of the wood may be seen through it, and so bright and shining, that it strongly reflects different objects, and its splendour is not a little heightened by those figures which are painted upon it, in different colours, or done over with gilding.

Besides the festivals and ceremonies above described, performed in the person of the emperor, the Chinese have also two other festivals, which are celebrated with great splendour. One is the commencement of the year; the other the *feast of lanterns*. During the celebration of the first, all affairs, whether private or public, are suspended; the tribunals are shut; the posts are stopped; presents are given and received; the interior mandarins go to pay their respects to their superiors, children to their parents, and servants to their masters. This F. Du Halde says is what the Chinese call *taking leave of the old year*. All the family assemble in the evening, and partake of a grand repast. To this no stranger is admitted; but they become more sociable on the day following, when they indulge in plays, diversions, and feasting, which is concluded in the evening by illuminations.

The feast of *lanterns*, is fixed for the fifteenth day of the first month: but it begins on the evening of the thirteenth, and ends on the sixteenth. It is easier to describe this festival than to discover its origin, or the period at which it was at first celebrated. It is universal throughout the empire; and all China is illuminated on the same day, and at the same hour. Every city and village, the shores of the sea, and the banks of rivers, are hung with lanterns, of various shapes and sizes. Some of them are even seen in the windows of the poorest inhabitants. The abbé Grosier asserts, that rich people sometimes expend eight or nine pounds sterling for one lantern; and that those which the emperor, viceroys, and great mandarins, order to be made, cost an hundred or an hundred and fifty pounds each. These lanterns are very large, and some of them are composed of six wooden frames, either painted or neatly gilt, and filled up with fine transparent silk, upon which are painted flowers, animals, and human figures; others are round, and made of a blue transparent kind of horn. Several lamps, and a great number of wax-candles, are put into these lanterns; to the corners of each are fixed tassels, or streamers of sattin and silk of different colours; and a curious piece of carved work is placed over its top. F. Du Halde observes, that, "they cause shadows to appear, which represent princes and princesses, soldiers, buffoons, and other characters, the gestures of which are so conformable to the words of those who put them in motion, that one is almost induced to believe that they speak in reality." This is the origin of the *Ombres Chinoises*, or magic lanthorn; for which see CHINESE SHADES. The Chinese fireworks, so justly celebrated, are displayed in all their varieties during this festival; and a large one is then exhibited in each city.

On the day corresponding to our first of March, it is usual, according to ancient custom, for dramatic pieces to be performed on stages in the principal streets of the different towns throughout the empire, for the amusement of the poor people, who are not able to purchase those pleasures. This beneficent act continues for a succession of several days, at the expence of the emperor; so that every morning and evening, during this period, the lower classes of his subjects enjoy a favourite pleasure without cost, and bless the hand which bestows it on them. Yet, as the Chinese employ most of their time in attendance on their duty as members of society, they bestow very little on amusements. Naturally a grave people, they seldom assume an air of gaiety, but in compliance with some established custom. They have indeed theatrical pieces, both comic and tragic; but they have no public theatres authorised by government, and their actors, like those of the Tartar nations, are strollers, who attend the houses of those who are able to pay them.

Hunting and fishing is considered by the Chinese rather as an object of industry than amusement. In their great fisheries, they use nets; but private people employ a line. They use also for this purpose, in certain provinces, an aquatic bird, which is trained to catch fish, almost in the same manner as dogs are taught to pursue game. The bird principally used in these fisheries, is a species of corvorant, though we are informed that some of the colymbus genus are educated for this purpose.

In China there are no disputes concerning rank and precedency; every individual knows the titles he must give to others, and is always content with those due to himself. A common salutation in China consists in joining both hands together before the breast, moving them in an affectionate manner, bending the head a little, and reciprocally pronouncing *tsin-tsin*, a complimentary word, which

A CHINESE PRINCESS of the present

MANCHOO TARTAR RACE

which has almost the same signification as your humble servant. When a person of the lower order meets another of superior rank, it is then necessary to join the hands, raise them above the forehead, afterwards bring them down to the earth, and bow with the whole body. When two persons who are acquainted meet after an absence of any time, they both fall on their knees opposite one another, bend their bodies to the earth, then raise them up, and repeat the same ceremonies two or three times. When two mandarins, of equal rank, meet in the street, they never quit their chairs; each joins both hands, moves them downwards, then raises them to the forehead, and this salutation is repeated until they are out of each others sight; but if one of the two be of higher rank than the other, the inferior orders his chair to stop; or if he be on horseback, he dismounts, and makes a profound bow to his superior. In a word, politeness in China, being regulated by law, is nearly as prevalent in villages as in cities.

A Chinese, when addressing his superior, speaks neither in the first nor in the second person. He will neither say I, nor you, but if he acknowledges a favour received, he will say, "the service which his lordship has rendered to his little servant, has been very acceptable to him." A son, when speaking to his father, never stiles himself his son, but his grandson, though he is perhaps the oldest of the family, and probably father of a family himself. He will also often make use of his own name, that is to say, of the name given him at that period, for the Chinese have different names, in succession, according with their age and rank. The family name is that given at their birth; this is common to all those who are descended from the same grandfather. A month after, the mother and father give what is termed a diminutive name to their son, which is generally that of a flower, animal, &c. This name is changed when the youth has made some progress in his education at a public school, and generally for some flattering appellation, given by the master, which the pupil adds to his family name. When he attains to manhood, he requests a new name from his friends, and this he retains during life, unless he rises to some dignity. He is then honoured with another, suited to his talents and office. No other is afterwards given him, not even that of his family.

The repasts or entertainments of people of distinction are generally sumptuous, and always accompanied with the most ceremonious etiquette. It is only while they are drinking, that the dishes on the tables are removed, and others brought in, all of which are in the form of ragouts. The Chinese never use knives in their repasts, and two small sharp-pointed sticks, ornamented with ivory or silver, supply the place of forks, and with which they take up every thing they eat. The common people, who are the suffering part in every country, live very poorly in China, as well as elsewhere; they are satisfied, in times of scarcity, with the flesh of horses and dogs. That of cats and rats is also sold publicly in the streets.

The funeral rites in China are as singular as their other customs. A few moments after a person has expired, he is dressed out in his richest attire, and with every badge of his dignity. He is then placed in the coffin which has been purchased for him, or which he himself provided in his life-time; for one of the most anxious cares of a Chinese is to prepare himself a coffin, which sometimes remains twenty years useless in the family, though considered by the head of it as the most valuable piece of furniture in his possession. In preparing the body for interment, they first sprinkle, in the bottom of the coffin, a small quantity of lime, on which they lay the corpse, taking care to place its head on a pillow, and to add a quantity of cotton to keep it more steady, and prevent it from shaking. The lime and cotton serve also to receive the moisture which may issue from it. In this manner the body remains exposed seven days; during which time all the relations and friends come and pay their respects to the deceased, and the nearest relations remain in the house. The coffin is exposed in the hall of ceremony, which is then hung with white. Those who enter the hall, salute the coffin, in the same manner as if the person were still alive, prostrate themselves before the table, and knock their foreheads against the earth; they afterwards place upon the table some perfumes and wax candles, which they have taken care to provide for that purpose. The corpse is then conveyed to the place destined to receive it, preceded by solemn music, with a procession as large and numerous as the relatives are abundant. When they arrive at the burying-place, the coffin is deposited in a tomb appropriated for it. The burying-places are always situated at a small distance from a city or town, and generally upon some eminence, around which are planted pines and cypresses, a custom which has existed, at the same period, in different nations who never had the least communication with each other. Some of the Chinese have carried their attachment so far, as to preserve in their houses, for three or four years, the bodies of their deceased fathers. The mourning continues three years, and during that long interval they abstain from the use of flesh and wine; they can assist at no entertainment of ceremony, nor frequent any public assembly. When a Chinese dies in a province in which he was not born, his children transport the body to the burying-place of their ancestors. A son, who should be wanting in this respect, would be disgraced in his family, and his name would never be placed in the hall of ancestors, where the different branches of a family meet once a year, to pay honour to the memory of their deceased friends, by an offering to their manes.

One, and not the least, among the singularities of this extraordinary people, is their language; which is, perhaps, of all the languages of the early ages, the only one now spoken. The following are the observations of the abbé Grosier respecting it, whose opinion is, that it has never undergone, in its different parts, any material change since the foundation of the empire.

"In the Chinese there are four distinct languages:— First, the *kou-ouen*, or language of the King, and other ancient classical books; it is not spoken at present, but the speeches in the Chou-king, and the songs of the Chi-king, prove it to have been spoken in the early ages. The diction is so laconic, that it is almost impossible for those who have little practice in reading the Chinese authors to understand it, the ideas are so various, and so 'wrapt up in the words,' as one of the missionaries expresses it. Nothing can exceed this manner of writing; it unites energy and depth of thought, with boldness of metaphor, splendour of imagery, and harmony of style; but it is difficult to learn, and requires a very laborious application to render it familiar.

"Secondly, the *ouen-tchang*. This is the language used in compositions where a noble and elevated style is requisite. It is never spoken, but sentences and complimentary expressions are often borrowed from it. The *ouen-tchang* has not the same laconic brevity and sublimity as the *kou-ouen*; it is, however, concise, natural, and easy, and abounds with a variety of grand and beautiful expressions; but it is not much adapted to the ambiguities of metaphysics, or the formal and rugged diction used in treating of the abstract sciences.

"Thirdly, the *kouan-hoa*. This is the universal language of the court and of the literati; it is understood throughout the whole empire, and pronounced with much gracefulness at Pekin, and in the province of Kiang-nan, where the court formerly resided. The *kouan-hoa* admits of synonymous expressions, to moderate the brevity of monosyllables; of pronouns and relatives for the connecting of phrases, and perspicuity of style; of prepositions, adverbs, and particles, to supply the want of cases, moods, tenses, and numbers, which have place in other languages.

"Fourthly, *hiang-tan*. This is a kind of provincial dialect,

dialect, spoken by the lower classes in China. Every province has its own. The sense of the words varies in a great number of places, and they are so altered by diversity of pronunciation, as to be almost unintelligible." Of this fact lord Macartney experienced a singular proof, at a meeting of two Chinese interpreters, who, on entering into conversation, could not understand each other. The Chinese annex great merit to the talent of tracing or writing their characters with taste; they often prefer them even to the most elegant painting; and there are some of them who will purchase, at an exorbitant rate, a page of old writing, when the characters appear to be elegantly formed. We shall not in this place enter into an investigation of the principles of the Chinese characters, or language; since it more properly belongs to that department or head in this work, under which we shall treat of all the known languages in the world.

A taste for poetry is pretty general in China, and there are few Chinese writers who have not devoted some part of their leisure hours to the muses. The common people have their ballads and songs, and some of the literati have thought it of importance to turn into verse for their use the most celebrated maxims of morality, the duties of the different conditions in life, and the rules of civility. "If good grain," say they, "produce only straw, it will benefit the ground by preventing the growth of weeds." Though China abounds with works of erudition, they are seldom the production of private individuals, who have neither the leisure nor conveniencies requisite for literary pursuits. The first years of the young literati are spent in studying the language, characters, and doctrine, of the King; the examinations keep them continually employed. When admitted to the first literary degree, it is still necessary to continue their studies, in order to obtain the second and third. They then obtain employment in the tribunals, or become governors of cities in their own provinces. In this situation their occupations are so various and constant, that it is impossible for them to follow a course of uninterrupted study. The sword of the sovereign is continually over their heads, and they have need of all their application, to avoid even slight omissions, which are sufficient to occasion their ruin. The difficulty of procuring access to libraries, is also an inconvenience which the man of genius, unconnected with any literary societies, must experience in China; and the condition of individuals is so liable to change, that it is impossible for any of them to have such a collection of books as are found in the houses of men of letters in Europe. The great bonzeries are the only resources of the literati; it is there that government, in order to guard against losses, by conflagrations, wars, and revolutions, has ordered the most curious and rare manuscripts to be collected; and there also are deposited copies of every collection and new edition of any work published at the expence of the state. These immense libraries are open to all the literati; but the greater part of the bonzeries which contain them are situated on mountains, at a distance from large cities, and therefore in a great measure cut off from the inspection of persons in private life.

All the great works nearly, which have appeared in China, have proceeded from the college of the Han-lin. This body, composed of the most celebrated literati, and of the greatest geniuses of the empire, freed from every care, and surrounded with all the literary treasures of the empire, find every convenience and assistance that can facilitate their labour. Employment is assigned to each of them, suited to his taste and talents. They are never subjected to the fettering restraint of time, nor hurried to finish any work which they have undertaken. Interest and self-love unite them closely together, for the glory attending their success is never divided. A reciprocal communication of knowledge, in the fullest and most unreserved manner, is, therefore, a necessary consequence, because every imputation affects the whole body. Hence it happens, that all the works which come from the pencil of the Han-lin, bear a character of perfection rarely to be found in those of a private man of letters. To them are the Chinese indebted for all their great historical collections, dictionaries, commentaries, new editions of ancient authors, &c. The emperor generally furnishes for these large works a preface, by his own hand. They are printed at the expence of government, and the whole edition belongs to the emperor, who distributes the copies as presents to the princes of the blood, his ministers, the great mandarins, the chiefs of the different tribunals, governors of provinces, and the most celebrated literati of the empire. In 1770 the Han-lin were employed in the compilation of a Chinese Encyclopædia, in which are discussed the most interesting points of such sciences and arts as are known to them; also history, chronology, geography, jurisprudence, politics, and natural history. This edition was to form a collection of an hundred and fifty volumes.

Much has been said by different writers for and against the knowledge which the Chinese have of astronomy. F. Gaubil, who wrote a particular treatise on Chinese astronomy, which he long studied, thus speaks of the Chinese astronomers: "The Chinese have been long acquainted with the motion of the sun, moon, and planets, and even of the fixed stars, from west to east; though they did not determine the motion of the latter till about four hundred years after the Christian era. To Saturn, Jupiter, Mars, Venus, and Mercury, they have assigned revolutions which approach very nearly to ours. They have no notion of their different situations, when stationary and retrograde; and, as in Europe, some imagine that the heavens and planets revolve round the earth, and others around the sun. By reading their books, we may easily perceive that the Chinese have had a perfect knowledge of the quantity of the solar year; that they have also known the diurnal motion of the sun and moon; that they have been able to take the meridian altitude of the former by the shadow of a gnomon; and that they have thence made pretty exact calculations to determine the elevation of the pole, and the sun's declination: it appears that they have had a tolerable knowledge of the right ascension of the stars, and of the time when they pass the meridian; of the reason why the same stars, in the same year, rise and set with the sun; and why they pass the meridian sometimes when the sun rises, and sometimes when he sets. In short, it evidently appears, from perusing their history, that the Chinese have always been acquainted with a great many parts of astronomy."

The Jesuit missionaries contributed much to the enlargement of astronomical knowledge in China; Ricci, Adam Schal, Verbiest, Couplet, Gerbillon, Regis, d'Entrecolles, Jartoux, Parrenin, and a great many others, were men whose talents would have rendered them celebrated, even in Europe. F. Verbiest found, in the observatory at Pekin, a number of instruments made of brass; but, as he judged them improper for astronomical purposes, he substituted new ones in their room, which still remain. F. le Comte has given an accurate description of all these machines. At present astronomy is cultivated at Pekin as it is in the greater part of the capital cities of Europe. A particular tribunal is established there, the jurisdiction of which extends to every thing that relates to the celestial phenomena. The observation of eclipses is one of the most important functions of this tribunal. Information must be given to the emperor of the day and hour of the eclipse, in what part of the heavens it will happen, its duration, and the number of digits eclipsed. It is necessary that this intelligence precede the eclipse by some months, and it must be calculated for the longitude and latitude of the capital city of every province. These observations, as well as the diagram which represents the eclipse, are preserved by the tribunal of ceremonies; and the great calao, or prime minister, takes care to transmit them into all the cities of the

the empire, in order that it may be observed according to the form prescribed.

Each town is supposed to be under the protection of some star or constellation, of which last the Chinese reckon twenty-eight; and they have, beside, a division of the stars answering to the signs of the zodiac, which they call the twelve mansions of the sun. On some of their ancient coins are to be found the characters denoting the mansions of the sun, which shews, in part, the great antiquity of their astronomical knowledge. By dint of observation they at length came to know the true number of days in a solar year; as well as other periods and phenomena of the heavenly bodies: but they fell chiefly into the delusions of astrology; the magnificent prophecies and promises of which, destroyed their taste for the patient labours and sober science of astronomy. Their astrologers, like those in Europe, pretend to foretell, and publish annually in their almanacs, every variation of the weather in the several seasons of the next approaching year; and they mark, besides, the lucky and unlucky days for every possible human undertaking, whether public or private, and whether applicable to individuals, or to the affairs of the nation.

The Chinese have invariably fixed the beginning of the astronomical year at the winter solstice; but that of their civil year has varied, according to the will of their emperors; some of whom have fixed it at the third, or second moon, after the winter solstice, and others at the solstice itself. The Chinese year has at all times consisted of a certain number of lunations; twelve lunations forming a common, and thirteen the embolismic, year. They reckon their lunations by the number of days which fall between the moment in which the sun is in conjunction with the moon, and the moment of the conjunction following; and as in the interval between one conjunction and another, the number of days cannot be constantly equal, they sometimes admit twenty-nine, and sometimes thirty days, to complete their lunations. They divide their days into a greater or smaller number of equal parts, but generally into twelve hours, which are double those used by us. Their day begins and ends at midnight.

The Chinese year, divided into lunations, is also divided into four equal parts, or seasons, each of which has three parts, its beginning, its middle, and its end; that is to say, a lunation for each of the three parts. This year is still subdivided into twenty-four equal parts, each of which contains fifteen degrees; so that the whole together make up three hundred and sixty degrees. To express the age of the moon, besides numbers, they use the words superior and inferior string; they say, *chang-bien*, a bow having the string uppermost; and *hia-bien*, a bow having the string undermost: thus they distinguish what we call the opposite quarters of the moon. The Chinese astronomers divide the stars according to the following order: they place first the *pe-teou*, or celestial bushel of the north; this is what we call the Great Bear: secondly, the *nan-teou*, or celestial bushel of the south; which comprehends the principal stars opposite to the Great Bear, and which together form a figure almost like that of the Great Bear in the north; thirdly the five planets, *ou-hing*, which are, Saturn, Jupiter, Mars, Venus, and Mercury: fourthly, the twenty-eight constellations, in which are comprehended all the stars of our zodiac, and some of those which lie nearest to it.

The Chinese fix the discovery and first fabrication of their paper, about the year 105 before Christ. Prior to that epocha, they wrote upon cloth, and different kinds of silk stuff. In more early ages, they wrote with a sort of style upon small slips of bamboo, and even upon plates of metal; several of these slips, strung and joined together, formed a volume. At length, under the reign of Ho-ti, a Chinese mandarin invented a kind of paper much more commodious. He took the bark of different trees, hemp, and old pieces of silk stuff, and boiled these substances until they were reduced to a kind of paste, of which he formed paper. Chinese industry improved this discovery, and found out the secret of whitening and smoothing different kinds of paper, and of giving them a beauty and lustre. Different papers are at present greatly multiplied. The Chinese, for making paper, use the bamboo reed, the cotton shrub, the bark of the kou-chu, and of the mulberry-tree; hemp, the straw of wheat and rice, parchment, the cods of the silk-worm, and several other substances, the greater part of which are unknown in this manufacture in Europe.

The Chinese ink is made from the smoke of different substances, but principally from that of pines, or of oil burnt in lamps. Care is taken to add to it a little musk, or some other perfume, to correct the strong and disagreeable smell which it would otherwise retain. The ingredients are mixed, until they acquire the consistence of paste, which is afterwards divided, and put into small wooden moulds. The interior part of these moulds is neatly cut and carved, so that the cake of ink, when taken out, appears ornamented with different figures, such as dragons, birds, trees, and flowers; one of its sides is generally marked with some beautiful characters. This we see on all the squares of what we term Indian ink.

The art of printing, so recent in Europe, has long existed in China, but it differs very much from ours. The small number of letters which compose our alphabet permit us to cast a certain number of moveable characters, which, by their arrangement and successive combinations, are sufficient to print the largest works; the types employed in printing the first sheet may furnish characters to print the whole volume. But this is not the case in China, where the characters are so numerous. The Chinese find it more commodious to engrave upon pieces of wood the whole work which they intend to print. Their method of proceeding in this operation is thus: They first employ a writer to transcribe the work. The engraver glues each of the leaves of the manuscript upon a piece of plank, made of any hard wood; he then correctly traces the strokes of the writing, carves out the characters in relief, and cuts down the intermediate part of the wood. Each page of a book, therefore, requires a separate plank. The Chinese, however, are not unacquainted with the use of moveable characters; they have a kind, not cast, but made of wood, and it is with these characters they correct every three months The State of China, and the Gazettes, which are printed at Pekin. Other small works are also printed in the same manner.

Ink used for printing is made in a particular manner; it is liquid, and different from that which is formed into oblong sticks, or cakes. The leaves are printed upon one side only, because thin and transparent paper, such as the Chinese, would not bear a double impression, without confounding the characters of the different pages. Each leaf of a book is, on that account, double; so that the fold stands uppermost, and the opening is towards the back where it is stitched. Hence it happens that the Chinese books are not cut upon the edges. They are generally bound in grey pasteboard, which is very neat; those who wish to have them done in a richer and more elegant manner, get the pasteboard covered with thin satin, flowered taffety, and sometimes with gold and silver brocade. The edges are neither gilt nor coloured.

The culture of the mulberry-tree, and the manufacturing of silk, have been greatly extended in China. The most beautiful and valuable silk of the whole empire is that which comes from the province of Tche-kiang, which is wrought in the manufactories of Nankin, by the best workmen of China; thence are brought all those silk stuffs, destined for the use of the emperor, and those which he distributes in presents to the nobility of his court. The open commerce carried on with Asia and Europe draws also to the manufactories of Canton a great number of excellent workmen. The principal silk stuffs manufactured by the Chinese, are plain and flowered gauzes, of which they make dresses for summer; damask of

of all colours; ſtriped and black ſatins; napped, flowered, ſtriped, clouded, and pinked, taffeties; crapes, brocades, pluſh, different kinds of velvet, and a multitude of other ſtuffs, the names of which are unknown in Europe.

Porcelain is a prominent feature of Chineſe ability and induſtry, and a branch of commerce which employs a vaſt multitude of workmen. After a piece of porcelain has been properly faſhioned, it paſſes into the hands of the painters, who follow no certain plan in their art; all their knowledge is the effect of practice, aſſiſted by a fertile imagination. Some of them ſhew great taſte in painting flowers, animals, and landſcapes, on porcelain, as well as upon the paper of fans, and the ſilk uſed for filling up the ſquares of lanterns. The labour of painting is divided among a great number of hands. The buſineſs of one is entirely confined to tracing out the firſt coloured circle which ornaments the brims of the veſſel; another deſigns the flowers, and a third paints them; one delineates waters and mountains, and another birds and other animals; human figures are generally the worſt executed.

The uſe of glaſs is very ancient in China. It is related, in the Large Annals, that, "in the beginning of the third century, the king of Ta-tſin ſent the emperor Taitſou a magnificent preſent of glaſs of all colours; and that ſome years after, a glaſs-maker, who had the art of converting flint into cryſtal, by means of fire, taught this ſecret to ſome others, by which thoſe who had come, and thoſe who then came from the Weſt, acquired much glory." That part of the Annals in which this quotation is to be found, was written in the ſeventh century: but from the little attention which at times ſeems to have been paid to the art of manufacturing glaſs, and its being loſt and revived at different periods, we have reaſon to ſuſpect that the Chineſe have never ſet any great value upon this branch, and that they have conſidered glaſs rather as an object of luxury than utility. According to ſir George Staunton, there is at preſent no manufacture of glaſs in the whole empire, except at Canton, where, inſtead of fuſing the rough ingredients of flint, or ſand and barilla, and converting them by the proper proceſs into glaſs, the manufacturer is ſatisfied with only melting the broken pieces collected of that material, and forming it into new ſhapes, according to the uſes to which it might be deſtined.

The ſtudy of medicine among the Chineſe is as ancient as the foundation of their empire. Their phyſicians were never ſkilful anatomiſts, or profound philoſophers, nor will their moſt reſpectable theories bear the ſcrutiny of the practical anatomiſt; indeed, where anatomy is ſhackled by a prejudice which prevents the opening of the human body, it is impoſſible that the knowledge of phyſic, or ſurgery, can be very extenſive. Vital heat, and radical moiſture, are conſidered by the Chineſe phyſicians as the two natural principles of life; the blood and ſpirits they conſider only as their vehicles. Theſe two principles, according to them, are ſeated in all the principal parts of the body, in which they preſerve life and vigour. The Chineſe phyſicians ſuppoſe alſo, ſays F. du Halde, that the body, by means of the nerves, muſcles, veins, and arteries, is like a kind of lute or muſical inſtrument, the different parts of which emit various ſounds, or rather have a proper temperament for each, and ſuited to their figure, ſituation, and particular uſes; and that its different pulſes, which reſemble the different tones and notes of theſe inſtruments, enable the practitioner to judge infallibly of their ſituation and ſtate, in the ſame manner as a cord, more or leſs tenſe, touched in one place or in another, in a ſtronger or gentler manner, ſends forth different ſounds, and diſcovers whether it be too much ſtretched, or too much relaxed. In a word, they ſuppoſe that between all the parts of the human body, there is a certain influence on the one hand, and a ſympathy on the other, and theſe form the baſis of their ſyſtem of phyſic. They pretend to judge of the ſtate of a patient, and to determine the nature of his diſeaſe, by the colour of the face and eyes, by inſpecting the tongue, noſtrils, and ears, and by the ſound of the voice; but it is chiefly upon a knowledge of the pulſe that they found their moſt infallible prognoſtics. Their theory reſpecting the pulſe is very extenſive, and varies according to circumſtances. One of the ancient phyſicians has left a complete treatiſe upon this ſubject, which ſtill ſerves as a guide. This work was compoſed about two hundred years before the Chriſtian era; and it appears certain that the Chineſe were acquainted with the circulation of the blood long before any of the nations of Europe.

The modern Chineſe entertain the ſame ideas reſpecting their ancient muſic, as thoſe which have been tranſmitted to us concerning that of the Greeks and Egyptians; and they regret their ancient harmony, as we lament the loſs of that which has been ſo much extolled by antiquity, and of which ſo many wonderful things have been related. If Egypt had a Hermes, or Mercury Triſmegiſtus, who, by the ſoftneſs and charms of his voice, finiſhed the civilization of men; if Greece had an Amphion, who built cities by his harmony alone; and an Orpheus, who, by the ſound of his lyre, ſuſpended the courſe of rivers, and made the moſt rugged rocks follow him; China boaſts of no leſs miracles performed by her ancient muſicians. We are told of a Lyng-lun, a Kouei, and a Pin-mou-kia, who, by touching their kin and their ché, produced ſounds capable of ſoftening the hearts of men, and of taming the moſt ferocious animals. It is not our intention to enter into a diſſertation on the ancient muſic of the Chineſe; we ſhall only obſerve, that the muſical ſyſtem, ſo long attributed to the Egyptians and the Greeks, has been diſcovered in China; and that it had its origin there, at an epocha much anterior to the times of Hermes, Linus, or Orpheus. We cannot enter into that tedious detail which would be requiſite to explain this ſyſtem; the muſical reader may find it in the diſſertation of F. Amiot, publiſhed by the abbé Rouſſier, and which this learned theoriſt enriched with his own obſervations. They have always diſtinguiſhed eight different ſounds; and they believe that nature, in order to produce them, formed eight kinds of ſonorous bodies. The order in which they diſtribute theſe ſounds, and the inſtruments they have conſtructed to produce them, are as follow: 1. The ſound of ſkin, produced by drums. 2. The ſound of ſtone, produced by the king. 3. That of metal, by bells. 4. That of baked earth, by the hiuen. 5. That of ſilk, by the kin and the che. 6. That of wood, by the yu and the tchou. 7. That of bamboo, by the koan, and different flutes. And, 8. That of a gourd, by the cheng.

The firſt drums were compoſed of a box made of baked earth, covered at both extremities with the tanned hide of ſome animal; but, on account of the weight and brittleneſs of baked earth, wood was ſoon ſubſtituted in its ſtead. The Chineſe are, perhaps, the only nation who have had the ingenuity to apply ſtones to the purpoſe of making muſical inſtruments. We have already mentioned the ſonorous ſtones which are found in this empire; the inſtrument conſtructed of them is called *king*, and is diſtinguiſhed into tſe-king, and pien-king. The tſe-king conſiſts of only one ſonorous ſtone, which, conſequently, produces only one tone. The pien-king is an aſſortment of ſixteen ſtones, ſuſpended together, which form all the tones admitted into the muſical ſyſtem of the ancient Chineſe. They have always made their bells of a mixture of tin and copper: their ſhapes are various, thoſe of the ancients were not round, but flatted, and in the lower part reſembled a creſcent. The Chineſe have formed an inſtrument of ſixteen bells, properly aſſorted, ſo as to correſpond with the ſonorous ſtones, of which the king are compoſed.

The inſtrument hiuen, which is made of baked earth, is

is highly respected by the Chinese, on account of its antiquity. They distinguish it into two kinds, the great and the small. "The great hiuen," says the Dictionary Eulh-ya, "is like a goose's egg, and the small hiuen, like that of a hen: it has six holes for the notes, and a seventh for the mouth. The kin and the che, which have been known from the remotest antiquity, emit the sound of silk. The kin has seven strings, made of silk threads, and is distinguished into three kinds, differing only in size; the great kin, the middle kin, and the small kin. The body of this instrument is formed of the wood of the toung-mou, and varnished black; its whole length is about five feet five inches. The che, of which there are five kinds, is furnished with twenty-five strings, and its ordinary length is nine feet. F. Amiot assures us, that we have no instrument in Europe that deserve to be preferred to it.

The instruments which emit the sound of wood, are the tchou, the yu, and the tchoung-tou; the first is shaped like a square bushel, and is beat on the inside with a hammer; the second, which represents a tyger squatting, is made to sound by scraping its back gently with a rod; the third is a collection of twelve pieces of board tied together, which are used for beating time, by holding them in the right hand, and knocking them gently against the palm of the left. The bamboo furnishes a numerous class of instruments, composed of pipes joined together, or separate, and pierced with more or fewer holes. The principal of all these wind instruments is the cheng, which emits the sound of a gourd. The neck of the gourd is cut off, and the lower part only is reserved, to which a cover is fitted, having as many holes as are equal to the number of sounds required. In each of these holes a pipe is fixed, made of bamboo, and shorter or longer, according to the tone it ought to emit. The mouth of the instrument is formed of another pipe, shaped like the neck of a goose; it is fixed to the gourd on one side, and serves to convey the air to all the pipes it contains. The ancient cheng differed in the number of their pipes; those used at present have only thirteen: this instrument appears to have some affinity with our organ.

The Chinese are unacquainted with the use of our musical notes; they have not that diversity of signs which distinguish the different tones, and the gradual elevation or depression of the voice; nor any thing to point out the various modifications of sound which produce harmony. They have only a few characters to mark the principal notes; all the airs which they have learned, they repeat merely by rote: the emperor Kaung-hi was therefore greatly astonished at the facility with which an European could catch, and remember an air the first time he heard it. In 1679, he sent for fathers Grimaldi and Pereira to the palace, to play some tunes upon an organ and a harpsichord, of which they had made him a present. He appeared much satisfied with the European music, and afterwards ordered his musicians to play a Chinese air; F. Pereira pricked down the whole air while the musicians were playing it; and when they had done, the missionary repeated the air without omitting a single note. The emperor could not comprehend how a stranger could learn a piece of music so quickly, which had cost so much time and labour to his musicians; and how it was possible, by the help of a few characters, to make himself so far master of it, as not to be in any danger of forgetting it. He bestowed the highest praises on the European music, and admired the means which it furnishes to facilitate and lessen the labour of the memory.

With respect to the art of painting, it seems to be universally agreed, that the Chinese have no notion of correctness or perspective, and little knowledge of the beautiful proportions of the human body. But those who refuse them the talent of painting figures well, cannot disallow that they particularly excel in flowers and animals. They execute these subjects with much taste, justness, and freedom; and they pride themselves, above all, in an exactness of representation, which might appear to us trifling and minute. Painting makes little progress in China, because it is not encouraged by government; it is reckoned among the number of those frivolous arts, which contribute nothing towards the prosperity of the state. The late emperor's cabinets and galleries are filled with European paintings; he employed, for a long time, the pencils of Castiglione and Attiret, both eminent artists, whom he highly esteemed, and whose works he often inspected; but, on account of that notion entertained of the inutility of painting, he rejected an offer made by them of establishing a school for painting, and of instructing pupils in that art.

Painting in fresco was known in China long before the Christian era: it was much in vogue under the Han, who ornamented the walls of their principal temples with it. This kind of painting made fresh progress, and gained more admirers in the fifth and sixth centuries; and it was carried to a degree of perfection seldom equalled. The late emperor caused an European village to be painted in fresco, in his park, which produces the most agreeable deception. The remaining part of the wall represents a landscape, and little hills, which are so happily blended with the distant mountains behind, that it is almost impossible to conceive any composition more ingeniously imagined, or better executed. This beautiful work is the production of Chinese painters, and was copied from designs sketched out for them. Engraving, or printing, in colours is very ancient among the Chinese, who discovered that method long before it was known in Europe.

The chissel of the Chinese sculptors is seldom employed, because, if we except the idols of the temples, the luxury of statues is not known in that empire. There is not a single statue to be seen in the squares, public edifices, or palaces, of Pekin; indeed, the only real statues to be found in China, are those which, for the sake of ceremonious distinction, are used to ornament the avenues leading to the tombs of princes, and great men of a certain rank.

The Chinese architecture is not the mere effect of custom without any fixed system; it has its principles, rules, and proportions. When a pillar is two feet in diameter at the base, it must be fourteen in height; and by one or other of these measures that of every part of the building may be determined. This architecture, though it has borrowed nothing from that of the Greeks, Romans, or Saxons, yet it has a certain beauty peculiar to itself.

The numberless rivers and canals by which China is watered, have rendered it necessary to construct a multiplicity of bridges of various shapes and forms; the arches of some are exceeding lofty and acute, with easy stairs on each side, the steps of which are not quite three inches in thickness, for the greater facility of ascending and descending; others have no arches, but are composed of large stones, placed transversely upon piles, after the manner of planks. These stones sometimes are eighteen feet in length: some of these bridges are constructed of stone, marble, and brick; others of wood; and some are formed of a number of barks, joined together by strong iron chains. The invention of the latter is very ancient; they are known by the name of *feou-kiao*, floating bridges; and several of them may be seen upon the Kiang and Hoang ho. The most remarkable bridge in China is about three leagues from Pekin; it is two hundred paces in length, and broad in proportion. Most strangers who view it, appear astonished at its height, and the apparent inutility of the greater part of its arches, because it is constructed upon a very small river. But when this river becomes swelled by the summer rains, all these arches are scarcely sufficient to afford a passage to its waters.

The naval architecture of the Chinese appears to have made no great progress for several centuries; neither their frequent intercourse with those Europeans who have visited their coasts, nor the sight of their vessels, has made them turn their thoughts to change or improve their

their own. Their largest ships are not more than 250 or 300 tons burthen, and they have neither mizen, bowsprit, nor top-masts, but only a main and a fore-mast, to which is sometimes added a small top-gallant-mast; this, however, can afford only a feeble assistance. The Chinese supply the place of sails with mats made of bamboo; they are strengthened by whole bamboos, equal in length to the breadth of the sail, and extended across it, at the distance of a foot one from another. They draw up the water from the hold with buckets, for they have not yet adopted the use of pumps in any of their vessels. They pretend to have been the first inventors of the mariner's compass, yet seem to have little desire for improving the interesting discovery.

The Chinese have never been exposed to the necessity of fighting their naval battles, except on the river Kiang, around and near their own coasts, or in the neighbourhood of the isles of Japan. They have, however, several distinct kinds of vessels for warlike operations. Those belonging to the port of Canton are much larger than those employed on the coasts of Fo kien, and the latter are built only of fir, or common deal; whereas the vessels of Canton are mostly constructed of iron-wood. In naval battles they are found to be much stronger, and more useful; but they are heavy, and far inferior to the others in point of sailing. These vessels last long, worms never pierce them, and some of them are armed with cannon.

Thus far we have endeavoured to give a connected detail of the Chinese history, selected from the most authentic documents; as well those afforded by several of the Christian missionaries, who spent the principal part of their lives in the country, as from the well-founded information of several modern travellers. What more particularly relates to the Chinese commerce, to the present state of that country, and to the general views of the people, we have purposely reserved for the concluding article, in order to place on record the memorable and laudable endeavour of the king of the united empire of Great Britain and Ireland, to open a commercial intercourse between this country and China; and although we have, in the preceding part of this narrative, been indebted to sir George Staunton for the elucidation of many controverted and interesting facts; yet, for the sake of unquestionable certainty and truth, we are induced to give the whole particulars of the embassy from sir George's own valuable and admired publication.

BRITISH EMBASSY TO CHINA.

Of those nations distinguished by the spirit of enterprise for commercial views, the Portuguese appear to have been the first who had the honour of exploring the Chinese coasts, and of opening an European intercourse with that distant country. This happened about two centuries ago, in the period of their most brilliant exploits; at which time they rendered such signal services to the empire of China, that, in return, lands for building the town of Macao, on the margin of a safe harbour at the southern extremity of the country, with several collateral advantages, were granted to them; and, notwithstanding the decline of their power, and the intermediate lapse of time, the recollection of their former services and long connection, still continues to procure them, on the part of the Chinese, a marked preference before all other Europeans.

Next to these, the Dutch, in consequence of assisting them against the formidable rebel Co-shing-ga, whose fleets infested the eastern coasts of China about the middle of the seventeenth century, were caressed by the established government, and invited even to Pekin, where the first emperor of the Man-choo Tartar race was then sitting on the throne. His successor, the great Kaung-hi, or, as more accurately pronounced, Caung-shee, during a long and prosperous reign, received very favourably any foreigners, skilled in such arts and sciences, and in such conveniencies of life, as were unknown to his own subjects. He admitted many foreigners into his service and confidence, and employed some of them in political negociations. But in all these kindly offices we do not find that the emperors ever encouraged or permitted an interior commerce, or suffered the transactions of the mercantile world to approach nearer to them than the river and city of Canton. With respect to commerce, the Chinese really entertain an opinion, that it is useful only so far as it eases them of their superfluities, and procures them necessaries: on this account, they consider even that which they carry on at Canton, as prejudicial to the true interests of the empire. "They take from us, say they, our silks, teas, and our porcelain: the price of these articles is raised through all the provinces; such a trade, therefore, cannot be beneficial. The money brought us by Europeans, and the high-priced baubles which accompany it, are mere superfluities to such a state as ours. We have no occasion for more bullion than what may be necessary to answer the exigencies of government, and to supply the relative wants of individuals." The only commerce which the Chinese consider of any advantage, is that which they carry on with Tartary and Russia; as it furnishes them, by barter, with those furs so much used in all the northern provinces.

The disputes between the Russians and Chinese, concerning the limits of their respective empires, seem to have first paved the way for that commercial intercourse which has subsisted between them since the peace concluded in 1689. This treaty was signed on the 27th of August of the above year, under the reign of Ivan and Peter Alexiovitz. The chief of the embassy on the part of Russia was Golovin, governor of Siberia. Two Jesuits, Pereiraand Gerbillon, (the former a native of Portugal, the latter of France,) were deputed by the emperor of China; and the conferences were held in Latin, with a German in the Russian ambassador's train, who was acquainted with that language. By this treaty the Russians lost a large territory, besides the navigation of the river Amoor, called by the Man-choo Tartars, *Saghalien-oula*; but, in return, they obtained what they had long desired, a regular and permanent trade with the Chinese. The advantages arising from it were soon found to be so considerable, that Peter I. formed a design of still farther enlarging it. For this purpose, in 1692, he dispatched to Pekin, Isbrand Ides, a native of the duchy of Holstein, then in his service, who requested, and obtained, that the liberty of trading to China, which, by the late treaty, had been granted to individuals, might be extended to caravans.

After this arrangement, caravans went regularly from Russia to Pekin, where a caravansary was allotted for their reception; and all their expences, during their continuance in that metropolis, were defrayed by the emperor of China. The right of sending these caravans, and the profits arising from them, belonged to the crown of Russia. In the mean time, private merchants continued, as before, to carry on a separate trade with the Chinese, not only at Pekin, but also at the head quarters of the Moguls. The camp of these roving Tartars was generally stationed near the confluence of the Orhon and Toula, between the southern frontiers of Siberia and the Mogul desert. A kind of annual fair was held at this spot, by the Russian and Chinese merchants, who brought their respective commodities for sale. This rendezvous soon became a scene of riot and confusion; and repeated complaints of the drunkenness and misconduct of the Russians were transmitted to the emperor of China. Kaung-hi, exasperated by these complaints, and by the frequent representations of his subjects, threatened to expel the Russians from his dominions, and to prohibit them from carrying on any commerce, either in China, or in the country of the Moguls. This circumstance occasioned another embassy to Pekin in 1719. Captain Ismailof, the ambassador, who was deputed to accommodate

date matters, succeeded in his negociation: he adjusted every difficulty, to the satisfaction of both parties; and, on his departure, Laurence Lange was permitted to remain at Pekin, for the purpose of superintending the conduct of the Russians. The residence of this gentleman in that metropolis was, however, but short; for he was soon after compelled to leave China in haste. His sudden dismission was owing partly to a caprice of the Chinese, and partly to a misunderstanding between the two courts, respecting some Mogul tribes who bordered upon Siberia. These tribes had thrown themselves under the protection of Russia, and were demanded by the Chinese. Their request was not complied with; and this refusal, added to the disorderly conduct of the Russians, who again began to indulge in excesses, so exasperated the Chinese, that an order was issued, in 1722, for their expulsion; and all intercourse between the two nations immediately ceased.

Affairs continued in this state till 1727, when a Dalmatian, in the service of Russia, was dispatched to Pekin. Matters were again accommodated by a new treaty; a caravan was allowed to go to Pekin every three years, provided it consisted of no more than an hundred persons; and that, during their stay, their expences should be no longer defrayed by the emperor of China. A permission was at the same time obtained by the Russians for building a church within the precincts of their caravansary; and, for the celebration of divine service, four priests were allowed to reside at Pekin. The same favour was also extended to some Russian scholars, for the purpose of learning the Chinese language, in order to qualify themselves for interpreters between the two nations. This treaty was concluded on the spot where Kiatka now stands, by count Ragusinski, and three Chinese plenipotentiaries, on the 14th of June, 1728. It is the basis upon which all the subsequent transactions between Russia and China have been founded.

Since the year 1755, no caravans have been sent to Pekin. Their first discontinuance was occasioned by a misunderstanding between the two courts of Petersburgh and Pekin; and, though a reconciliation took place, the caravans have never since been re-established. The late empress of Russia, sensible that the monopoly of the fur-trade, which was entirely confined to the caravans belonging to the crown, and prohibited to individuals, was prejudicial to commerce, in 1762, she wisely gave up, in favour of her subjects, the exclusive privilege which the crown enjoyed, of sending caravans to Pekin; and Kiatka, a place near the Russian frontiers, is now the centre of commerce between the two nations.

This commerce is entirely a trade of barter. The Russians are prohibited an exportation of their own coin; and they find it more advantageous to take goods in exchange, than to receive bullion at the Chinese standard. The principal commodities which Russia exports to China, are furs, the most valuable of which are those of sea-otters, beavers, foxes, wolves, martens, and ermines. The greater part of these skins are brought from Siberia, and the newly-discovered islands; but, as they cannot furnish a supply equal to the demand, foreign furs are imported to Petersburgh, and thence transported to Kiatka. England alone furnishes a large quantity of beaver's and other skins, chiefly procured from the American settlements. According to Mr. Coxe, the number of skins exported to Petersburgh in the year 1777, amounted to twenty-seven thousand three hundred and sixteen beaver, and ten thousand seven hundred and three otter skins. The Russians also send to China cloth of various kinds, hardware, and live cattle, such as camels, horses, &c. The commodities procured from China are raw and manufactured silk, cotton, porcelain of all sorts, rhubarb, musk, &c. The government of Russia has reserved to itself the exclusive privilege of purchasing rhubarb: it is brought to Kiatka by some Bucharian merchants, who have entered into a contract to supply that country with it in exchange for furs. The exportation of the best rhubarb is prohibited by the Chinese, under the severest penalties: it is, however, procured in sufficient quantities, sometimes by clandestinely mixing it with inferior roots, and sometimes by means of a contraband trade. Great part of Europe is supplied with this drug through Russia.

All this time the English seem to have had but little opportunity of making themselves known at the court of Pekin, or of rescuing their national character from an odium which had been cast upon it, in consequence of the following commercial adventure, and spirited attempt to force a trade with the Chinese at Canton. This happened in the following manner. At the close of the sixteenth century, John Mildenhall was sent out by order of queen Elizabeth, to the court of the great Mogul, to obtain certain commercial advantages for the English. He was there strongly opposed by the Spanish and Portuguese Jesuits, who, from craft and presents, contrived to frustrate its completion for some years. The exclusive privilege of resorting thither was claimed by the Portuguese till the year 1634, when a free trade to China, as well as to other parts of the East Indies, was agreed upon between the viceroy of Goa, and a company of English merchants, pursuant to a licence granted for that purpose by Charles I. though in opposition to an existing charter of queen Elizabeth, which delegated that immunity to others. This company of merchants fitted out a fleet of ships, and gave the command to captain Weddel, who being furnished with correspondent letters to the governor of Macao, could foresee no obstacle to prevent an intercourse with the Chinese at Canton. It seems, however, that the procurator of Maccow, or, as it would appear, the Portuguese consul, on the fleet's arrival off that place, went on-board the commodore's ship, and said, "that as to matters of refreshment, he would provide them; but that there was an obstacle to their trading, which was, the non-consent of the Chinese, who, he pretended, held his (the Portuguese) people in miserable subjection. In the History of Commerce, whence this article is extracted, we are farther informed, that the English, mortified at the disappointment, were determined to discover, if possible, the river leading to Canton. A barge and pinnace, with about fifty men, were accordingly sent out to explore, and in the course of two days they came in sight of the mouth of the river, the entrance of which was prohibited even to the Portuguese; and who, in consequence, carried on their traffic in small craft, through circuitous narrow straits amid various islands. The Chinese, alarmed at the appearance of these vessels within their precincts, came down the river, opposite a fort or castle, with twenty sail of junks, mounted with ordnance, treble-manned, and commanded by an admiral, who desired them to come to an anchor. Having complied, the Chinese began to expostulate on their temerity in coming thither to inspect their manufactures, and explore the interior parts of so great a prince's dominions; and asked who were their pilots. Being told that they came from England to exercise a free trade for the mutual advantage of both princes, paying the accustomed duties, like others; that they were without pilots, and were able, of themselves, to discover passages infinitely more intricate and dangerous; they began to relax their austerity, and promised to introduce three of them to the Chinese viceroy at Canton, provided they would proceed no farther in their pinnace. This was agreed to, and the next day, being within five leagues of Canton, (the alarm having reached that city,) a deputation waited on them, and desired them, in a friendly manner, to return to their ships; with an assurance, that if they would apply to certain persons at Maccow, they should have a licence granted them for the exercise of a free trade. This was nothing but an artifice; for their request being complied with, six vessels belonging to the Portuguese, laden with merchandize,

merchandize, failed in the interim for Japan; and it appeared they were under apprehensions lest commodore Weddel should have seized them. Being now out of danger, they derided the credulity of the English; and confiding in their own strength on the score of defence, sent the English a peremptory refusal of having any intercourse with them.

Enraged at this duplicity, a council of war was holden by the commanders of the English ships, at which it was unanimously resolved, to proceed up the river as far as Canton. Having reached the castle above-mentioned, by means of some interpreters they fell in with, they were introduced to some mandarines; who promised, on condition of their remaining on the spot for six days, to intercede with the principal men, resident at Canton, for the accomplishment of their wishes. This was another subterfuge in order to gain time; for, in the course of four days, the said fort, before dismantled, was now furnished with forty-six pieces of heavy ordnance; and they actually discharged several shot at one of the vessels as it was passing by, in search of a convenient watering place. This dastardly conduct, superinduced by the false representations of the Portuguese, so incensed the English, that, as the same history tells us, they immediately hoisted the bloody flag, got under way, anchored within musket-shot of the fort, and, by a brisk and well-directed fire, silenced, in a few hours, this formidable battery. They then landed a hundred men, got possession of the fortress, dismounted the ordnance, hoisted the British flag on the walls, set fire to the council house, and demolished whatever they could. Having also seized two or three small vessels, they sent a deputation to the viceroy of Canton, complaining of their breach of faith. They justified their proceedings wholly upon that ground; and throwing all the odium on the perfidy and intrigues of the Portuguese, they effected a reconciliation, and obtained the object in view, a licence for a free trade.

The resolute and persevering circumstances, however, under which the English first got footing in China, must have operated to their disadvantage, and rendered their situation, for some time, peculiarly unpleasant. Till then, the name of their country was unknown; and many contemptuous epithets were thrown upon them long after their commercial intercourse. Of all foreigners, the English were portrayed in the most unfavourable point of view; their complaints were deemed frivolous and vexatious; and, to prevent their grievances from being made known, persons were forbidden to translate them. The few English who had acquired as much of the Chinese language as to be able to represent them, being applied to for that purpose, rendered themselves obnoxious; and it became dangerous for the natives of Canton to undertake to teach it. And though a factory had now been established upwards of a century, yet, for want of an assimilation of manners and habits, which facilitate and invigorate commerce; their mercantile concerns were materially impeded, and exposed to various impositions. Added to all this, those ancient prejudices to strangers, early imbibed, and deeply rooted, operating on the minds of the Chinese, induced them to issue orders that only one port should in future be open for foreign ships; and at a stated period, every European was obliged to embark, or quit the Chinese territories, leaving his factory and concerns until the return of their ship the next year. This conduct, and these measures, it was thought, could never have taken place, but in consequence of gross misrepresentations to the emperor of China; and, therefore, under this conviction, many agents of the East India company, hinted the propriety of sending a messenger to his imperial majesty, in hopes that, by a true statement of their situation, he would order a removal of the existing grievances. Such an event, however, was not to be brought about by any of the English at Canton; for they were no otherwise known than through the descriptive medium of their adversaries or competitors. The same motives of policy or commerce, which had led to the establishment of ministers at other courts, applied with equal force and propriety to the appointment of one at Pekin. The annual amount of the trade between the two countries amounted to several millions sterling; and though the two seats of government were many thousand miles apart, yet the dependant territories of each state approximated within two hundred miles of our East Indian territories. It is here, however, deserving of notice, that there are many petty princes, often hostile to each other, yet closely connected with, or dependant on, one or other of these two powerful neighbours, who occupy much of the space situated between the western limits of the Chinese province of Shen-si, and the eastern boundary of the British government of Bengal. In the common course of events, from such a relative situation must arise discussions which might, without the intervention of persons of high rank and confidential character, lay the basis of disagreeable disputes between the two courts.

Indeed an accident which only happened at Canton a few years since, had well nigh put a stop to our further trade there. On some day of rejoicing, in firing the guns of one of those vessels which navigates between the British settlements in India and Canton, but not in the employment of the East India company, two Chinese, in a boat lying near the vessel, in the river of Canton, were accidentally killed by the gunner. The crime of murder is never pardoned in China. The viceroy of the province, fired with indignation at the supposed atrocity, demanded the perpetrator of the deed, or the person of him who ordered it. The event was stated, in a remonstrance, to be purely accidental; but the viceroy, supposing it to have been done from a wicked disposition, still persisted in his demand, and to assure himself of that object, he seized one of the principal supercargoes. The other factories being alarmed, united themselves with the English as in a common cause, and seemed disposed to resist the intentions of the viceroy; who, on his part, arranged his troops on the banks of the river to force a compliance. It was at last deemed expedient, on principles of policy, to give up the gunner, who fell a sacrifice to this rancorous spirit of the viceroy.

The English factory tried the experiment of delegating a messenger to the court of Pekin; but he was stopped on the way, and severely punished, for presuming to penetrate to the capital without the emperor's permission. Some time after this, a more rational plan was conceived, of sending an envoy of rank and authority, with the previous concurrence of the emperor; and on this mission colonel Cathcart was, in the year 1787, really dispatched; but dying on the outward passage, in the straits of Sunda, the embassy of course failed.

The accounts given by most of those who had hitherto penetrated into the interior of China, were contradictory and problematical, contributing rather to excite attention than satisfy curiosity. They all concurred however, in assuring, that, in regard to its natural and artificial productions; the policy and uniformity of its government; the manners and sentiments of the inhabitants, their civil institutions, moral maxims, and general economy; it presented, collectively, one of the sublimest objects for human contemplation, or deep research. The imaginary danger of admitting a free intercourse to persons, prone to tumult and immorality, were the obstacles raised by the Chinese government against the English. It appeared that some of those who had insinuated themselves as missionaries into the very heart of the country, and had gained access to the court of Pekin, being of the Roman catholic persuasion, had not only taken pains to place their own, and all other Roman catholic countries, in the most favourable point of view; but, from jealousy and prejudice on the score of religion, had sedulously endeavoured to represent the English as men of no faith, and of little principle; and, by pointing out to the

the emperor the very small space which England occupies in the map of the world, particularly when compared with the more extensive tracts of their own country, or with the magnitude of the Chinese empire, the English were represented as of no importance in the scale of nations; a feeble race, circumscribed in riches, in population, and in territory! Yet the more sedate and thoughtful of the sages in China, are said to have made many sensible remarks, in contrasting the superior number and neatness of the English ships in the river of Canton, and the immensity of their returns for teas, silks, and porcelain, over and above those of all other trading nations. Teas were unknown in Europe, before the commencement of the seventeenth century, when they were first introduced by the Dutch. At the beginning of the eighteenth century, the whole of the annual public sales of teas by our East India company, did not much exceed fifty thousand pounds weight; but for several years past, the company's annual sales have approached to twenty millions of pounds, being an increase of four hundred fold, in less than one hundred years! This astonishing demand by the English merchants alone, the vast increase of their shipping, and the eclat of their victories in Hindoostan, as well as their conquest of the Philippine Islands in the Chinese seas, could not but attract the notice of the emperor; yet it is a fact, that representations inimical to Great Britain were uniformly kept up at the court of Pekin; whereby the English at Canton, thus denied the privilege of asserting their own cause on the spot, and destitute of support at the capital, were still constantly subjected to oppressions in their dealings, and insults upon their persons. The representation of these facts by the East India company; the necessity there appeared to be of securing, if possible, a preference in proportion to our superior demand in the market for teas, which can be had in no other part of the world; and the mutual advantages that might accrue from bartering English manufactures for the produce of China, under a fair and honourable commercial treaty between the two nations; are the circumstances on which was founded the propriety, or rather necessity, of a diplomatic embassy to the court of Pekin: of which intention official notice having been forwarded to the Chinese emperor, it received the previous approbation and sanction of that prince.

For this arduous negociation, earl Macartney was named the ambassador, and sir George Staunton, bart. secretary to the embassy; with a suite, which in every respect did honour to the appointment. The Lion man of war, of sixty-four guns, commanded by sir Erasmus Gower; the Hindoostan East Indiaman, commanded by captain Mackintosh; and the Jackall brig, were the ships destined to convey the embassy with the rich and valuable presents sent by his Britannic majesty to the emperor of China. A military guard, under the command of major, now colonel, Benson, was also ordered to attend on the person of the ambassador. Every necessary arrangement being made, these ships set sail from Portsmouth on the 26th of September 1792, and arrived safe on the coast of China, opposite the islands of Chu-san, on the 30th of June 1793. Earl Macartney, for further assistance in the voyage, had been obliged to purchase another vessel at Batavia, which he named the Clarence; so that the squadron now consisted of four ships. On the 2d of July, they fell in with a small cluster of islands, called *Quee-san*, where they came to anchor in nine fathoms water. The highest and most southerly of these, called by the English, *Patchcock*, bore north by west four miles. On the third of July the squadron weighed, and stood in, not without difficulty, nearer to Chu-san, by reason of a multiplicity of boats around them. There were some thousands in sight. Three hundred crouded about the Lion, from one of which a pilot was procured by the Hindoostan. He conducted her off Tree-a-top island, and anchored her four miles to the southward of it; but the Lion and Jackall stood in, and came to between the Ploughman and Buffalo's Nose. From hence some of the gentlemen, with the interpreter, were dispatched, in the Clarence, to Chu san, to bring down the pilots who had been previously ordered by the Chinese government, to carry the ships safe to Tien-sing. The Clarence, in her passage to Chu-san harbour, anchored the first evening a little to the southward of Kee-to-point, in seventeen fathoms water; and so good a look-out was kept, that intelligence of her approach had already been received at Chu-san. An officer, from a Chinese vessel, paid a visit on-board, who, pursuant to instructions, conducted the Clarence, with his boat, the next morning safe into the harbour. Three hundred islands are said to be comprised between the Quee-san and Chu-san harbour; a space of about sixty miles in length and thirty in width; among which there are many valuable and commodious harbours, fit for ships of the greatest burden. This advantage, added to its central situation with regard to the eastern coast of China, and its contiguity to Corea, Japan, Leoo-keoo, and Formosa, make it a place of great trade, particularly at Ning-poo, a great commercial city, bordering on the province of Tche-tchiang, to which are annexed all the Chu-san islands. Twelve vessels are dispatched annually for copper, from one of its ports to Japan.

As soon as the governor had information that the Clarence belonged to the embassy, he ordered provisions of every kind on-board. He also politely received the gentlemen on-shore the next morning, and invited them to partake of some refreshments. The governor had provided pilots who were capable only of carrying them to the next port, at which others were successively to be procured, till they should arrive at Tien-sing. He observed, that it had long been the custom of the Chinese to navigate along the coast from province to province, and that that mode in the present instance must be the most eligible; that the port of Chu-san was only an auxiliary port to the greater one of Ning-poo, and not able to furnish such pilots as were required. To this it was answered; that as the English ships were much larger than the Chinese, and of a different construction, they required a mode to be followed different from their usual pactice; and that, as Ning-poo might supply such pilots as could not be met with at Chu-san, they would immediately go thither in search of them. The governor instantly took the alarm. Their departure for Ning-poo, he said, would be construed by the emperor as proceeding from an improper or cool reception, and that he might not only be dismissed from his office, but be divested of his honours. To avert the danger, he undertook to find pilots capable of taking the squadron to the desired place. Orders were therefore instantly dispatched, commanding all persons who had ever been at Tien-sing, to repair forthwith to the hall of audience. Several came, and underwent examinations; and at last two were found who had often traded to that port, and who said, the squadron might be carried to a safe and commodious harbour, under the island of Mi-a-tau, within a day or two's sail of Tien-sing. The pilots being brought on-board, the Clarence got under way, and the next day rejoined the Lion.

Before the squadron could arrive at the gulf of Pekin, they had to sail about ten degrees of latitude and six of longitude, through the Yellow Sea, in which no European had before penetrated, Chu-san having been the utmost boundary of their nautical researches. The Yellow Sea is bounded by China, Tartary, and the peninsula of Corea. The great Hoang-ho, Whang-ho, or Yellow River, disembogues into this sea; carrying with it, in its circuition, a vast quantity of yellowish mud, from which circumstance the sea, as well as the river, derived its name. The Chinese pilots, being upon deck, looked with astonishment at the manœuvres of the Lion, and the alacrity of the seamen in preparing her for sea. They had brought with them a compass, but no chart, nor any instrument

ſtrument for taking an obſervation. The Chineſe ſometimes carry with them rough drafts of their intended track, ſketched out or engraved upon the back of an empty gourd, its globular form correſponding, in ſome degree, to the rotundity of the earth. But as the Chineſe ſeas are narrow, and every where interſected with iſlands, they have leſs occaſion for charts, and they depend chiefly on the polarity of the needle. The compaſs, however, though here of little avail, is in univerſal uſe among them.

The ſhips entered the Yellow Sea on Tueſday the 9th of July, in dark cloudy weather. Vaſt quantities of the yellowiſh mud were diſturbed by the ſhips' motion through the water, when they were ſailing in about ſix fathoms, as appeared in the ſhips' wakes at a conſiderable diſtance. On the morning of the 10th of July, being in from thirty to thirty-ſeven fathoms water, they diſcovered the iſlands of Tchin-ſan and Shoo-tong-yeng, which bore about north-weſt by weſt, diſtant nine or ten leagues. On the 11th they deſcried two iſlands, called Pa-tcha-ſan and Te-tchong. Friday, the 12th of July, they had a thick fog, which increaſed much in the morning. Guns were fired, during the fog, to keep the ſquadron together; notwithſtanding which the Hindooſtan loſt company. Sunday the 14th, the fog was diſpelled. The Hindooſtan, it afterwards appeared, had this day fallen in with the Endeavour brig, belonging to the Eaſt-India company, commanded by captain Proctor, on-board which veſſel was a young man, maſter of the Spaniſh and Chineſe languages, who meant to offer himſelf as an additional interpreter to the embaſſy. On Wedneſday the 17th of July, the whole ſquadron again joined company. Two capes or headlands were this day diſcovered. Theſe, with an iſland lying in the track from the ſouthward to the gulf of Pekin, being likely to be the firſt iſlands made by future European navigators, their exact ſituations were aſcertained, and the following names given to them by ſir Eraſmus Gower: Cape Macartney, N lat. 36. 54. E. lon. 122. 12. by ſun and moon; 122. 20. by time-piece. Cape Gower, N. lat. 36. 57. E. lon. 122. 15. by ſun and moon; 122. 23. by time-piece. Staunton's Iſland, N. lat. 36. 47. E. lon. 122. 9. by ſun and moon; 122. 17. by time-piece. There was an inlet within Cape Macartney, where ſeveral ſmall craft were ſeen lying at anchor. This cape may be eaſily known, if it is brought to bear north-north-eaſt to north-weſt, by a ſingular appearance of ſix pointed peaks. From hence the ſquadron ſailed along the coaſt in various directions, till they got into the bay of Ki-ſan-ſeu. The harbour of Mi-a-tau was in an iſland, diſtant fifteen leagues farther to the weſtward, though the latitude differs but a few miles only to the northward. The bay of Ki-ſan-ſeu is very ſpacious, extending about ten miles from eaſt to weſt, and nearly the ſame diſtance from north to ſouth. It is ſheltered from every wind except from eaſt-north-eaſt to eaſt-ſouth-eaſt, the direction of the entrance into it. The ſquadron remained one day in this bay, having procured new pilots; but on Sunday the 21ſt of July, they made ſail through the paſſage between Cape Zeu-a-tau and the iſland, keeping rather cloſer to the former than the latter. There was a bay, a little to the weſtward of the moſt northerly point of Zeu-a-tau, in which ſeveral veſſels were ſeen to enter. This has been laid down by ſome miſſionaries as a ſafe and convenient harbour. After clearing the eaſt point, they ſteered a courſe from north to north-weſt, keeping the coaſt pretty well on-board. On the evening they hauled round a projecting head-land, which, with a bluff point due weſt from this, diſtant about eight miles, form the entrance of Ten-choo-foo bay, in which the ſquadron anchored in ſeven fathoms water. The anchorage being foul, by reaſon of ſhells and hard ground, the Clarence was immediately ordered to proceed to Mi-a-tau, to examine its harbour. In the interim, an officer was ſent to the governor of Ten-choo-foo, to notify the arrival and purport of the ſquadron; who, when he heard the ambaſſador was on-board the Lion, inſtantly ſent off a preſent of freſh proviſions and ſome fruit, and went afterwards in perſon to compliment his excellency. The governor did not fail to invite the ambaſſador and his ſuite, in the moſt preſſing manner, to entertainments and plays on ſhore. He wiſhed for an opportunity of ſhewing his excellency, on a ſmall ſcale, what a magnificent reception was preparing for him by his ſovereign, againſt his arrival at the court of Pekin.

To a nation like the Chineſe, among whom ſubordination in the various ranks and degrees of ſociety is obſerved with unremitting ſtrictneſs; who look up to the throne with the profoundeſt veneration, and whoſe minds were about to be impreſſed, from the example of their ſovereign, with the higheſt degree of conſideration for the Engliſh nation, heretofore held, if not in contempt, at leaſt in diſeſteem; it was a matter of the higheſt importance, that the individuals who compoſed the embaſſy ſhould adopt ſuch a cautious and circumſpective conduct as ſhould avoid giving offence where it was ſo eaſily taken; and alſo endeavour to root out their prejudices, and conciliate their eſteem, by examples of civility, courteſy, and moral rectitude. As the ſquadron was now pretty far advanced in the Yellow Sea, and likely ſoon to arrive at its place of deſtination, his excellency judged it expedient to cauſe a paper to be diſperſed throughout the fleet, tending to put thoſe perſons, who compoſed the embaſſy, on their guard with reſpect to their general demeanour. This paper, which was publicly read to the crews and paſſengers of each ſhip, purported, that the ſucceſs of the embaſſy depended on gaining the good-will of the Chineſe; that this might alſo depend on the ideas entertained by them of the diſpoſition and conduct of the Engliſh nation, now to be judged of by their behaviour; that the unfavourable impreſſions retained by the Chineſe againſt the Engliſh for irregularities heretofore committed at Canton, ſtamping them as the worſt of Europeans, could only be effaced by a conduct diametrically oppoſite; and ſuch a conduct only was likely to eradicate that ſettled enmity; that the meaneſt of the Chineſe were ſupported by their ſuperiors in all their differences with foreigners; and, if neceſſary, were ready to avenge his blood, of which a fatal inſtance had happened to the Engliſh gunner, who moſt innocently, and very unintentionally, deprived a Chineſe of life: he therefore recommended particular caution and mildneſs in every intercourſe or accidental meeting with the pooreſt individual of the country.

His excellency, who was convinced there was no neceſſity for recommending to ſir Eraſmus Gower to make ſuch regulations, as prudence might dictate on the occaſion, for the perſons under his immediate command, nor to captain Mackintoſh for the officers and crew of the Hindoſtan, truſted alſo that the propriety and expediency of maintaining the credit of the Engliſh name would ſecure their voluntary obedience; and that the ſame incentives would produce ſimilar effects on every perſon concerned in the embaſſy. His excellency declared, that as he ſhould be prompt to encourage and report the good conduct of thoſe who merited commendation, ſo he ſhould be equally ready, in caſe of miſconduct, to report with equal exactitude, and to ſuſpend or diſmiſs the violators; and that, ſhould injury be offered or done to a Chineſe, or a miſdemeanor of any kind be committed, puniſhable by the laws of China, they were not to expect him to interfere with a view of mitigating or warding off their ſeverity.

The next object of importance was, to know whether the ſquadron could be ſafely ſheltered in the harbour of Mi-a-tau. The officer who had been thither in the Clarence to reconnoitre, ſoon after returned, and reported that that harbour did not afford them a ſecure retreat, on account of a dangerous reef of rocks that lay off the eaſt end of the eaſternmoſt of the Mi-a-tau iſlands, called Chan-ſan, which could not be approached by the ſquadron nearer than where they were nine fathoms water. The Clarence, however, anchored in ſeven fathoms, in clayey ground, within a mile of the ſhore. The iſland was

was three miles long, and nearly as many broad; and was populous and well cultivated. From this report it was determined, by sir Erasmus Gower, to send an officer, previous to the squadron's sailing to the gulf of Pekin, to survey the mouth of the river which fell into it from Tien-sing, that its safety might be ascertained. The Jackall was no sooner dispatched for this purpose, than a new pilot was recommended, well acquainted with the spot in question. He did not hesitate to affirm there was a commodious harbour within six miles of the Pei-ho, or White River, flowing from Tien-sing, with water deep enough for the largest vessels; and he drew a sketch of the place. As this man appeared to be more skilful in nautical affairs than the other pilots, much confidence was placed in him, and it was resolved to enter the gulf without farther delay. The squadron therefore got under way in the afternoon of the 23d of July, keeping the Mi-a-tau islands on the right. The weather moderate and clear, and the wind easterly; soundings through the day from fifteen to nine fathoms. In the morning of Friday the 26th, were violent showers of rain, and in the evening tremendous claps of thunder, with continuous vivid flashes of lightning. The Jackall was discovered returning from the westward, environed with numerous Chinese junks; and from lieutenant, now captain, Campbell's report, who had been sent to explore, it appeared that no secure harbour was to be found on the shores of the river Pei-ho. The Jackall, in going up the river, was hailed by some Chinese soldiers in a boat, who desired her to cast anchor. Soon after a mandarin, with several attendants, came on-board; and, being assured she belonged to the embassy, enquired after the ambassador, and what presents he had brought for his imperial majesty. When he had obtained all the information he could as to the number and size of the ships, and how many guns they carried, he closed his interrogatories by declaring, that the emperor had given special orders for the reception and accommodation of the embassy, and that he would provide whatever might be wanted. In the mean time the gentlemen of the Jackall accepted an invitation, and were hospitably entertained on shore, but strictly re-examined on the former points. The mandarin also inquired respecting the merchandize brought for sale at Pekin, and offered to get them deposited in the four Christian churches. Trade and an Englishman were, in the minds of the Chinese, so associated, that nothing could exceed his surprise on being told that they had no goods for sale; that the persons of the embassy were not merchants; and that men of war never carried out, nor dealt in, any kind of merchandize. The mandarins, being informed that the ships were too large to cross the bar, gave orders for a sufficient number of junks to be got ready, to bring the presents, and passengers, and baggage, on shore. An extensive building, near the river's mouth, had been prepared for the ambassador's reception, supposing he would have remained there some days to recover himself from fatigue; and his excellency had the choice of travelling to Pekin in a sedan chair, in a two-wheeled carriage, or in a commodious vessel by water.

Soon after the Jackall's return, a prodigious quantity of live-stock, fruit, and vegetables, were brought to the squadron in junks; and, not being able to stow away the whole, the surplus was necessarily returned. The following is a list of the articles: twenty bullocks, a hundred and twenty sheep, a hundred and twenty hogs, a hundred fowls, a hundred ducks, a hundred and sixty bags of flour, fourteen chests of bread, a hundred and sixty bags of common rice, ten chests of red rice, ten chests of white rice, ten chests of small rice, ten chests of tea, twenty-two boxes of dried peaches, twenty-two boxes of fruit preserved with sugar, twenty-two chests of plums and apples, twenty-two boxes of ochrus, twenty-two boxes of other vegetables, forty baskets of large cucumbers, a thousand squashes, forty bundles of lettuce, twenty measures of pease in pods, a thousand water melons, three thousand musk melons, besides a few jars of sweet wine and spirituous liquors; together with ten chests of candles, and three baskets of porcelain. Not only here, but also at Turon-bay, Chu-san, and Tenchoo-foo, the squadron experienced the same hospitality; and they were gratuitously supplied, without having been previously demanded.

Two mandarins of rank, one in the civil, the other in the military, department, numerously attended, came to the Lion to congratulate the ambassador in the emperor's name, and in their own, on his safe arrival, after so long and perilous a navigation; and informed him they were ordered by their sovereign to accompany him to court. The civil mandarin, whose family name was Chow, had the title of *ta-zhin*, or great man, annexed to it. He bore the honorary distinction of a blue globe or button upon his bonnet. The name of the military mandarin, who had an engaging open countenance, was Van; but he, too, had the addition of *ta-zhin*, or great man. His valour had been conspicuous in battle; he had received many wounds, and was not only honoured with the red button upon his bonnet, but had also superadded a peacock's feather, taken from the tail. He was celebrious for his skill in archery, the bow and arrow being still there often preferred to fire-arms. These gentlemen were received on-board the Lion with every mark of attention and respect. A third person of high rank, of a Tartar race, had also been appointed by the emperor as a principal legate, to attend the ambassador; but being very timid of the sea, he waited to receive his excellency on shore.

Inquiry was made by the two mandarins, whether the letter brought by the ambassador for the emperor was rendered into Chinese, and what were its contents, in order that they might be able to transmit to Pekin every possible information relative to the embassy. As this question was not urged on the authority of the court, the answer given was, that the original, with its translation, were locked up together in a gold box, to be delivered into the hands of the emperor. But with regard to the presents, after which they sedulously inquired, they were formally instructed to demand a list of them, to be forwarded to the emperor. An ordinary catalogue could neither point out their qualities, nor their worth, nor be comprehended by any translation: they were, therefore, described, by circumlocution, in all the pomp of oriental style.

The presents consisted of an orrery, a reflecting telescope, a pair of magnificent globes, several chronometers or time-pieces, an air-pump, a machine exhibiting the mechanic powers, five pieces of brass ordnance, muskets, pistols, sword-blades, a complete model of a first-rate man of war of a hundred and ten guns, ornamented vases, various kinds of earthen ware, a large burning-glass or lens, a pair of magnificent glass lustres, specimens of the productions of the manufactures of Great Britain, in wool, cotton, steel, and other metals; representations of several cities, towns, churches, seats, gardens, castles, bridges, lakes, volcanos, and antiquities; of battles by sea and land, dock-yards or places for building ships, horse-races, bull-fighting, and of most other objects curious or remarkable in the dominions of his Britannic majesty, and other parts of Europe; also portraits of some of the most eminent persons, including the royal family of Great Britain. The description of these presents was translated into Chinese, and done into Latin by Mr. Hüttner, before mentioned; as had also been his majesty's letter to the emperor, for the purpose of giving the missionaries an opportunity of correcting any mistake which might have been committed in the Chinese translation, which, however, was understood sufficiently by the two mandarins to excite their admiration of its contents. Orders

Orders were given to prepare a number of junks to convey the whole across the bar, after which they were to be transhipped into different vessels, better adapted for the navigation of the river; other junks were provided to convey the persons and baggage of the embassy from the ships to the river, where proper vessels were also ready to receive them.

The sea junks which attended the ships were to the number of thirty, each about two hundred tons burden. The hold, by means of partitions, is divided into twelve compartments. The composition used for caulking the seams is made of lime and oil, with some scrapings of bamboo. It is very glutinous, soon acquires solidity, is not combustible, and is impenetrable to water. The weather was exceedingly favourable for transhipping the presents and baggage into these junks; for, though done on the open sea, they did not sustain the least damage. The stormy season, however, was approaching fast, and something was to be resolved on to provide for the safety of the squadron, their present situation being ineligible. With respect to the Hindoostan, it was thought desirable in her way home to touch at Chu-san, provided leave could be obtained at Pekin for that purpose, which it was intended captain Mackintosh, by accompanying the ambassador, should solicit in person. He could not only procure there teas and silks on better terms than at Canton, but, on his way to rejoin his ship, he might have an opportunity of observing the mode of fabricating the articles he usually carried from China, of which the East India company was anxious to gain information. His excellency recommended sir Erasmus Gower to prepare to conduct the squadron, either to the bay of Ki-san-seu, or to that of Chu-san, where proper conveniencies might be procured for the sick, and refreshments for the crews; but trusted that the necessary supply of provisions would be paid for, and that no presents would be allowed to come on-board for individuals.

While these preparations were making, under orders from sir Erasmus Gower to his officers, his excellency wished to have the satisfaction of his company to Pekin, One of the brigs was to remain in the river Pei-ho to take him to the Lion, after which his excellency requested that sir Erasmus would quit the coast of China, and not revisit it till the ensuing month of May; the interval of which was filled up with general instructions of what ports he was to touch at, observing to be at Macao, to meet the ambassador on his return, in the beginning of the following May. Sir Erasmus, however, begged to decline the proposal of going to Pekin, deeming his presence with the squadron indispensably necessary. He should return to one of the bays mentioned, and, after the health of the crews were re-established, proceed to accomplish the objects contained in the instructions, for the public advantage. The mandarins, having been applied to, procured from the viceroy letters to ensure good treatment for the Lion. The ambassador and his suite were now preparing to quit her, on whose departure the crew cheerfully obeyed the orders of their commander, to man the yards as a token of esteem; loud cheers were given, and a general salute from the ships fired, which was a novel spectacle to the Chinese.

It was on Monday the 5th of August, 1793, that the ambassador, and the gentlemen belonging to the embassy, embarked on-board the Clarence, Jackall, and Endeavour, brigs, for the Pei-ho river, as the lightness of these vessels admitted of their being got over the bar; the servants, guards, musicians, and other attendants, went with the baggage and presents in the junks. The wind being favourable, they crossed the bar in a few hours, and in the afternoon came to, for a short time, on the southern bank of the river, opposite a small village called Tung-coo, which being a military post, the troops were drawn up as a mark of respect to his excellency. From this place the vessels were dragged or trailed along, by men upon the river's bank, to another village named See-coo, and thence to a town called Ta-coo, where a great number of yachts and other boats were lying ready for the accommodation of the embassy. The naval procession, on this great occasion, was as follows:

First, The grand mandarin and his suite, in five large covered barges; afterwards, in a yacht,

No. 1. His excellency the earl of Macartney.

2. Sir George Staunton, bart. secretary, and Mr. Staunton, his son, page of the embassy.

3. Mr. Plumb, the Chinese interpreter.

4. Lieutenant-colonel Benson, lieutenant Parish, and lieutenant Crewe.

5. Captain Mackintosh of the Hindoostan; Mr. Maxwell, secretary to the ambassador; Dr. Gillan, physician; and Mr. Hüttner, preceptor to master Staunton.

6. Mr. Barrow, mathematician, comptroller of the household, &c. Mr. Winder, joint secretary of the embassy; and Mr. Baring, son of sir Francis Baring.

7. Dr. Scott, surgeon to the embassy; Dr. Dinwiddie, professor of astronomy, &c. Mr. Hickey, portrait painter; and Mr. Alexander, draftsman.

Lastly, Five other large junks, which contained the mechanics, soldiers, and servants, closed the procession.

The yacht prepared for the reception of the ambassador, into which he entered on their arrival off Ta-coo, was spacious, richly ornamented, and contained a greater number of glass panes than the other yachts; whose windows, instead of being glazed, were filled up with a transparent kind of paper, fabricated in Corea from cotton, and is not easily affected by rain or any other weather. His excellency's apartment comprised most of the vessel, and consisted of an anti-chamber, a saloon, a bed-chamber, and a closet. The saloon was furnished with a square sopha, or seat of honour, such as are met with in the mansions of the chief mandarins, which they always occupy on giving audience. On each side of the yacht, from head to stern, was constructed a gangway, projecting two feet beyond the gunwale. Upon this the crew manoeuvred the vessel; and by it the domestics were prevented from passing through the principal rooms. The cabin allotted for the crew was next the stern, in a corner of which was a small altar, with an idol upon it, and around it perfumed matches were kept constantly burning. Besides the ambassador's, there were sixteen other yachts in the procession, independent of lighters for conveying the presents and luggage; and the junks for the accommodation of mandarins of various ranks, as well as other Chinese, ordered to attend on the occasion, were equal in number to those which composed the embassy. Many of the yachts were eighty feet long; and, notwithstanding they were encumbered with upper-works, drew only eighteen inches water. The cabins in them were lofty and airy; above them were births for the crew, beneath lockers for stowage. Some had coloured curtains on the outside, reaching from stem to stern, to keep out the sun, and shutters to ward off the rain. Some of these boats, in which were several cooks, contained provisions for the ambassador's table, to preclude the necessity of going on shore, or prevent procrastination whenever the wind and tide were favourable for their passage. The transhipping of the luggage, of which there were six hundred packages, occupied nearly three days. While this was doing, the chief directors of the route, Chow-ta-zhin and Van-ta-zhin, made occasional complimentary visits to the ambassador, as well as to see that he was properly accommodated. Their politeness extended to the principal gentlemen of the embassy, who were likewise honoured with visits of civility. The inferior mandarins were not less attentive to the accommodation and comfort

fort of the paſſengers belonging to the embaſſy; and even the Chineſe ſoldiers and ſailors evinced a diſpoſition to pleaſe beyond the ordinary line of duty.

On the morning of the 9th of Auguſt, every neceſſary arrangement having taken place, the ſignal was made for ſailing. This ſignal, always uſed upon the water, is not made with guns, but with an inſtrument called in Chineſe *loo*, and by Europeans in China *gong*. It conſiſts of circular rimmed plates of copper, in which there is mixed a certain portion of tin, or ſpelter, to make it ſonorous. Theſe being ſtruck with a wooden mallet, covered with leather, emit a ſound which may be heard at two or three miles diſtance. Authoritative notice on ſhore, eſpecially among troops, is made not by drums, but by ſtriking two pieces of hollow bamboo together. The drum is no martial inſtrument, being uſed only in their temples. The meandrous courſe of the river, which rendered a wind that was fair on one ſtretch foul on another, retarded the progreſs of the embaſſy, but afforded a favourable opportunity of viewing its banks and circumjacent places. Each ſide was adorned with pleaſant villas and delightful gardens, and the fields were in the higheſt ſtate of cultivation, many of them covered with Barbadoes millet, *holcus ſorghum*, the talleſt of the vegetable tribe, growing to the height of ten or twelve feet, called by the Chineſe *lofty corn*, and is ſaid to increaſe a hundred fold. At night its banks were ſplendidly illuminated with a diverſity of lights, from lanterns of tranſparent party-coloured paper. Lights were alſo affixed to the maſt-heads of the veſſels; their number and ſituation denoting the rank of thoſe on-board. The ſhrill and repeated ſound of the *loo*, and the conſtant buz and threatening ſting of muſquitos in the night-time, were both ſingularly troubleſome. Not only during the firſt, but alſo in the ſecond day's progreſs up the Pei-ho, were the banks lined with innumerable ſpectators of both ſexes, and of all ages; but the river itſelf was literally covered with boats of every deſcription. Its ſhores on one ſide were crowded with ſtacks or pyramids of ſalt, from two to ſix hundred feet long, and about fifteen feet high. Two hundred and twenty-two entire ſtacks were counted, beſides many others incomplete; which, from a nice calculation, were ſuppoſed to contain ſix hundred millions of pounds weight. This is an article of great revenue to the emperor.

On the third day the embaſſy reached the port of Tien-ſing, the general mart for the northern provinces of China. The city is built at the confluence of two rivers; the one, upon which the embaſſy was to proceed to Tong-choo-foo, was alſo called Pei-ho, the other Yun-leang-ho. A bridge of boats extended acroſs the rivers, which occaſionally ſeparated to admit a paſſage for veſſels. Temples and handſome edifices were built along the quays, contiguous to which were yards and magazines for naval ſtores, and ſhops and warehouſes for retail trade. A pavilion was erected in the centre of the city, oppoſite to which the ambaſſadorial fleet ſtopped. The viceroy, who had come by land from Ta-coo, was in waiting here for the ambaſſador. His excellency diſembarked, with all his ſuite, attended with his whole train of ſervants, guards, and muſicians, and was received on-ſhore by the viceroy and the legate above-mentioned, according to the following order of parade: Three military mandarins, or principal officers.—A tent, with a band of muſic outſide the tent.—Three long trumpets.—A triumphal arch.—Four large green ſtandards, with five ſmall ones between each, and bowmen between each ſmall colour.—Six large red ſtandards with matchlock men, and five ſmall colours between each ſtandard.—Two large green ſtandards, with ſwordſmen between each.—Muſic tent.—Triumphal arch.—A body of Chineſe archers.

After an interchange of compliments, and the accuſtomed refreſhments of tea and ſweetmeats, the legate informed the ambaſſador that the emperor was at his country reſidence at Zhe-hol, in Tartary, at which place it was his intention to celebrate the anniverſary of his birthday, which happened on the thirteenth of the eighth moon, correſponding with the 17th of September; and that it was his deſire to receive the embaſſy in that city. The ambaſſador and the gentlemen returned to their reſpective yachts, and ſoon after a ſumptuous repaſt, with the addition of wine, fruit, and ſweetmeats, was ſent to them from the viceroy, as he had done before at Ta-coo; and his hoſpitality was even extended to the ſervants of the embaſſy, to whom he alſo ſent a plentiful dinner. One among the many inſtances of polite attention to the ambaſſador, was a temporary theatre, which he had cauſed to be erected oppoſite to his excellency's yacht, where a company of comedians, at various times of the day, exhibited dramatic pieces and pantomimes. Boys or eunuchs played the female characters. In the evening, the weather proving favourable, the yachts and veſſels proceeded up the Pei-ho. Its ſides, in ſome places, were banked up by the lower ſtalks of the millet; in ſome reaches, by parapets of cut granite; and at others, by cauſeways of the ſame material; and ſluices were made here and there to let off water to irrigate the adjoining lands. During the progreſs up the river, they were aſſiſted by the tide for thirty miles from Tien-ſing, where it ceaſes to flow; but in light airs, and contrary breezes, the Chineſe ſailors frequently made uſe of a couple of ſweeps, or large oars, which are never lifted out of the water. When rowing was impracticable, men were employed upon the banks to draw or trail the veſſels by ropes. There were fifteen men to each yacht, and upwards of five hundred were occupied on this ſervice.

Tien-ſing, the literal tranſlation of which is *heavenly ſpot*, is in length nearly equal to London, and was ſaid to contain ſeven hundred thouſand perſons. Some of the houſes are built with ſtone, but moſtly with brick, of one ſtory only, though there are ſome of two ſtories high. The moſt durable bricks are thoſe of a bluiſh or lead colour; ſome few are red; and others pale brown. The laſt kind, uſed for the mean dwellings, are only baked in the ſun. The blue bricks are burnt in a kiln by a cloſe wood fire, the blaze of which is not allowed to touch them; and thoſe which are expoſed to its flame, acquire a reddiſh colour. In the making of bricks from the clay, thin layers of ſtraw are placed between them, without which they would, as they dried, run or adhere together; ſo that the Chineſe, like the children of Iſrael, could not make bricks without ſtraw. The lands, as on the other ſide of Tien-ſing, were many of them covered with millet, which with rice, and a little wheat, are the principal objects of cultivation; yet the people have experienced the dreadful effects of famine from the deſtruction of locuſts, or from the burſt of torrents from the mountains. In ſome ſpots were ſeen growing a ſpecies of the dolichos, not very diſſimilar to the kidney bean; in others fields of beans, and various kinds of pulſe; and likewiſe ſeſamum, and other plants whoſe ſeeds produce oil. Plantations of the tea tree, of a dwarf ſize, were alſo abundant. The leaves had a near reſemblance to a myrtle. It was the ſeaſon for plucking the bloſſoms, the ſmalleſt of which, when carefully dried, poſſeſs the higheſt flavour. The tea-tree often grows upon the ſides of mountains in China, and among rocky cliffs, to come at which is frequently dangerous, and ſometimes impracticable. The people therefore, that they may gather the leaves, make uſe of a ſingular ſtratagem. Thoſe declivities are often the habitation of monkeys, whom they menace, mock, and imitate, till the animals, to revenge themſelves, break off the branches, and ſhower them down upon the inſulters; from theſe branches the Chineſe collect the leaves, which is the object they had in view. When doctor Letſom had read the above ſtatement, taken from Groſier's Deſcription of China, he wrote to the author, to thank him for having given an account which coincided ſo exactly with his own, which he had given in his Hiſtory of the Teatree,

tree, and which had been treated with unmerited ridicule. In nations, which have not acquired the common art of printing, the arts, which they have discovered, are generally preserved and explained by paintings and hieroglyphic representations. In Chinese drawings are to be seen the history of manufacturing porcelain, of cultivating rice, as well as collecting and preparing tea; in gathering which that irascible animal the monkey is shewn to advantage. Dr. Letsom mentions drawings, in which monkeys are represented gathering the branches or leaves of the tea-tree, without exhibiting any menacing attitude. They appeared rather to be fulfilling an office to which they had been regularly trained; and the more so, because others were walking and sitting by the people, as if tamed and domesticated, whilst they were quietly gathering the branches upon the trees. This tame style of painting led to the vulgar error.

The number of junks employed upon the Pei-ho, appeared to be incalculable. Exclusive of those busied in the ordinary course of commerce, not less than a thousand, of a large size, were employed in the service of the government between Tong-choo-foo and Tien-sing, for the purpose only of gathering such taxes as were paid in kind. It is usual for the wives and families of the officers and sailors to live constantly upon the water. Children, are born, brought up, and spend their whole lives, on board; every land is foreign to them; and the water may be called their native element. Each vessel, on an average, contained fifty persons; and, estimating the total of the boats at two thousand, it will appear that a hundred thousand souls move and live daily upon the surface of the waters of that river.

The travellers, in their slow progress up the river, often quitted and rejoined the yachts, in order to inspect objects on shore which struck their fancy. This conduct was watched with extraordinary jealousy; and they were given to understand, that this freedom was displeasing to the legate. In short, the interpreter communicated, by several intimations, occasionally let out in conversation with the ambassador, that some recent dissatisfaction had been conceived at the court of Pekin against the English nation. Great circumspection had been observed by the interpreter, in acquiring this important information; nor was it without much address that he extorted from the mandarins the following particulars: In the year 1791, the emperor of China sent an army into the country of Thibet, to drive back the rajah of Napaul, who had made predatory excursions thither; and, in the contest, his army met with more obstacles, greater resistance, and heavier losses, than had been foreseen, or ever before experienced, from so feeble an enemy. Some of the Chinese officers, mortified at their ill success, fancied they saw opposed to them not only European tactics, but European soldiers; and reported at court, that they perceived hats, as well as turbans, among their enemies; and they concluded the former must have been English. Thus it had been politically reported among the people of China, that the English had, in the above instance, actually afforded assistance. Though the ambassador gave no credit to either fact, he was induced to believe, that the bare assertion would have the power to alienate any previous favourable disposition of the country towards the government of Great Britain.

It had long been a policy practised in the east, prior to a meditated attack on the territories of a foreign prince, to send an embassy thither, under the mask of friendship, the better to discover its real situation and strength. The British government had been apprised with what a jealous eye the Chinese viewed their acquisitions in Bengal, and the prejudices which might be raised on the score of ambition; and the ambassador was furnished with arguments to allay their suspicions on that head. But it was not within the compass of human wisdom to foresee, and prepare against, an imputation of having interfered hostilely with the arms of China, which had never taken place; nor was it till the following year, when his excellency arrived at Canton, that he was informed, from England and Calcutta, what were the circumstances upon which an assertion so groundless had been founded. It was notorious, that the governor-general of Bengal conducted himself, in this business, with strict neutrality, and with great propriety and attention towards the emperor of China; declaring to the rajah of Napaul, that the only assistance he should give, was to endeavour to extricate him from a ruinous war, by means of conciliatory negociation between the commanders of the Thibet and Chinese forces.

It is probable, that if the embassy previously intended for China, in the year 1787, had not failed through the premature death of colonel Cathcart, then appointed minister to the court of Pekin, any misunderstanding might have been prevented; or, if even the circumstances connected with the Thibet war had arrived at Canton before the present ambassador quitted its vicinity to proceed to Tien-sing, it is possible it might have been in his power to refute the calumny. His excellency did convince the principal mandarins, and Chinese officers of state, that the story was unfounded; but he was not able to effect so much with the Tartar legate, over whom the others had no influence; who alone was allowed to correspond with the government, and who evinced no disposition to make a favourable or just representation of the matter to the emperor. The legate, either from mistrust or malevolence, even refused to send the ambassador's letters to sir Erasmus Gower, by the messengers of government, though he knew his excellency had the honour of receiving a packet from the emperor. Without the legate's permission, there was no mode of conveying any intelligence whatever; of course, he was secluded from corresponding with the company's commissioners at Canton. Thus the most necessary intercourse was obstructed, without the least prospect of redress; inasmuch as the legate was the intimate creature of the colao or prime minister of the empire, whose sentiments were, doubtless, in perfect unison. It may be proper to observe, in this place, that the government of China has not established any mode of conveying letters of correspondence for the conveniency of the people. The emperor only receives and sends expresses, which are conveyed on horseback to and from every part of his extensive dominions, at the rate of a hundred and fifty miles a-day. For the ordinary exigencies of government, as well as for the use of the mandarins and officers of state, there are slower couriers appointed, who are sometimes, though rarely, permitted to carry letters or packets for individuals. But information is conveyed to, or with-held from, the body of the people, just as the government may deem it expedient.

The perverse circumstances above-mentioned augured an unfavourable success to the embassy, which was proceeding, but slowly, towards the capital. The river being shallow, much mud, or diluted clay, was disturbed from the bottom; and this, added to what was occasionally washed down into it from the mountains, rendered the water turbid and scarcely potable. The Chinese, however, have an easy mode of refining it. A small quantity of alum is put into the hollow joint of a bamboo, in which several perforations are made. A convenient quantity of water being taken from the river, it is to be stirred about three or four minutes with this bamboo; by which means the alum unites with the earthy particles, and precipitates them to the bottom of the vessel, leaving the water pure and transparent. But the Chinese of rank use distilled water for their own consumption; and even the lower classes never drink water till tea, or some other salubrious herb, has been infused in it. Not only is this infusion drunk hot, as common beverage, but even wine and every other liquid, is made warm before taken. The same mode prevails in the hot climate of Hindoostan. The Chinese, however, enjoy, in the heat of summer, the grateful coolness of ice; but it

it is principally with fruits and ſweetmeats. But, notwithſtanding tea is the common beverage of all the Chineſe, and is preſented to viſitors at all hours, yet there are ſome, eſpecially in the northern provinces, who are fond of ſpirituous liquors, and are diſpoſed to be very convivial. The mandarins ſeemed to indulge in luxury; they made, daily, two, or three, meals of animal food, highly ſeaſoned; each repaſt conſiſting of many courſes. The intervals were employed in ſmoking, and chewing the areca nut.

The embaſſy, in its paſſage up the river, was ſaluted by a diſcharge of three guns at every military poſt, ſome of which were paſſed every day when the high road was near the river. This road, though narrow, was good; carriages were few; and thoſe only with two wheels, and without ſprings. Gentlemen commonly travel in ſedan chairs, chair-palanquins, or on horſeback; and ladies in cloſe litters ſuſpended between mules; and even in this manner only for ſhort diſtances. There are no coaches in the country. The ancient cuſtom of applying ſails to carriages by land, is not entirely laid aſide. Theſe vehicles are carts or double barrows made of bamboo, having one large wheel placed between them. Two poles, riſing from the oppoſite ſides of the cart, ſerve as maſts, upon which the ſail, conſiſting of a mat, is ſet. But this can only take place when the cart is going before the wind. In other caſes, the machine is drawn by one man, while another, behind, not only keeps it ſteady, but impels it forward.

On the 16th of Auguſt, the yachts having proceeded as far up the river Pei-ho as the depth of water would admit, came to anchor within half a mile of Tong-choo-foo, which is ninety miles diſtant from Tien-ſing, and within twelve miles of the city of Pekin. It appeared that the Lion and Hindooſtan ſailed from the gulf of Pe-tche-li on the 8th of Auguſt, and on the 12th had paſſed through the ſtraits of Mi-a-tau. While they remained at anchor in the gulf, they found the latitude of the anchorage to be thirty degrees fifty-one minutes and a half north, and longitude by time-keeper, a hundred and ſeventeen degrees fifty minutes eaſt; and that the latitude of the mouth of the Pei-ho, or White River, was thirty-nine degrees north. The letter which had been ſent from the viceroy of Pe-tche-li to the governor of Ten-choo-foo, in favour of ſir Eraſmus Gower, had been the mean of procuring him every aſſiſtance of which he ſtood in need. From thence he went to take a minute examination of the bay of Ki-ſan-ſeu, ſometimes named Zeu-a-tau, where he arrived on the 15th of Auguſt, and found it ſpacious, the depth of water from nine to five fathoms, the ground or anchorage tough, and that ſhips were ſecure in all directions; but that wood and water were at ſome diſtance in the bay. The country, however, had a barren appearance, the inhabitants were poor; and it was doubtful whether proper accommodations could be procured for the ſick and convaleſcents. Sir Eraſmus, therefore, determined to go to Chu-ſan, where he had more favourable proſpects; and for this place the two large ſhips ſteered their courſe.

The route preſcribed for the embaſſy, was through the city of Pekin, to a villa in the vicinity of the emperor's autumnal palace, called *Yuen-min-yuen*, or garden of perpetual verdure. At this palace were to be depoſited ſuch of the preſents as might receive damage by conveying them along the rugged roads to Zhe-hol, in Tartary. A temple, near Tong-choo-foo, was appropriated for the accommodation of the ambaſſador and his ſuite, and temporary buildings had been erected for receiving the preſents. Theſe buildings, conſtructed of bamboo, were impenetrable to rain; guards were placed around, and perſons forbidden to approach them with fire or lights. All the packages were re-landed and houſed in a day. The temple, now converted into a caravanſary for travellers of rank, was founded for the maintenance of twelve prieſts of the religion of Fo. The prieſts were removed to a neighbouring monaſtery, except one, who was appointed to watch over the lamps of the ſhrine, and to attend his excellency's commands. The rooms had boarded platforms, elevated a foot from the floor; thick woollen cloths were ſpread upon them, which, with the addition of a cuſhion, conſtituted the bedding of thoſe prieſts. The apartments of the ſuperiors were allotted for the embaſſy, in which, to their great terror, were diſcovered ſcorpions and ſcolopendras.

A public banquet, or breakfaſt, was prepared the next morning by the mandarins, to which every perſon belonging to the embaſſy was invited. Beſides tea, there were various kinds of viands. Tables were ſpread in the vacant parts of the new ſtore-rooms, no other place being ſufficiently capacious. This repaſt, according to Chineſe etiquette, was given as a mark of extreme civility, by including every attendant belonging to the perſon whom it was meant to honour; and not to have accepted of it, would, beſides giving umbrage, have been conſidered as a want of good breeding. The diſtance from the beach to the temple was ſo lined with people, that it had the appearance of a crowded fair, eſpecially as ſimilar ſtalls were purpoſely erected for the ſale of liquors, fruit, and other articles. Not a pauper was to be ſeen on the ſpot; nor did any one aſk alms. The preſent, indeed, was not the ſeaſon of diſtreſs for the peaſantry, who, in times of dearth or ſcarcity, impelled by ſharp hunger, are often driven to criminal exceſſes to procure food. In thoſe times of national calamity, however, the emperor opens the public granaries for their relief, remits the taxes of the hapleſs cultivator, and reinſtates him in his farm by pecuniary aſſiſtance.

A party of gentlemen, accompanied by ſome mandarins, going into the adjoining city to purchaſe a few trifles, obſerved the projection of an approaching lunar eclipſe diſplayed upon the ſides of ſeveral houſes. The Chineſe have always conſidered an eclipſe of the ſun as portending ſome national calamity; and, as they eſtimate their own happineſs by the degree of virtue poſſeſſed by their ſovereign, they attribute their misfortunes to his privation of moral goodneſs. Even the emperor is forced, as it were, to accede to the idea, and govern himſelf accordingly. On the eve of an eclipſe, for example, he never engages in any important enterprize; but ſeems deſirous of avoiding the converſe of his miniſters, that he may ſecretly examine into his paſt actions, with a view to correct their errors, for which the approaching eclipſe may be ſent as an admonition; and his ſubjects are then invited to offer him their advice.

The country, for ſome miles round Tong-choo-foo, appeared level; the ſoil light, and of eaſy culture. Its principal autumnal crops were Indian corn and millet: and the thick ſtubble was left upon the ground for manure. The inſtruments of huſbandry for thraſhing and winnowing corn, as well as for rolling the land, were nearly of European conſtruction. The incloſures were few, and but few cattle to incloſe; paſturage ground was rare, the animals for food and tillage being foddered and fed chiefly in ſtalls. Straw cut ſmall and mixed with beans was the food for horſes. Ploughing was performed by oxen. Their horſes are ſtrong and bony; and many of them are ſpotted as regularly as a leopard, occaſioned by croſſing thoſe of contrary colours. Mules are more valuable in China than horſes, as requiring leſs food, and performing more labour. The cottages of the peaſantry are neat and comfortable; but they have neither fences nor gates to guard them againſt wild beaſts or thieves; for the latter, perhaps, it were unneceſſary, as robberies are ſeldom committed, notwithſtanding the puniſhment is not capital, as before noticed, unleſs accompanied by acts of violence.

The wives of the peaſantry are truly induſtrious; for, beſides managing every domeſtic concern, they exerciſe ſuch trades as are carried on within doors. They rear ſilk-worms, ſpin cotton, and work at the loom: in ſhort,

they are the only weavers in the country. Yet their husbands tyrannize over them, keep them in the greatest subjection, and occasionally make them attend behind their table as servants. The old reside with the young, to temper their impetuosity; and obedience to them is enforced as well by habit as by moral precepts. Moral maxims are inculcated by the aged to the younger offspring; and plain sentences of morality are hung up in the common room, where the male branches of the family assemble. A tablet of ancestry is in every house, and references in conversation are often made to their actions. By their periodical visits to the tombs of their forefathers, the most remote relations become collected and united. Even the most distant relative, if in ill health, or in misery, has a claim on his kindred for charitable assistance. This is the reason why no mendicants, nor spectacles of real distress are to be seen in China.

The presents, and baggage, which hitherto had come by water, were now to be conveyed by land to the emperor's autumnal palace. Such as were liable to receive damage by the jolting of vehicles without springs, were destined to be carried by men; and it was found, that about ninety Chinese waggons, forty hand-barrows, two hundred horses, and nearly three thousand labouring men, would be wanted for this employ. The ambassador, and three gentlemen of his suite, travelled in sedan chairs; the other gentlemen, and all the mandarins, on horseback. They were preceded by Chinese soldiers on foot, who cleared the way. His excellency's servants and guard were conveyed in waggons. The road to Pekin from Tong-choo-foo is perfectly level, the middle of which is paved with granite, bordered in many places with trees. On the road, and over a rivulet, is a handsome marble bridge, wide, substantial, and but little elevated, as the banks of the river are never overflowed. After taking a breakfast at a small village on the road, they arrived soon before the walls of the city of Pekin. The ambassador's arrival was notified by the firing of guns. Refreshments were prepared at a resting-place within the gate, over which was a watch-tower, having, in the different stories, port holes for cannon. Near the gate were extensive storehouses for depositing rice; and a lofty building, at no great distance, said to be an observatory, built in the reign of the emperor Yong-loo, to whom the city was indebted for its principal ornaments. A funeral procession was met in this street, which, from the white colour of the mourners, was taken for that of a wedding; but the lamentations of young men attending the corpse, inclosed in a square coffin, shaded by a gaudy painted canopy, soon undeceived the travellers. The female relatives followed, behind, in sedan chairs, covered with white cloth. Soon after, a nuptial procession offered itself to view, in which it would be as preposterous to appear in white, as it would in Europe to be dressed in black. The lady, whom the bridegroom had not yet seen, was carried in a gaudy chair, decorated with festoons of factitious flowers, attended by her relations, friends, and servants, supporting the paraphernalia, the only portion the Chinese give to a daughter in marriage.

The embassy halted a little while opposite the treble gates on the northern side of the palace wall, which encompassed a considerable space of ground. Besides a few Mahometan spectators, recognised by their red caps, were several women, natives of Tartary, or of Tartar extraction, whose feet were not distorted like those of the Chinese. Many of them were genteelly dressed, and of delicate features; but their complexions were assisted by art. The seat of beauty was upon the lower lip, in the middle of which was a thick patch of vermilion. Some of these ladies were in covered carriages, and others on horseback, riding astride like men. The embassy now crossed a street, situated north and south, in length four miles; and, in about two hours more, after having passed by several beautiful temples and other extensive buildings, it arrived at one of the western city gates, whence commence the suburbs; to traverse which took up twenty minutes. At length the embassy reached the villa intended for its reception, situated between the town of Hai-tien and Yuen-min-yuen. The buildings comprised several distinct pavilions, constructed round small courts, whose apartments were mostly embellished with landscapes done in fresco. The whole encircled about twelve acres of land, in which was a garden laid out with taste; a rivulet meandering round an island; a grove of trees with scattered grass plots of factitious mounds and cavities, and craggy artificial rocks rudely piled upon each other.

The governor of this palace, between whom and the ambassador the accustomed compliments of civility passed, agreed with his excellency, that the most advantageous mode of displaying the presents would be to place the most rare and curious on each side of the throne, in one of the halls of audience. The entrance to this hall, whose external appearance was magnificent, was through three quadrangular courts, encompassed by several detached buildings. It was a hundred feet in length, and forty in breadth, and in height about twenty; and erected upon a platform of granite. Two rows of large wooden columns, whose shafts were painted red and varnished, supported its projecting roof; and its capitals, besides other ornaments, were decorated with dragons, whose feet were armed with five claws. There was nothing left in the hall but the throne, except a few large jars of porcelain, and a musical clock, made early in the eighteenth century, by George Clarke, of Leadenhall-street, London. The throne was ascended by steps in the front and on each side; and above it were the Chinese characters of glory and perfection. Tripods, and vessels of incense, were placed on each side, and before it a small table, as an altar, for placing offerings of tea and fruit to the spirit of the absent emperor. Being the period of full moon, a festival with the followers of Fo, it was a day of sacrifice. Among the many names given to his imperial majesty by these idolaters, he has one which corresponds in sound, as well as in written characters, with that sometimes given in China to the Supreme Being: doubtless as an attribute of power residing in the person of the sovereign, whose dominion they consider as virtually extending over the whole world. Believing the majesty of the emperor to be ubiquitary, they sacrifice to him when absent; it cannot, therefore, be surprising they should pay adoration to him when present. The adoration, or ko-teou, consists in nine prostrations of the body, the forehead being made each time to touch the floor; which is not only a mark of the deepest humility and submission, but also implies a conviction of the power of him towards whom this veneration is made. These abject prosternations are required not only from the subjects and tributary princes of the empire, but also from all strangers, however exalted; and the legate urged the British ambassador to perform them before the throne. His excellency had previously received his Britannic majesty's instructions on this head, and was therefore prepared to answer the demand. He well knew the tenacity of the court in exacting ceremonies as degrading to one part as exalting to the other, and which rendered embassies singularly grateful to the imperial court. It was this haughty spirit which had induced the legate and colao to give orders to write, in Chinese characters, not only upon the flags of the Chinese yachts up the river Pei-ho, but likewise upon those which accompanied all the land carriages provided for the embassy, the words, "Ambassador bearing tribute from the country of England."

His excellency, considering that he might probably be supposed ignorant of the meaning of those characters, forbore to make any formal complaint; in which, in the first place, he augured no success; and, in the next, that it might be the cause of abruptly terminating the embassy. These characters, however, had attracted general notice;

notice; they were inserted in the court gazette; they would be recorded in the annals of the empire; and would find their way into Europe through the medium of the Russian residents, and the missionaries in the capital. The ambassador was therefore particularly on his guard with respect to any act of his own, which might lessen the dignity of his sovereign; and he had the example of a Russian ambassador who had refused to comply with the ceremony in question, until a regular promise had been made for its return in like manner to his sovereign. The Dutch, who, in the seventeenth century, had meanly submitted to every degrading ceremony in the hope of obtaining profitable commercial advantages, complained afterwards of being treated with neglect, and of being dismissed without experiencing the smallest mark of favour. In any point of view, therefore, it was most likely that the disposition of the Chinese, at that time, would refuse a return of favours for any sacrifice of dignity. The prejudices imbibed against the English on their first appearance at Canton; the effect of subsequent misrepresentations; and, to complete all, the recent circumstances of the Thibet war, notwithstanding the magnificence which every where accompanied the embassy, worked so strongly upon the minds of every Tartar chief, as to excite a mistrust that the English "were come to spy out the land," and intended ultimately to share with the Tartars themselves some portion of their ruling power.

The legate, who was not ignorant of the case of the Russian embassy, flattered himself of being more successful with the British ambassador, from whose kind disposition he had built upon unconditional compliance; and to his own efforts he added those of the mandarins, who were intimate with his excellency. These, however, were astonished when they heard that, for a similar act done by an European, Timagoras, in the character of ambassador to a powerful monarch of Persia, was condemned to suffer death by his countrymen, the Athenians, as soon as he returned home, for having degraded the nation who deputed him; that less acts of humiliation had, in modern times, been severely censured; the actions of men in a public capacity being looked upon as the acts of those whom they represent; and that ceremonies practised by subjects to their sovereigns, ought not to be exacted from the representatives of foreign princes. The point in question being of the utmost delicacy, the British ambassador was disposed to gratify the declared wishes of the emperor, as far as lay in his power, without insult to the dignity of his own sovereign. He did not, therefore, refuse to accede to the ceremony of prostration, but offered to perform the whole, on a condition which, while it did not abstract any personal respect from the emperor, removed the principal objection attached to it as an act of homage or dependence in his representative character. This condition was, "That a subject of his imperial majesty, of equal rank to his own, should perform, before the picture he had with him of his Britannic majesty, dressed in his robes of state, the same ceremonies that the ambassador should be directed to do before the Chinese throne." It was of the utmost moment that this proposal should be accurately translated and forwarded to the emperor, to avoid the possibility of misconception. The ambassadorial interpreter, though a native of China, was unacquainted with the language used at the court. The legate, taking advantage of this, and directing his views to unconditional compliance, resisted any agreement in writing, and was unwilling to afford assistance to the interpreter for that purpose. After repeated applications, some of the missionaries were introduced to his excellency, but with the utmost circumspection, and in presence of the legate and Portuguese jesuit, whom the emperor had raised to a higher dignity than any of his brethren. This man was inimical to the interests of Great Britain, and encouraged the legate to resist the request which the ambassador had made to remove to the capital, where he might more conveniently prepare for his journey to Zhe-hol; but the governor of the palace of Yuen-min-yuen, superior in power to the legate, interposed on the occasion, and the embassy was immediately ordered to take residence at a palace in the city of Pekin. Here, a Chinese Christian, qualified in all respects for the office of translator, undertook, privately, to write very explicitly the above conditions, though not without much risk on his part, in case it should be known to the legate; for it is a fact that a native of Canton had been formerly put to death, for only writing a petition for the English. Care, however, was taken in this case to prevent detection. The translation was copied fair, and the original rough draught destroyed in the translator's presence.

This memorial of his excellency was addressed to Ho-choong-taung, colao, first minister of the empire, and represented, that "his majesty the king of Great Britain, in sending an embassy to the emperor of China, fully intended to give the strongest testimony of particular esteem and veneration for his imperial majesty; that the ambassador entrusted to convey such sentiments, was earnestly desirous of fulfilling that object of his mission with zeal and effect; that he was ready, likewise, to conform to every exterior ceremony practised by his imperial majesty's subjects, and by the tributary princes attending at his court, not only to avoid the confusion of novelty, but, in order to shew, by his example in behalf of one of the greatest, as well as most distant, nations on the globe, the high and just sense universally entertained of his imperial majesty's dignity and transcendent virtues; that the ambassador had determined to act in that manner without hesitation or difficulty, on this condition only, of which he flattered himself his imperial majesty would immediately perceive the necessity, and have the goodness to accede to it, by giving such directions as should be the means of preventing the ambassador from suffering by his devotion to his imperial majesty in this instance; for the ambassador would certainly suffer heavily, if his conduct, on this occasion, could be construed as in any wise unbecoming the great and exalted rank which his master, whom he represented, held among the independent sovereigns of the world; and this danger could be easily avoided, and the satisfaction be general on all sides, by his imperial majesty's order that one of the officers of his court, equal with the ambassador in rank, should perform before his Britannic majesty's picture at large, in his royal robes, and then in the ambassador's possession at Pekin, the same ceremonies which should be performed by the ambassador before the throne of his imperial majesty." This paper was shewn to the legate, who appeared to approve its contents, and undertook to forward it to the emperor, whose acquiescence was little doubted. In this persuasion, the articles destined for Zhe-hol were brought back to Pekin, among which were six neat brass field-pieces, on light carriages. His excellency had them tried by the artillery men, previous to their exhibiting before his imperial majesty, and they were fired several times in a minute. This celerity in military manoeuvres was disrelished by the legate, who affected to say, that the imperial army was equally as expert. He countermanded the orders respecting these field-pieces, which before were destined for Zhe-hol, but now to remain at Pekin. The few barrels of gunpowder, intended for salutes, and the musquetry of the ambassador's guard, were both become objects of suspicion, and were desired to be given up. The request was immediately complied with as a matter of indifference. In short, the whole tenor of the legate's conduct displayed a mind agitated by alarm and distrust, and lest the Chinese should attribute superior prowess to the English nation. Even in a display of the presents, to gratify curiosity, he was so illiberal as to suppress the least emotion of approbation.

In the thirteenth century, the commencement of the first Tartar dynasty, a new plan was laid down for dividing the city of Pekin into two parts; when that designed

signed for the principal capital was called *the Tartar city*. It has a parallelogramic form; and the four walls, which front the four cardinal points, include an area of about fourteen square miles, of which the palace, situated in the centre, comprises, within its yellow walls, at least one square mile. The whole is computed to be one-third larger than London. The other part, called *the Chinese city*, by way of distinction, contains about nine square miles, the major part of which is not occupied by buildings. Upon that part of it which is in cultivation is constructed the *sien-nong-tang*, or eminence venerable for agriculture, on which the emperor sacrifices previous to ploughing and sowing the grain, as described above.

The ambassador, and most of his suite, set out from Pekin for Zhe-hol, on the 2d of September 1793, accompanied by the usual number of Chinese. His excellency travelled in an English post-chaise, in which he occasionally accommodated some of the mandarins. At first they were under great apprehensions for its over-turning; but their fears soon subsided, and gained it a decided preference over their clumsy carriages. Accommodations were previously ordered at the same palaces along the road, where his imperial majesty had stopped in his way to Zhe-hol. The land, as they passed, seemed to be highly cultivated; and its produce generally the same as on the other side of the city. One field, adjoining the road, attracted particular notice; as, from its regularity, it seemed to have been planted with a species of the polygonum. The leaves, being macerated and prepared like those of the indigo plant, imparted a dye of a blue colour, equal, or nearly so, to that produced from indigo. It was said likewise that a dye of a green colour was extracted from the buds and tender leaves of a species of the colutea; that carmine was seldom used, as their finest red was drawn from the carthamus; and that the cups of the acorn afforded a dye of a black colour.

Early in the first day's journey a river was crossed, which, though narrow, was navigable for boats. The course of this, and of the others in this tract, was to the south-east. Goods of various kinds are brought down these rivers from the borders of Tartary; and furs, the richest of its produce, as well as charcoal, the chief fuel for culinary purposes at Pekin, are conveyed thence upon the backs of dromedaries, animals which are fleeter and stronger than camels. Sheep were descried grazing upon the plains, having short fleshy tails, in high estimation among Chinese epicures. Having advanced about twenty miles in the country, the soil, in lieu of rich loam which they had hitherto seen, now put on a sandy and more barren appearance. A few miles farther the embassy reached the palace which completed their first day's tour. It was situated at the bottom of a gentle hill, encompassed with a park and pleasure-grounds. In its neighbourhood were some mineral springs, said to be occasionally resorted to by the emperor, and thence called his baths.

During their progress on the second and third days, the travellers observed several plantations of tobacco upon the low grounds. This article in the West Indies is cured in extensive buildings, here principally in the open air. It is hung upon cords to dry, under little apprehensions of its leaves being injured by rain. Smoking is not only very prevalent with both sexes here, but this custom extends even to girls of nine or ten years old. The smoke of the tobacco is inhaled through bamboo tubes. Its powder, too, is taken as snuff, as is likewise pulverised cinnabar; and opium and odoriferous gums are sometimes made use of for smoking. Approaching the confines of Tartary, there was a perceptible assimilation of manners between the Chinese and Tartars, which at Pekin were strikingly opposite. The principal discrimination of the Tartar women here, consisted in the size of their feet. Both wore natural and artificial flowers in their head-dresses. This decoration is neither neglected by the poor, nor abandoned by the old; and flowers are purposely cultivated for dress by persons who have no other occupation. Many of these gardeners, from attention and experience, have discovered methods of heightening the beauty, and increasing the fragrancy, of the anemone, the peony, the matricaria, and many other flowers.

On the morning of the fourth day the travellers came in sight of what will ever continue to be the wonder and admiration of ages, the great wall of China. The road which led to it was by a steep ascent, which carried the embassy to the southern gate, thrown across the road, where it passed over the summit of a range of hills, inaccessible almost in every part. Along this it ran through a narrow pass to a military post situated at its extremity. Here, as well as at other posts, are placed small bodies of troops, who turned out as the embassy passed. A loo was beat by a man at the top of a tower, while another fired a salute of three cannon, placed vertically in the ground. The embassy passing soon after through a gate, nearer to the Tartar boundary, arrived at Koo-pe-koo, where the strong garrison resides, destined for the defence of this part of the outer wall. Concentric works, united with the main wall, inclose the fortress. At this northern border of China Proper, the ambassador received military honours. The troops were drawn up in two lines, facing inwards. A captain was at the head of each of the companies, with the standard, and five camp colours. Mandarins were on each side of the lane, formed by two lines; then music, tents, and trumpets; triumphal gates; on each side twelve companies in succession; and lastly, ten field-pieces. Each of the companies was drawn up in the following order:

	The leader, usually a bowman;	
	the standards;	
one sword,	five small colours;	one sword,
and	matchlocks and swordsmen,	and
swordsmen,	in numbers nearly equal,	swordsmen,
five deep.	five deep.	five deep.

The whole number amounted to about twelve hundred men; and the space between the companies was about seven yards, nearly equal to the extent of their front. The embassy had hardly passed the Chinese wall, when a Tartar, one of the attendants, being ordered to be punished by some of the Chinese mandarins, for misbehaviour, the man made a vigorous resistance, and exclaimed, in a loud voice, that no Chinese had a right to inflict punishment on a Tartar after having passed the great wall. An instance of claimed or affected superiority of the Tartar chiefs over Chinese, of equal rank, occurred also on his excellency's arrival at the next stage; where, receiving a complimentary visit from a Tartar military mandarin, Van-ta-zhin scarcely ventured to sit down in his presence.

On this side of the wall the season appeared to have undergone a sudden change. The air was much cooler, the mountains were either bare or thinly scattered with verdure, the pine-trees were stunted, the oak, aspin, elm, and walnut, trees, diminished in size, and the woods, inhabited by wolves, bears, and tigers, little better than thorny shrubs. Hares, remarked for the length and spread of their feet and toes, many of which had white furs, were not hunted by dogs, but driven into snares by men. The peasants of this part, like those about Swisserland and the Alps, are subject to a swelling in the glands of the neck, called *goitres*, or *craws*, supposed to be superinduced by the frequent use of snow water. In the seventh or last day's journey, the ridges of the mountains, containing immense rocks of granite, ran nearly parallel to the road. Between the upper ridge and bottom of the valley was descried a perpendicular rock or antique ruin, of a very singular appearance, two hundred feet high, of an irregular form, or rather of that of an inverted pyramid, having tall shrubs growing upon its surface. The cool temperature of the atmosphere is considerably increased by the relative elevation of this part of the country; it having been ascertained, that the ascent into Tartary is at least five thousand

A Sketch of the Chinese Wall, Military Post and Guard. Watch Tower and Pagoda

fand yards above the furface of the Yellow Sea. At a fmall diftance from the towering rock above defcribed, through a recefs of mountains, the valley of Zhe-hol, the fummer retreat of his imperial majefty, opened to view. The embaffy proceeded in due order to Zhe-hol, was received there with military honours, and conducted to a fuite of edifices, connected to each other by fteps of granite. They were fpacious and convenient, commanding a view of the town, and part of the emperor's park. The imperial garden, the palaces, and the temples, fituated immediately beyond the town, exhibited at once a pleafing fcene of grandeur and magnificence.

Soon after the ambaffador's arrival, he was vifited by two mandarins of rank, with polite greetings from his imperial majefty; and by another mandarin on the part of the great colao or prime minifter, Ho-choong-taung. The legate called the fame day, and, without offering the fmalleft apology, delivered back to his excellency, open, the memorial refpecting the ceremony of reception, which had been entrufted to him fealed, under the promife of tranfmitting it to Ho-choong-taung. The legate infinuated that he had kept the memorial in his own poffeffion, though it was a known fact it had been forwarded to Zhe-hol, and its contents approved. This change of fentiment was fuppofed to have been effected at the inftigation of the viceroy of Canton, recently arrived at Zhe-hol from Thibet, where he had commanded the Chinefe troops. He was a declared enemy to the Englifh, and reprefented them as a reftlefs, enterprifing, and dangerous, people. The colao was induced to believe it defirable, that the homage of vaffals to the emperor fhould be performed by the ambaffador, without any return of the independence of his own fovereign. Upon this ground, his excellency's memorial to the court was not to be avowed, and, of courfe, no anfwer returned; and a firm opinion was entertained, that when the ambaffador fhould be introduced into the prefence of the emperor, he could not avoid making the accuftomed profternations without annexing any condition. Before his excellency, then, fhould make his appearance at the palace, it became indifpenfably neceffary to have an eclairciffement of the bufinefs. The colao, indeed, had requefted an immediate conference with the ambaffador, to learn the purport of his majefty's letter to the emperor. But, independent of indifpofition, other motives would have induced him to decline the vifit; and it was determined that fir George Staunton, fecretary to the embaffy, fhould be fent in his ftead, with a copy of the king's letter, and the memorial returned by the legate. As by the etiquette of the Chinefe court, no fecretary can hold converfe with the prime minifter, nor even fit down in his prefence, recourfe was had to the commiffion of minifter plenipotentiary, granted to the fecretary, in cafe of abfence or indifpofition of the ambaffador; and in this character he waited on the colao. This vizier of China had been raifed, about twenty years before, from an obfcure birth, and from the humble ftation of one of the guards of the palace gates, to the dignified ftation which, under the emperor, delegated to him the whole power of the empire. On entering the audience-room, the colao was found fitting upon a platform covered with filk, between two Tartar and two Chinefe mandarins of ftate. A chair was brought for the Englifh minifter, but the legate, and feveral other mandarins, and the interpreter, ftood the whole time. The colao having formally demanded the object of the Britifh embaffy to China, he was referred to his majefty's letter to the emperor, a Chinefe copy of which was handed to him, and read. It commenced with complimenting the emperor of China, by ftating, that "the natural difpofition of a great and benevolent fovereign, fuch as his imperial majefty, whom Providence had feated upon the throne for the good of mankind, was to watch over the peace and fecurity of his dominions; and to take pains for diffeminating happinefs, virtue, and knowledge, among his fubjects; extending the fame beneficence, with all the peaceful arts, as far as he was able, to the whole human race." That his Britannic majefty, "impreffed with fuch fentiments, from the very beginning of his reign, when he found his people engaged in war, had granted to his enemies, after obtaining victories over them in the four quarters of the world, the bleffings of peace, upon the moft equitable conditions:" that, "fince that period, not fatisfied with promoting the profperity of his own fubjects in every refpect, and beyond the example of all former times, he had taken various opportunities of fitting out fhips, and fending in them fome of the moft wife and learned of his own people, for the difcovery of diftant and unknown regions; not for the purpofe of conqueft, or of enlarging his dominions, which were already fufficiently extenfive for all his wifhes, nor for the purpofe of acquiring wealth, nor even for favouring the commerce of his fubjects; but for the fake of encreafing the knowledge of the habitable globe, of finding out the various productions of the earth; and for communicating the arts and comforts of life to thofe parts, where they had hitherto been little known: and," that "he had fince fent veffels, with animals and vegetables moft ufeful to man, to iflands and places where, it appeared, they had been wanting:" that "he had been ftill more anxious to enquire into the arts and manners of countries, where civilization had been improved by the wife ordinances and virtuous examples of their fovereigns, through a long feries of ages; and felt, above all, an ardent wifh to become acquainted with thofe celebrated inftitutions of his Chinefe majefty's populous and extenfive empire, which had carried its profperity to fuch a height, as to be the admiration of all furrounding nations." That "his Britannic majefty being then at peace with all the world, no time could be fo propitious for extending the bounds of friendfhip and benevolence, and for propofing to communicate and receive the benefits which muft refult from an unreferved and amicable intercourfe between fuch great and civilized nations as China and Great Britain." With this letter the colao feemed highly gratified: upon which fir George Staunton laid before him the ambaffador's memorial; of which, however, he affected to be ignorant, although he was prepared to make objections to the propofal it contained; which objections being anfwered in a manner that had been pointed out by his excellency, the conference ended in the wifh, that the colao's reafons might be communicated to the ambaffador, for his future confideration.

The next day, the legate and two other mandarins paid an official vifit to the ambaffador, on the part of the colao, and preffed him to give up the point in queftion. They reprefented the proftration as a fimple unmeaning ceremony, when done towards the emperor, but a fimilar one towards his Britannic majefty as of the moft ferious import; and as hints of perfonal inconvenience were thrown out, in default of unconditional compliance, his excellency took that opportunity of declaring, how much his fenfe of duty to his fovereign exceeded his fenfe of danger; that there muft either be a reciprocity of ceremony, or that fome ftriking characteriftic fhould be eftablifhed whereby to diftinguifh between a compliment paid on the part of a great independent fovereign, and the homage performed by tributary princes; efpecially as already it had been endeavoured to confound them by giving the name of *tribute* to the Britifh prefents, as appeared by the infcriptions placed upon the flags by the Chinefe. Not being, perhaps, aware that this circumftance was known to the ambaffador, they were forced to admit the propriety of the propofal; and they afked, how far confiftent with his duty, and in what manner, different from that of the vaffals, he could teftify his perfonal refpect to his imperial majefty? His excellency replied, that on approaching his own fovereign, to whom he was bound by every bond of allegiance and attachment, he bent upon one knee; and that he was willing

to comply with the same form, to demonstrate his respectful sentiments towards his imperial majesty. This proposition seemed perfectly satisfactory to the mandarins, who promised to return soon with the court's determination. In the interim, it became a matter of surprise at Zhe-hol, how a few solitary strangers, at the mercy of a foreign court, should have the presumption to offer to it conditions, or the intrepidity to refuse to it obedience. They were to be sent back without audience, and no attention paid to their complaints. It was at that moment, however, necessary to complain of the paucity of provisions, which neglect was instantly redressed, and supplies in future abundantly furnished. Intimation was also given to the ambassador, that his imperial majesty would accept of the same form of respectful obedience from the English, which they were accustomed to pay to their own sovereign. It was also notified, in form, that the reception of the embassy by the emperor of China, should take place on the 14th of September, three days prior to his birthday. In the interim very flattering messages were conveyed to his excellency, expressive of the great satisfaction which the presents gave to his imperial majesty.

In a private visit which the ambassador afterwards made to the colao, he was received with unreservedness and affability, and with proper attention to his rank and character. In the course of conversation, his excellency was desirous of impressing the colao with a full conviction of the ingenuousness of the past conduct, and the purity of the future intentions of his Britannic majesty towards China. He persisted in the pacific and beneficent maxims of his government, whose chief object was the extension of commerce for universal benefit; and he slightly touched, as incidental matter, on the affairs of the tributary princes; on the dissolution of the Mogul empire of Hindoostan, in whose contests, though they claimed protection of the neighbouring countries, the English did not interfere. The colao, however, afforded not the least opening for a particular disavowal of having lent assistance to the rajah of Napaul against the people of Thibet. His excellency also, being no stranger to the haughty notions entertained by the Chinese of their being independent in point of commerce, and that every such transaction with foreigners was by them considered as a courtesy, was far from insinuating that they could be advantaged in a mutual interchange of commodities; in the supply of cotton or rice from India, of bullion, or lastly, by the aid of a naval force to exterminate the swarm of pirates from their coasts. The ambassador was not averse to their considering a commercial intercourse as a condescention on their part, and offered to treat on those terms. The colao observed hereupon, that they should have frequent opportunities of conversing upon this subject, during his excellency's abode in China. Ho-choong-taung, besides being a finished statesman, was of refined manners, and of deep penetration. The favour of his sovereign called him to his high office and power, and the approving voice of persons of rank and influence maintained him in it. He was rendered still more secure in its possession by a matrimonial tie, his son being married to a daughter of the emperor; for princes, in Asiatic governments, often intermarry with their subjects. This connection, however, alarmed some of the imperial family, and other loyal subjects, who saw no bounds to this favourite's ambition, inasmuch as the established principles of that government leave the succession to the choice of the reigning prince, who, in lieu of its descending by primogeniture, may exclude, as has already been noticed, even his own offspring and family. A man, over zealous, was punished capitally, by the emperor, for daring, in a memorial, to advise his imperial majesty to proclaim his successor, in order to avoid future dissentions.

The emperor was accompanied by most of his family on the day of the ambassador's presentation, the scene of which was in the garden of the palace of Zhe-hol. The emperor's magnificent tent was placed in the middle of the garden, and within it was a throne. Immediately behind this tent was another, of an oblong form, having a sopha in it at one extremity, for the emperor to retire to occasionally. In the front were several small round tents; and one for the accommodation of the embassy till his imperial majesty should arrive; others for that of the tributary princes of Tartary, and delegates from tributary states, who generally come to Zhe-hol, to be present at the celebration of the birthday, but who attended now to dignify the ambassador's reception. The representative of the king of Great Britain was to be received by his imperial majesty in his large state tent, seated upon his throne. As a compliment to the British embassy, the emperor permitted his courtiers to appear dressed in English cloth in lieu of silk and fur. The princes wore the transparent red button, marking the highest of the nine orders, as fixed by the present emperor. No person appeared who was inferior to the second rank in the state, the characteristic of which is, the opaque red button. There are three classes of another kind of dignity, which consist of peacock's feathers fixed in agate tubes, worn pendent from the bonnet; and he who had been honoured with three feathers, doubtless thought himself thrice happy. In compliance with the etiquette of the court, which is to be a long time in waiting, the embassy assembled by the dawn of day; but many of the courtiers had remained all night in the garden.

The emperor's approach was notified, soon after day-light, by instruments of music. His imperial majesty was preceded by persons loudly proclaiming his virtues and his power. He was borne by sixteen men in a triumphal chair, followed by his guards, officers of the houshold, standard and umbrella bearers, and a band of music. He entered his tent, and ascending a few steps, seated himself upon the throne. The colao, and two officers of his houshold were next him, and knelt whenever they addressed him. The princes of the family, the tributary princes, and officers of state, having taken their respective stations in the tent, the president of the tribunal of rites conducted the ambassador, attended by his page and interpreter, the minister plenipotentiary being also present, near the foot of the throne, on the left hand side, which is the place of honour. The other gentlemen of the embassy, many mandarins and officers of various ranks, were placed at the great opening of the tent, where every thing that passed could be observed.

His excellency the earl of Macartney appeared in a suit of velvet richly embroidered, decorated with a diamond badge and star, the order of the Bath, and over this, a long mantle of the same order. The minister plenipotentiary, sir George Staunton, being an honorary doctor of laws, of the university of Oxford, was habited in the scarlet gown of that degree. The ambassador, pursuant to instructions received from the president of the ceremonies, held the large, magnificent, square gold box, embellished with jewels, containing his majesty's letter to the emperor, between both hands raised above his head, then mounting the steps which led to the throne, and bending upon one knee, presented the box with a suitable address to his imperial majesty, who receiving it graciously with his own hands, put it by his side, and expressed "the satisfaction he felt at the testimony which his Britannic majesty gave to him of his esteem and good will, in sending him an embassy, with a letter and rare presents; that he, on his part entertained sentiments of the same kind towards the sovereign of Great Britain, and hoped that harmony would always be maintained among their respective subjects."

The person of the emperor was described as being about five feet ten inches high, of a well proportioned form, with regular features; and, though he had just completed his eighty-third year, he discovered not the decrepitude of age. He was affable in his deportment, displaying

TCHIEN LUNG, EMPEROR OF CHINA

who gave Audience to the British Embassy in 1793

displaying the dignity of the prince in the superior manners of the man. His habit was a robe of dark purple silk, with a cap of black velvet, surmounted with a red ball, and ornamented with a large pearl in the front; his boots were of silk embroidered with gold; his under garment was of yellow silk; a blue silk sash or girdle was tied round his waste, and a string of pearl beads were suspended from his neck; on his breast he wore a tablet of yellow sattin, on which was beautifully wrought a figure or crest of the five-clawed dragon, which, like the lion in Great Britain, is made the emblematic guardian of the Chinese throne. The portrait of the emperor, done by Mr. Alexander, draftsman to the embassy, and published as a frontispiece to sir George Staunton's magnificent work, is said to have been taken under unfavourable circumstances. Sir George remarks, "that to render the portrait more correct, it might have been proper to draw the eye more full and clear, and the countenance more open and cheerful. Such at least it was during the interview with the ambassador, which was prolonged by the necessity of interpreting whatever was said by either party."

The dignified and splendid manner in which the embassy was received, influenced the minds of the Chinese, and induced them to believe that the government was about to make a change of measures favourable to the English. Ambassadors were not usually received by the emperor upon his throne; nor were their credentials delivered into his hands, but ordinarily into those of his ministers. The first present which the emperor of China made in return, to his Britannic majesty, was a jewel or precious stone, more than twelve inches long, highly valued by the Chinese. It was carved into the similitude of a Chinese sceptre, in the form of that which is always placed upon the imperial throne, allusive of peace and plenty. The ambassador, in compliance with the Chinese etiquette, and also the minister plenipotentiary, respectfully offered presents, in their turn, on their own behalf; which his imperial majesty vouchsafed to receive, and gave others in return. Adverting to the inconveniency of having recourse to an interpreter to explain whatever passed during the interview, his imperial majesty asked the colao, if there were any persons in the embassy acquainted with the Chinese language; and being told that the ambassador's page, master George Staunton, a youth then in his thirteenth year, was the only one who had made any proficiency in it, the emperor desired he might be brought up to him; and he asked him to speak Chinese. His imperial majesty was so pleased with the converse and elegant manners of this accomplished young gentleman, that he took from his girdle his areca-nut purse, which hung to it, and presented it to him with his own hand. It was of plain yellow silk, and had the figure of the five-clawed dragon, and some Tartar characters wrought upon it.

At the conclusion of these ceremonies, were brought up to the emperor, at the right hand of the throne, several Hindoo ambassadors from Pegu, and Mahometans from the vicinity of the Caspian Sea, who, when they had repeated nine solemn prostrations, were speedily dismissed. After this, the English ambassador, and the three personages accompanying him, were conducted to the left hand of his imperial majesty, and seated upon cushions. The princes of the imperial family, the chief Tartar tributaries, and the highest officers of the court, were seated according to rank, nearer to or more remote from the throne, before which was placed a table for his imperial majesty; and one table was likewise laid for every two guests. When all were seated, the tables were uncovered, and displayed a splendid banquet. Various kinds of viands and different sorts of fruit were served up in bowls, piled pyramidally one above another. Tea was also introduced. During the repast, every bowl or cup handed to the emperor was taken with hands raised above the head, as had been done by the ambassador when he presented the gold box. Much silence and great solemnity, verging on religious awe, were observed during the whole of this business. Yet his imperial majesty's attention to his European guests was remarkably conspicuous. By his order, several dishes were handed to them from his own table; and, when the repast was finished, he sent for them, and gave them, with his own hand, a goblet of warm Chinese wine. Inquiring of the ambassador how old his own sovereign was, he cordially wished, in answer, that he might attain to his years, which then amounted to eighty-three, in a perfect enjoyment of health. The festival being concluded, he descended from the throne, and walked firm and erect to the open chair which was in waiting, and which conveyed him back to his palace with the same solemnity in which he came.

A short time after, the ambassador received from his imperial majesty, presents of silk, porcelain, and teas for himself and all the gentlemen of his suite. Some rare white grapes, more oblong in form than the Spanish olives, and about their size, were mixed with the occasional presents of fruit. At or after the customary visits, between superiors and inferiors in China, an interchange of presents takes place; but those from the former are bestowed as donations, while the latter are received as offerings: these being the Chinese terms for such presents as pass between the emperor and foreign princes. But among the many instances of civility and politeness on the part of the emperor, was an invitation to the ambassador and suite to visit the gardens and pleasure grounds of Zhehol. This, like many other transactions at the imperial court, began early in the morning. In going thither they met the emperor, who, after being greeted by the ambassador, informed him, he was proceeding to his devotions in the temple of Poo-ta-la; that, as they did not adore the same gods, he should forbear to solicit his excellency to join him; but that he had given directions to his ministers to accompany him through the gardens.

His excellency was not less surprised than pleased to find that Ho-choong-taung, the prime minister, had been ordered for this purpose, in the hope that it might afford a favourable opportunity of contracting an intimacy, and of resuming the topic which was the chief object of his mission. But this pleasurable idea was soon repressed by the appearance of the Thibet general, who joined the colao, as if he dreaded the ambassador's gaining any ascendency over him, or that any explanation might take place between them relative to the Thibet war, or concerning any other subject interesting to Great Britain. The general's brother, and another chieftain of rank, were also present. His excellency and suite were conducted by them through a vast inclosure of pleasure grounds, forming a portion only of the extensive gardens; the remainder, appropriated for the use of the female part of the imperial family, was inaccessible to these ministers as well as to the English. Riding through a verdant vale, in which were willows whose trunks were of vast magnitude, they arrived at a lake, upon which they sailed in yachts till they could proceed no farther for a bridge. The spreading leaves and fragrant flowers of the lien-wha, a species of lily, covered the surface of the water.

Near the borders of the lake were several small palaces. In each was a public hall, having a throne in the middle, and a few side rooms chiefly furnished with European works of art, and rare natural productions of Tartary. Upon a marble pedestal, placed in one of the pavilions upon the lake, was an agate of unique beauty and size, which, by art, is made to represent a landscape; it is four feet long, upon which is cut a copy of verses composed by his imperial majesty. Various kinds of quadrupeds and birds were discovered in the gardens, but no menagerie of wild beasts. There were also uncommonly large varieties of gold and silver fishes sporting in ponds of clear water, whose beds were covered with

with agate, jasper, and other precious stones. The walks were not covered with gravel, nor were the grounds enriched by belts of trees, nor clumps of shrubs; art had lent but little assistance to nature in the distribution of its objects. One of the curiosities, reported to be in the garden of Zhe-hol, was inadmissible to the party, *the town in miniature*; being inclosed within those limits set apart for the ladies of the palace. It is said, by a missionary, to be an exact representation of the transactions of common life; as well as the bustle and confusion of the capital. The same missionary, in quality of artist, had been engaged in the embellishment of a similar work, in the ladies' garden at Yuen-min-yuen. Something of this kind is just finished in one of the imperial palaces of Petersburg.

The general deportment of the colao, during the excursion through the gardens, was that of an experienced courtier; his politeness and attention to the ambassador were unremitting. The other minister was affable and courteous; but the manners of his brother, the general, were formal and ungracious; nor was it in the power of the ambassador, by flattering his talents as a warrior, to dissipate his ill humour. The prime minister, in the course of conversation, mentioning the arrival of the Lion and Hindoostan at Chu-san, his excellency seized that opportunity of requesting that captain Mackintosh might now be permitted to join his ship, having paid his obeisance to the emperor; but the Thibet general, who kept close to the colao, immediately interposed and exclaimed, "It was highly impolitic to suffer him to traverse the Chinese dominions." Nothing decisive was therefore determined on for the present; but the ambassador pressed the colao to give him an opportunity hereafter of renewing the subject. Ho-choong-taung, from the multiplicity of state business, and the great fatigue of that day's exercise, was taken ill, and he sent to request the ambassador would allow his English physician to visit him. Doctor Gillan followed the messenger to the colao's house, where some of the faculty were assembled. Tea, fruit, and sweetmeats, followed the first ceremonies of introduction; when these were removed, the patient presented first his right arm, then his left; and the doctor, to comply, in some degree, with the prejudices of the country, and that he might give no offence either to the patient or his physicians, very gravely felt the pulse of both arms, and for some continuance. He told them, however, that Europeans did not deem it at all necessary to feel the pulse in different parts, as they well knew that the pulsation was simultaneous in every part of the body; which doctrine being new, and as amazing to the physicians as to the colao himself, he applied the fore finger of the colao's right hand to the left temporal artery, and the same finger of his left hand to the right ankle, when, to his utter astonishment, he found the pulse beat at the same instant of time at each part. By the answers to the questions which doctor Gillan put to him, he found two distinct complaints, rheumatism and hernia. The doctor's explanation of the nature of the disorders, and proposed method of cure, were put down in writing; the colao was perfectly satisfied with the doctor's ideas, and made him a present of a piece of silk.

As no interview could be obtained with the colao for some time, notwithstanding he was soon eased of his rheumatic pains, the ambassador determined to write to him on the subject of captain Mackintosh, to request leave for his speedy departure to rejoin his ship at Chu-san; and, as no Chinese could be found hardy enough to carry a letter, without leave, from the legate, (who had just been degraded by the emperor for not going on-board the Lion with the two mandarins, Van-ta-zhin and Chow-ta-zhin, and now wore in his bonnet the opaque white, instead of the transparent blue button, and, pendent from his cap, a crow's tail feather instead of a peacock's, though he still retained his authority and offices, being protected by Ho-choong-taung,) the interpreter to the embassy, not without great risk, and much personal insult from the rabble on the road, undertook the business, and put the letter in a proper channel for its speedy delivery.

The ambassador and his suite were called before sunrise, on the morning of the 17th of September, to be present at the celebration of the emperor's birth-day, a festival which lasted many days, though the feast appeared to be calculated for rendering solemn and devout homage to the supreme majesty of the emperor. The ceremonial passed in a vast hall, in which were assembled the princes, tributaries, ambassadors, great officers of state, and principal mandarins. To the sound of cylindric bells, suspended in a line from ornamented frames of wood, and gradually diminishing in size; and also to that of triangular pieces of metal, placed in the same order as the bells, as well as to the music of various other instruments, a slow and solemn hymn was sung by eunuchs. During the chaunting of this encomiastic song, which, accompanied by the music, produced a grand effect; at particular signals, nine times repeated, every person present prostrated himself nine times, except the ambassador and his suite, who made only one profound obeisance. He to whom this awful act of adoration was made, the emperor, kept himself the whole time invisible. The influence intended to be wrought upon the minds of men by this veneration of a human being, was not to be effaced by an immediate succession of sport or merriment: scenes of this kind were deferred till the morrow. In the mean time the ambassador, accompanied by Sun-ta-zhin, a Tartar chief, lately promoted to the rank of colao, visited, among other places, the grand temple of Poo-ta-la, comprising one prodigiously large, and several small, fabrics. The principal was a grand cathedral of a square form, each of whose sides was two hundred feet. It contained eleven rows of windows, one above another, having as many ranges of apartments. The front was plain and uniform, but well finished. The apartments of the quadrangle were united together by a spacious corridor below, and an open gallery above. A space railed off in the middle of the chapel, raised above the floor, presented three altars superbly decorated, and three colossean statues of Fo, his wife, and child; and, in an obscure recess, at the back of these altars was the sacred tabernacle, with a single glimmering light, as if intended to impress the mind with religious awe. No less than eight hundred lamas, or priests, were attached to this temple, some of them from their infancy; but all officiated in the exterior ceremonies of religion, which greatly contributed to its magnificence.

The next day, upon the lawn before the emperor's great tent, were exhibited a variety of entertainments; and his imperial majesty, surrounded by his court, cheered them with his presence. The amusements were entirely Chinese; and every person who excelled in any particular talent, whether for strength, dexterity, or in the performance of any extraordinary feat of agility, were assembled on the occasion, in the presence of innumerable spectators. Some were famous in the art of balancing; others at legerdemain, tumbling, wrestling, dancing, and various other exercises. There was also some vocal, and a great variety of instrumental, music. After the musicians, were performed fancied ballets, by many hundred persons, habited in tunics; in which such Chinese characters were represented as, discovered by the aid of lights in translucent lanterns of various colours, reflected much commendation on his imperial majesty. After the ballets, various kinds of fire-works were launched off, which displayed great skill in the pyrotechnic art. Several of the conceits were new to the English spectators, among which was the following: A large box being sent up high in the air, its bottom seemed accidentally to drop out, from which aperture issued a vast number of papers wrapped up in a flat form. These papers unfolded themselves from each other by degrees, and were transformed

formed into regular lanterns, in each of which a burning light was suddenly perceived, whose flame was vivid and beautifully coloured; effected without any communication from without which could produce the flame that was within. But what was most extraordinary, this devolution and developement were reiterated, with a change of figure every time, as well as a change of colours. Smaller correspondent boxes were affixed to each side of the large one, which unclosed in the same way, and exposed to view a kind of net-work of fire, with partitions of various forms that glittered like burnished copper; and, with every gust of wind, produced coruscant flashes resembling lightning. The whole concluded with a volcanic eruption of artificial fire, in the grandest stile imaginable.

A select party was invited to a pantomimic entertainment in the theatre belonging to the ladies of the palace; a small handsome building, three stories high, situated between their pleasure-grounds and the emperor's garden. It contained three open stages, one above another. The guests, among which were the ambassador and a part of his suite, sat in deep boxes, opposite the lowest stage; over them were the ladies, in latticed galleries, who could see what was doing upon any of the stages, though they were invisible to all. It appeared that the emperor was willing to gratify their curiosity with the sight of one belonging to the embassy, the page, master Staunton, being conducted out of the ambassador's box, by a eunuch, upon a platform within view of the ladies. The actors, who were numerous, and filled the three stages, instead of appearing in the human shape, assumed the likeness not only of animals, but likewise of a variety of inanimate productions of both sea and land; intended, perhaps, to represent an epitome of the world. The pantomime was divided into several acts, and lasted a considerable part of the afternoon. During the performance, the emperor called the ambassador to him, and said, "It was only on particular occasions, like the present, that he assisted at such spectacles; the care of watching over the safety of his people, and enacting laws for their welfare, necessarily demanded every moment of his time."

Notwithstanding this unremitting attention to the public weal, his imperial majesty had found leisure to cultivate some of the polite arts. He had written poems, something like the epics of Voltaire, which shewed taste and fancy. A few stanzas were consigned to the ambassador for his majesty, as were some rare gems, highly prized from having been eight centuries in the family; and they were presented as a pledge of perpetual friendship. It had been the custom of the emperor, after the celebration of his birth-day, to follow the great chase of wild beasts in the forests of Tartary; but this sport was now declined on account of his advanced age. He generally passed the summer in his Tartar, and the winter in his Chinese, territories; and, as his imperial majesty had resolved on a speedy return to Pekin, it was settled that the ambassador should leave Zhe-hol before him. Previous to his excellency's departure for Pekin, he received an answer from the colao to his letter, signifying that the Hindoostan should be allowed to sell goods and purchase a cargo at Chu-san, under the protection of the mandarins, who should take care that the natives did not exact; and that, as she had come from Europe chiefly laden with presents for the emperor, no duties should be taken on her return; but that captain Mackintosh could not be allowed to join his ship. This disappointment was, doubtless, owing to the illiberality and unfriendliness of the Thibet general.

The embassy returned to Pekin on the evening of the 26th of September, to the inexpressible joy of such of their fellow-travellers as had necessarily been left at that place, and who had remained ever since immured in a state of little better than actual captivity. Some of the missionaries, in the first days, had paid them occasional visits; but this friendly intercourse arousing the jealousy of the Chinese, they were ordered to be discontinued, and the conduct of both, in future, was narrowly watched. An alarm of another kind was also occasioned, in the absence of the ambassador at Zhe-hol, by some of the persons of the embassy inadvertently walking upon the walls of their hotel, from whence could sometimes be perceived the female inhabitants of the neighbouring houses. This was considered as highly unbecoming, and gave great offence; though, the moment it was represented as improper, the practice was discontinued. The ambassador's re-entrance, however, into the city, was marked with the usual honours, and he received the accustomed visits of the mandarins. His excellency being aware that a system of precaution, originating in jealousy, had been constantly exercised with regard to the embassy, foresaw the expediency of fixing some certain day for his departure; and he had understood that such a proposal was expected from him. No permanent residence had ever yet been established in China for any foreign minister; and the government of the country considering ambassadors as guests, whose charges were defrayed out of the public purse, the unbounded hospitality, and sumptuous treatment, already afforded to the English, were powerful arguments against the prolongation of the visit. The ambassador, therefore, resolved to ask leave to depart in the beginning of February, before which time he might hope to effect something towards the establishment of a more frequent and friendly commercial intercourse.

Exterior ceremonies performed in honour of the emperor, which tend greatly to inspire the people with sentiments of respect and duty towards him, are practised generally on his birth-day throughout the empire. All the mandarins at Pekin dressed in their ceremonial robes, had assembled at noon, in the great palace of that city, and each, before the throne, upon which incense was burning, prostrated himself nine times, and made offerings of viands and liquors, as if he could partake of them though absent. In the same general manner is incense burned, and offerings made, every new and full moon, before the throne of the several palaces, by all the officers of the emperor's household. The temples of Pekin, however, have no claim to elegance when compared with its palaces. The religion of the emperor is not generally followed. The mandarins and men of letters venerate Confucius, and assemble, as of old, in halls of simple construction; and the lower classes of the people are unable to contribute to the erection of splendid edifices for public worship. Besides, their religious attention, like those of the patriarchal times, is much taken up with their household gods; insomuch that every house has its altar and its deities.

To qualify persons as officers of the household, and other departments among the women in the imperial palaces, it is necessary to become eunuchs; and the operation for this is generally performed before the age of puberty; though it is sometimes done from childhood to forty years of age. Such as are desirous of quitting plebeity, and willing to become eunuchs, are immediately received into one of the palaces, and invested with an employment that gains him the advantages and importance of a gentleman; and some few of them have been dignified with a ball upon their cap, the badge of office of both civil and military mandarins. But simple castration is not sufficient for those who are wholly entrusted with the care of the ladies of the court. They undergo entire emasculation, all traces of sex suffering complete excision. The beard of an adult, thus formed into a complete eunuch, soon begins to fall off; and in a short time the whole disappears. His frame also withers like a blighted plant; and his face, like the wrinkled hag, is full of furrows. From menial servants at the commencement, by degrees they creep gradually into favour and power, administering to the potentate's private pleasures and amusement; and their influence has been able, from a supposed indignity, to effect the dismissal and disgrace of

of mandarins of eminence. The missionaries who, from their principles of converting to their faith, stand on a precarious footing, are more afraid of giving offence to an eunuch than to a mandarin; and knowing they have the ear of the emperor, they endeavour, by meekness and acts of civility, to conciliate their good wishes. When an emperor dies, all his women are removed to an edifice called the *Palace of Chastity*, situated within the walls of the palace; in which they are shut up for the remainder of their lives. There are in China a few Pagan nuns who make a vow to remain virgins. Though the laws of the country do not admit of religious convents, these women are admired for persevering in an effort which is difficult to accomplish. The adultery of women is not, like that of men, punished capitally. When a new emperor accedes to the throne, it is said that very respectable persons of the country take their daughters to the palace for his choice; and the families of such as are accepted, think themselves highly honoured. Others are presented to the princes of the blood either for wives or concubines. The latter, in China, are looked upon in the same light as handmaids in the Old Testament. In the lower classes of life, however, beauty must be very rare, if what has been asserted be true; that all young girs among them, of good figure, with handsome features, and delicate complexions, are purchased from their parents at the age of fourteen, for the gratification of the rich and powerful.

Intimation was given to the ambassador of the emperor's approach to Yuen-min-yuen, and that the etiquette of the court required he should go some miles on the road to meet him. Though, much indisposed with rheumatism, his excellency went early in the morning to the rendezvous pointed out. The emperor came with regal pomp and dignity; and, perceiving the ambassador, he stopped to deliver a gracious message of civility, which ended in desiring him to return speedily into the city, as the dampness of the morning might increase his complaint. The ambassador was now informed by some of the great mandarins, friends to the embassy, that a council had been holden to take into consideration the letter brought by him from the king of Great Britain, and the proper mode to be used towards his subjects. On this occasion the prime minister had summoned the Thibet general, viceroy of Canton, and a former hoppo of the same place, a declared enemy of the English, then a state prisoner, convicted of embezzling the public treasure to an immense amount, and of exactions from the English while at Canton, to give their testimony and advice, as being competent to judge of the conduct and disposition of the foreigners trading to that port; but, without doubt, to strengthen the colao against the more favourable inclinations of his imperial majesty. Nothing auspicious could be expected from the suggestions of such persons; and the ambassador notified his desire to the prime minister, to leave Pekin early in the month of February. The ambassador, instead of an answer to this message, received an invitation to come to the colao at Yuen-min-yuen, where he had some English letters to deliver to him. His excellency went thither, and found a few letters, dated Chu-san, from the Lion and Hindoostan. The colao wished to know their contents. He was told that the Lion would soon put to sea, but that the Hindoostan would wait for her commander; and his excellency hereupon put the letters into his hands. The colao hoped the ship would wait to carry back the embassy. He observed, that the emperor, on hearing of the ambassador's illness, and the death of some of his suite, and apprehensive that they might materially suffer in their healths by a continuance, imagined it might be desirable to depart before the rivers were frozen up, as travelling by land was very inconvenient in that country. The ambassador discovered that other motives were concealed under the pretended solicitude for the embassy's health, and made a proper answer; which was replied to by the prime minister as before; and his excellency was suffered to take leave, without being informed that the emperor's answer to his Britannic majesty's letter was ready, and would be delivered the next day.

The legate having waited on the ambassador to say the colao desired to see him at the great hall of audience in the palace of Pekin, he went thither; in the midst of which was placed upon a chair of state, the emperor's answer. It was comprised in a large roll, covered with yellow silk, and was to be sent that evening, in form, to the ambassador's hotel. Whatever favour it might contain, could not be attributed either to the colao or his companions, whose unfriendliness was demonstrated by their pertinacity in refusing the presents usual from foreign ministers. In a conversation, however, with the minister on the points desirable to be procured for the English East-India company in China, he asked for a brief abstract; and, without pledging himself to support them, promised they should have an immediate consideration. His excellency, in consequence, lost no time in forwarding such a statement. The emperor's answer, which was sent the same evening, was accompanied with several chests of presents for his Britannic majesty; some for the ambassador and his suite; and even tokens of his beneficence were extended to all the officers and men of the ships of the embassy.

As no positive directions had been given for his excellency's departure, it was inferred, from the emperor's last declaration at Yuen-min-yuen, that recourse would not be had to absolute command. His excellency had to regret the little progress made as to the purport of his mission; though he saw the inutility of a wish to prolong his residence against the colao's inclination. He had, besides, been privately informed, that the Chinese had no other idea of an embassy than that of a visit, with presents on some solemn festival, and to last only during its continuance. Under these circumstances, his excellency signified to Ho-choong-taung his intention of joining sir Erasmus Gower, at Chu-san, with all possible speed; and requested a letter from him might be immediately forwarded containing such information. This determination, which seemed pleasing to the colao, was perfectly consistent with Chinese decorum, which demanded a total cessation of the embassy after the receipt of the emperor's answer, and the farewel presents; neither could any personal communication afterwards be obtained with his imperial majesty. An intercourse more favourable to the views of the ambassador unexpectedly took place on the route to Chu-san, through the means of one of the six grand colaos, appointed to accompany the embassy thither. This sudden removal from Pekin threw the embassy into great confusion, from the short time allowed to prepare for it; but it was forced to yield to imperious necessity. The route was directed through Han-choo-foo; and, besides, its two old and repectable companions, Chow-ta-zhin and Van-ta-zhin, another person of the first rank, Sun-ta-zhin, one of the grand colaos who was in the confidence of the court, was appointed to accompany the strangers on their return, and to watch and report their conduct.

On the morning of the 7th of October, Ho-choong-taung, and other ministers, came to a pavilion within the gates of Pekin, to take leave of the ambassador, and delivered some gracious messages on the part of his imperial majesty. They hoped the treatment his excellency had met with was consonant to his wishes; and at the same time assured him, that due attention should be paid to him and his suite, in order to render the journey pleasant to the port of embarkation. Upon a table were placed two tubes of bamboo wood, covered with yellow cloth, containing two rolls of yellow paper. Upon one was written an enumeration of the imperial presents, and upon the other, an answer to the recent requisitions made by the ambassador respecting the English factory at Canton. A mandarin of the fifth order was appointed to

carry

carry them as far as the river upon which his excellency was to embark. Lord Macartney, with his English and Chinese retinue, set out immediately for Tong-choo-foo, in order to embark upon the Pei-ho; and passing through one of the eastern gates of Pekin, he was honoured with the usual salutes. The embassy was received in a respectful manner at Tong-choo-foo. The temple, its former residence, was again prepared for its accommodation, and in the evening the city was illuminated. The next day, the yachts being ready, and the presents all shipped, the embassy embarked upon the Pei-ho, whose waters were decreasing so fast, that the second day the boats were forced to be dragged along. Very little progress had been made when the colao, Sun-ta-zhin, came to inform the ambassador, (whom he received with every mark of respect, and to whom his excellency reiterated his acknowledgments for the civility shewn him at Poo-ta-la, and in the gardens of Zhe-hol,) that he had just received a letter from the emperor: an extract of it, which he read, purported, that "he (Sun-ta-zhin) should take the embassy under his particular care; that every proper distinction should be shewn, and attention paid to the ambassador and his suite in their route to Chu-san; and that he should see them safely embarked on-board their ships: but that, if those ships should be sailed from thence, he was to proceed in the same manner, and for the like purpose, to Canton."

Sun-ta-zhin, besides being a colao, was honoured with the yellow mantle, worn over his other garments, the highest distinction known in China. He was elegant in manners, but tenacious of his rank and dignity. Without disclosing his private instructions, conveyed probably in the same dispatch, he gave the ambassador to understand, that his letter to sir Erasmus Gower had not been forwarded, having been kept back through the suspicions of Ho-choong-taung. Sun-ta-zhin, however, was soon convinced, by the candid explanation which the ambassador gave him of that letter, of the necessity of sending it, and he wrote concerning it to his imperial majesty. He held frequent communications with the ambassador, and his enquiries were less stimulated by personal curiosity, than by the desire of conveying to the emperor the best information he could collect, respecting the English and other Europeans trading to China; so that his excellency discovered, that though he was receding from the court, he was advancing more the object of his mission, through the medium of the present liberal conductor of the embassy, than when he was really present, by removing the prejudices which the Chinese, under false representations, had imbibed against the English character.

The gentlemen of the embassy were not, as before, restrained from little excursions upon the shore. In this part, they observed the fields were parched up by long drought; and the following was the method taken for watering them. Two men stood upon projecting banks opposite to each other; each held in his hand a rope fastened to a bucket, which when filled with water from the river, after swinging it to and fro several times, was thrown with rapidity into a reservoir made near the river's bank; and from this, by means of small channels, the water was conveyed over the adjoining fields. At other times a long pole, whose length was unequally divided, is made to turn upon a pivot across an upright post. A bucket fixed to the shortest end is lowered into the river, which when filled is hoisted by the longest lever, and its contents poured into the reservoir. A few sheep were seen grazing upon small spots, but the greatest number come from Tartary, as well as the larger cattle. Milk, cheese, and butter, are little known among the Chinese; and the common people rarely taste of animal food, unless of such as die by disease or accident, in which cases they are equally relished; and even the vermin picked off their filthy persons fall a prey to their depraved appetites.

After their crops of corn are got in, which was the case at this time, and the stubble taken off the ground, it is ploughed with a single buffalo. Their plough was of simple construction, and in parts where the soil is very light it was drawn by men and women. There is no coulter to the plough; the share which penetrates being made to terminate in a curve, performs the office of a mould-board for turning back the earth. It is sometimes made of iron, but more frequently with the iron-wood already described. Their rice and corn fields are all on an even surface, not as in Europe, divided into ridges and furrows; and their corn is sown neatly in drills, or dibbled. At a few miles distance from each other were military posts, with soldiers stationed to protect the internal traffic of the provinces. Chinese soldiers wear their swords on the left side, having the point before them; and they are drawn by turning their right hand behind them. Though several of their villages are as large as some European cities, they are held in little estimation, unless encompassed by a wall; and these walls, which always surround towns, are generally higher than the tops of their highest houses. No legal tax has been imposed for the maintenance of priests in any religion in China; yet there is something contributed to defray the expences of sacrifices made at every new and full moon, in spring and autumn, and at the commencement of the new year. No such thing as Sunday, or a day of rest, is known there; nor is the week divided in that manner. The temples are every day open for the free ingress of devotees, some of whom bequeath benefactions for the support of priests.

During the reign of the last emperor a land-tax was substituted for a poll-tax; and though most of the imports, and all kinds of luxuries, are taxed, yet as the duty is added to the original price of the commodity, the consumer can seldom distinguish the one from the other. There is likewise a transit duty on goods passing from one province to another, which is a great source of revenue. And the public treasury is not a little enriched by presents from tributaries, and subjects of the empire, as well as by confiscations of affluent criminals. But the several species of grain, upon which the poor principally subsist, are exempt from taxation.

The embassy entered the province of Chan-tong on the 18th of October, which being the day of full moon, the whole night was occupied in the performance of religious rites. There was an incessant noise of guns firing, music playing, loos beating, fireworks launching, and matches burning, from the hour of midnight till the sun-rising. On the 22d of the same month, the yachts arrived at Lin-sin-choo, a city of the second order, where the yachts quitted the Eu-ho, and entered the imperial or grand canal, on which the embassy was destined to proceed to the city of Han-choo-foo, in an irregular line of about five hundred miles, the length which the canal extends, not only over heights and through vallies, but across the great Yellow River, the Yang-tse-kiang, and several other considerable rivers, until it terminates in the large elegant bason of Han-choo-foo. Near the commencement of the canal, at Lin-sin-choo, stands a magnificent Ta, or pagoda, nine stories high; the situation of which, in the opinion of sir George Staunton, being improper either for a watch-tower, or an obelisk, the supposed usual purposes of such structures, he imagines it to have been erected as a monument to commemorate either the beginning, or the accomplishment, of this canal, as a work of no less genius than national utility. These pagodas, called by the natives *ta*, are generally from a hundred and twenty to a hundred and sixty feet high; the diameter of their bases being about a fourth or fifth of their altitude. On the 25th the yachts reached the highest part of the canal, where the river Luen, the largest which feeds the canal, descends into it, with a most rapid current, in a line perpendicular to the course of the canal. The opposite western bank is therefore strengthened by a strong bulwark of stone, against which the waters of the Luen strike with such violence as to divide, and follow, one part to the northern,

northern, and another part to the southern, course of the canal: a circumstance, which not being generally explained or understood, gave the appearance of wonder to an assertion, that if a bundle of sticks be thrown into that part of the river, they would separate of their own accord, and take different directions.

The Yellow River, which the yachts had next to cross, was so rapid in its current, as to induce the Chinese to think it necessary to make sacrifices to the spirit of the river to insure a safe passage. The master of the yacht, attended by the crew, assembled upon the forecastle; and holding a cock in his hand as a victim, wrung off his head, and threw it into the stream. He then consecrated the vessel, by sprinkling its blood upon the deck, masts, anchors, and doors of the cabins; upon each of which were stuck some of the cock's feathers. After this, bowls of meat were brought, and placed in a line across the deck; and before these cups containing oil, tea, salt, and ardent spirits. The captain now made three low solemn bows, lifting up his hands, and uttered a few words as if addressed to the deity. During this time the loo was forcibly beaten, matches were lighted and held towards heaven, tinsel paper was kept burning, and abundance of crackers let off. Libations were made by him to the river, by throwing into it the cups of liquids, afterwards that which held the salt. The ceremonial being finished, the people made a hearty repast of the bowls of meat. They then launched the yacht with confidence into the stream; and having reached the opposite shore, the captain offered thanks to heaven with three inclinations of his body.

During the embassy's progress towards the Yellow River, letters frequently passed between the emperor and Sun-ta-zhin, and the latter often paid friendly visits to the ambassador. Quotations from the imperial dispatches were cited at different times by Sun-ta-zhin, containing not only an account of the letter of sir Erasmus Gower having been forwarded to Chu-san, but also gracious expressions towards his excellency and suite, which he was informed was in consequence of Sun-ta-zhin's favourable reports of the embassy. He had declared to the emperor, that he was perfectly convinced the ambassador had no other view than that of procuring for his country advantages in trade, which Europeans considered as an object of the utmost importance; and that he had discovered nothing in their manners or sentiments which could create the smallest alarm to the nation, with whom the English was desirous of establishing a friendly or commercial intercourse. As further testimonies of the emperor's personal regard, his messages were often accompanied with presents of dried meats from his table, preserved after the eastern manner. His imperial majesty, in a recent answer to Sun-ta-zhin's letters, assured him, that he entertained himself an high esteem for the ambassador and his nation, notwithstanding the various surmises which had been made concerning them; that he had resolved to protect their trade, about which his excellency had interested himself so warmly; that he had, indeed, refused to comply with certain requests, as at his advanced period of life he could not reconcile himself to any innovation; that with regard to the business of Canton, it had been left to the discretion and management of the viceroy, who would not readily give orders to abolish practices which he himself had sanctioned; but as a particular mark of his imperial majesty's attention to the desires of the English on this subject, he had recalled the former, and appointed a new viceroy, one who was related to him by blood, and endued with sentiments of justice and benevolence towards strangers; and that he had received instructions to examine and revise the regulations of the port of Canton, and to put an effectual stop to the vexations and grievances of which the English complained. Sun-ta-zhin, in addition, said to the ambassador, that it might be supposed perhaps, out of delicacy to his excellency, he had put too favourable a construction on his imperial majesty's dispatches, but that he might rest assured they were the emperor's own words; and that as the newly-appointed viceroy was still at Han-choo-foo, he would introduce the ambassador to him there, who would confirm the assurances he had just given.

Proceeding farther on, they perceived plantations of mulberry-trees, some of which bore white, others red or black, fruit. The boughs being frequently lopped off, young scions shoot out abundantly, the leaves of which are tender and more nutritious for silk-worms than those gathered from older branches. The aurelias of the silk-worm, as well as the white earth-grub, and the larvæ of the sphinx moth, are accounted among the Chinese a delicacy for the table. In this, however, they are not singular; for in the West Indies a large caterpillar, which feeds upon a palm, is esteemed a delicious morsel. They now approached the city of Sou-choo-foo, in the vicinity of Nankin, termed the paradise of China. It is large and very populous; the houses are well built, and the inhabitants dressed mostly in silk. The women were fairer than those in the north, many of whom wore a small cap of black satin adorned with jewels upon the forehead, brought down to a peak between the eye-brows, and they had ear-pendents of gold or crystal. The yachts stopped at a village near the city of Han-choo-foo, to receive the new viceroy of Canton. He came in a barge to pay the first visit to Sun-ta-zhin and to the ambassador. He confirmed the assurances which had been given of the emperor's friendly disposition towards his excellency and the English, to which, in the most pleasing manner, he added his own good-will. In addition to the honour conferred by the emperor on Chaung-ta-zhin, the viceroy, the inhabitants of the Che-kiang, the government of which he had just quitted, and where he had administered impartial justice, gave him the most flattering of titles, by calling him "the second Confucius." He accompanied Sun-ta-zhin and the ambassador into Han-choo-foo, at which place they arrived on the 9th of November, 1793.

The city of Han-choo-foo, nearly equal in population to Pekin, is the grand emporium for merchandize and all kinds of articles which pass between the northern and southern provinces. The highest houses have only two stories; the streets are narrow, but well paved; in the principal of which the shops are nearly as splendid as those in London. The manufacture of silks and satins, for which there is a brisk demand, is done by women; and furs and English broad-cloths form no inconsiderable part of their trade. Information was received here that sir Erasmus Gower had sailed from Chu-san; but as he had stated in a former letter that he should proceed to Canton, to get a supply of medicines which he could not obtain elsewhere, a dispatch was immediately sent to the company's commissioners at Canton to stop the Lion. From this place the new viceroy permitted captain Mackintosh and a part of the ambassador's suite to go to Chusan, where the Hindoostan was taking in a cargo. Sun-ta-zhin, who took a friendly leave of the ambassador, accompanied this party. They set out on the 13th, and arrived there on the 19th of November; at which place their conductor, after making presents to them on behalf of the emperor, shook the captain heartily by the hand, and bade him a cordial adieu.

The ambassador and the viceroy set out the same day for Canton, the route to which was upon the river Chien-tang-chaung. Two bodies of Tartar troops, superbly dressed, were drawn out upon the beach, and saluted his excellency as he passed to his barge. An immense crowd of boats were assembled on the occasion, and among the experienced boatsmen was one who rowed, steered, held the sheet, and smoked at the same time. Between Han-choo-foo and Yen-choo-foo were some rich and picturesque valleys, which presented to view the large-leafed chesnut, and purple-leafed tallow-trees; also the towering larch, and the glittering leaves of the thick spreading camphor-

camphor-tree; and nearer to the latter place, a great number of the thuya, or arbor vitæ tree, which grows to an amazing height. During a short temporary obstruction to the progress of the boats, two young men overtook them, who were anxious to have a sight of the ambassador. They were dignified with the same office from the king of the Lequese islands, and were going to pay tribute and do homage from their sovereign to the emperor. Their dress, besides silk turbans, consisted of a fine brown shawl, the manufacture of their country, lined with the furs of squirrels. They were of dark complexion, well bred, and communicative. No European vessel, it seems, had ever been at any of their islands, (at the principal of which was a commodious harbour,) though they are not prohibited, and would be well received.

Several excavations were perceived in the sides of the contiguous hills, whence had been obtained a species of fine granite, called *pe-tun-se*, used in manufacturing porcelain. This, with *kao-lin*, a kind of clay; *wha-she*, similar to the English soap-rock; *she-kan*, the gypsum; and, it is reported, the inconsumable asbestos fossile stone, formed its principal materials. A village in the neighbourhood contained three thousand furnaces for baking porcelain; but the manufacturing of it is, with them, rendered uncertain; inasmuch as, for want of such a pyrometer as Wedgewood's to ascertain the degree of heat, the contents of whole furnaces are sometimes baked into one solid useless mass.

The embassy had now reached Chan-san-chen, where the river was no longer navigable. During their route, as well as on their arrival here, there were several interchanges of visits between the viceroy and the ambassador, while preparations were making for their journey by land. He had almost a daily correspondence with the emperor, from whom his excellency continued to receive expressions of personal esteem. The oppressions to which foreigners, and particularly the English, were exposed at Canton, frequently arose in the course of conversation. The benevolence of the viceroy disposed him to listen to such complaints; and Chow-ta-zhin, a staunch friend to the embassy, whom he had honoured with his confidence, undertook to urge the business to him in private. Every thing being ready, the embassy pursued their journey towards Canton. On their route they perceived stages upon the sloping sides of hills, in which were cultivated pulse, grain, yams, sweet potatoes, onions, carrots, turnips, and other culinary vegetables. Upon the top of the mountain was a reservoir to catch rain-water, which was conveyed thence by channels, to irrigate these cultivated terraces.

Besides the modes already pointed out for raising water from rivers for irrigating their lands, the Chinese make use of a chain-pump, the chambers of which, instead of being cylindrical, are universally square. The inside of a hollow wooden trunk is divided in the middle, by a board, into two compartments; a chain, made to turn over a small wheel or roller at each extremity of the trunk, is fastened to flat and square pieces of wood, nicely fitted to the capacity of the cavity. These, called lifters, move with the chain round the rollers, and raise a volume of water proportionate to the dimensions of the hollow trunk. The power to work this machine may be applied different ways. When it is intended to raise a great quantity of water, sets of wooden arms, in the form of the letter T, are affixed to the lengthened axis of the rollers, and smoothed for the foot to rest upon. The axis is made to turn upon two wooden uprights, rendered steady by a piece of timber stretched across them. Men, by treading upon the projecting parts of the wooden arms, supporting themselves at the same time by a cross beam, give a rotatory motion to the chain; and the lifters, being attached to it, raise up a constant and abundant stream of water. But for works of irrigation on a grand and more extended scale, the Chinese have invented a large water-wheel, most ingeniously constructed of bamboo, and which raises the water with wonderful celerity, and in vast abundance; for the manner and figure of which, see the article HYDROSTATICS. In the course of this short journey by land, no single spot was seen uncultivated where the efforts of labour could avail. In places where the soil was poor or steril, every means was employed to render it fertile. The Chinese are as neat in husbandry as in horticulture, and extirpate every nascent weed or noxious plant.

In the evening they arrived at a town, whence they were next day again to embark; and though inns are not wanting on the road, at all of which tea is sold like ale in England, yet there was not one of sufficient magnitude to receive the ambassador and suite; and they were accordingly accommodated with the public hall destined for the examination of young men previous to taking their degrees. These examinations are always public; and the governor and magistrates who preside, and the numerous auditors who attend, are supposed able to suppress any inclination to partiality in the judges. Oral and written questions are put to the candidates, as in England; and the successful one, after being elected to the university, may attain to the highest offices and dignities of the state. No person is precluded from arriving at this honour; it is open to all classes of men. The people, thus convinced that authority has been obtained through merit, are prompted to pay it respect and obedience, except in cases of notorious abuse, against which rank and learning do not always afford security. A system of government like this, holds out many advantages to society; nor can it fail but when the temptation to do evil preponderates over the strength of principle, and the hazard of detection in sacrificing it. The poor, and private individuals of China, who have no channel through which to impart the grievances they suffer from the conduct of their local rulers, may be said to be left almost at their mercy; and the same conclusion will apply to foreigners when left in the same predicament. It was under this idea, that the ambassador seized every opportunity of impressing on the mind of the viceroy, the expediency of his protecting the strangers at Canton from the extortions of the collectors of the customs, and other subordinate officers connected with the commerce of that port. The viceroy in return said, that he was convinced no pains would be spared by the persons he was about to govern, to impress him with ideas inimical to the British nation; but that he fully saw the necessity of a change of conduct, as well out of a principle of justice to the English, as for the honour of his own country. And though his influence was considerable, and his footing apparently firm, yet his new situation was not free from difficulties; that besides the officers at Canton interested in continuing those oppressions, and whose guilt would be implicated in a redress, there were other prejudiced enemies at court, who might equally consider reform as a censure upon them; that exclusive of all these, another important consideration had occurred to him, which was, the peremptory manner in which Ho-choong-taung had refused the requisitions of the ambassador; that if in a representation of these facts to the court of Great Britain an endeavour were made to excite resentment, any subsequent appearances of resentment against his country would involve him criminally in the eyes of his government, for favours which might be shewn by him to the English in the mean time; he was therefore anxious to be satisfied on that head.

It was not quite clear to the ambassador, whether the apprehension originated with the viceroy, or from a higher source; but at any rate it appeared to indicate, that from a conviction of the English armies in India, and of their vast maritime strength, the British nation was suspected of being too powerful not to require some delicacy of conduct even from the haughty empire of China. His excellency owned that he was dubious of the disposition of the court or minister of Pekin towards his country; but from the explanations which Sun-ta-zhin, as well as he,

he, the viceroy, had given of the genuine sentiments of his imperial majesty, he placed a firm reliance on the assurances solemnly made to him, that particular attention would be paid to the British subjects in China, and had already imparted this confidence to the English government in the letters he had sent from Han-choo-foo, which he did not doubt would confide in their fulfilment. The viceroy then enquired of the ambassador, whether he could empower him to certify a continuance of this amicable disposition, by the king's writing speedily to his imperial majesty; and by sending again a minister to China, if the emperor were inclined to admit of such, not in the expensive manner of the present embassy, but merely as a token of the continued amity of his Britannic majesty. His excellency, not expecting such a proposal, replied, that "the king would probably have no difficulty in writing to the emperor, to acknowledge the receipt of the presents, and to express his thanks for the distinguished manner in which he had received the embassy; a circumstance unconnected with its objects, all of which he had hopes might be effected in time; but that the vast distance between the two empires, and the difficulty and precariousness of the navigation, made it impossible to determine the advent of a new embassy." The viceroy ended by saying, that he would instantly send a messenger to court with a relation of the conference, together with such intimations of his own as would, he hoped, be in all points perfectly satisfactory to the emperor.

The embassy embarked anew, and proceeding rather in a northerly course, passed by a vast extent of swampy land, in the midst of which was the largest collection of water in the country, called Poyang Lake. Into this lake many rivers flow, and out of it several canals have been formed, and inclosed within strong high banks, for the security of vessels in stormy or deluging weather. The billows often rise as high as those at sea, which render its passage dangerous. Small sandy islands were descried in the lake, the solitary residence of fishermen. The province of Kiang-si, which lay by the river side, abounded with plantations of bamboo. The feet of the women here were not crippled, being left in their natural state. The river became again shallow, and a second land tour was unavoidable. Preparations being accordingly made on the day of disembarkation, the embassy set out early next morning, and soon arrived at the foot of that immense ridge of mountains which divide the province of Kiang-si, from that of Quang-tong. The travellers began in a little time to ascend the highest of these eminences, the summit of which was confounded with the clouds above. There was an appearance of two clouds without motion, which left a regular void space between them; but, after the travellers had ascended a long way upon a circuitous road, so traced for the purpose of being practicable for horsemen, they were astonished to find that those steady-looking clouds were nothing more than the summit of the mountain, which had acquired this appearance by its being cut down in the center to a very considerable depth, by mere dint of labour, in order to render the ascent less steep and difficult; a work of so much utility, that the statue of the mandarin who had it done, is erected in many Chinese temples in that neighbourhood. At the pass is always kept a military post. The mountain, on each side of this key to the interior country, is clothed with plantations of trees to its utmost height, from whence a most extensive and rich prospect opens to the eye. A gentle and uniform descent of several miles on each side, almost entirely covered with lively verdure, and crowned with towns, villages, and farm-houses, lays, as it were, a most picturesque scene at the feet of the spectator, whilst distant plains of unbounded extent, with mountains rising out of the horizon, terminate the view. The little hills scattered over the plains below, appeared like so many hay-ricks. The town of Nan-gan-foo, which the travellers had so lately left, seemed like a heap of tiles, while the river that passed by it appeared only as a shining line. From the computations made by sir George Staunton, this mountain was found to have an elevation of eight thousand feet above the level of the sea. The travellers arrived the same evening at Nan-shoo-foo, where small covered barges, on the river Pe-kiang, were prepared to carry them to Canton. Some days before they got to that city, persons were heard to utter broken English as they passed, a proof of the influence of British commerce; and many boats were seen going down the river with merchandize for the English market.

The viceroy judged it expedient to proceed to Canton before the party, to procure a suitable reception for the embassy. He sent from thence large elegant barges, in which the ambassador made his entrance into Canton, on the 19th of December, 1793. The splendid manner in which his excellency was received, added to the personal attentions of the viceroy, must have convinced the inhabitants that the English were no longer destitute of protection, nor unworthy of esteem.

Of the present state of the Chinese empire, its customs, manners, general polity, genius, &c. the most authentic information is unquestionably to be obtained from the account so recently given us by sir George Staunton. He suggests, that although the Chinese form of government be provident and laudable, and its general regulations benevolent and wise, yet it is far from being a model of perfect jurisprudence, or adequate in a number of instances, to the regulations it has in view. The object of the government, in seeking to maintain the general tranquillity and welfare, seems to have overlooked all precautions for the personal security of individuals. A court of justice is established for trying persons accused of crimes deserving death; but no jury is empannelled to try the fact. The impartiality of the judge is endeavoured to be secured by appointing no man to that office in the province of which he is a native; but though he may not lean, from affection, to the one or the other of the parties, he is liable to be swayed by the weight of presents. These dispensers of justice are not, as in England, placed above temptation by the amount of their salaries, which would render the acceptance of presents as unnecessary as they are improper.

Disputes amongst individuals concerning property, do not fill up a large space in the transaction of Chinese affairs. Property, whether real or personal, is held by tenures too simple to occasion much difference of opinion as to the right of it. There are no entails nor settlements; and the sort of community in which most families continue to live in China, cuts off the principal sources of dissention. The halls of audience are, in fact, more engaged in solicitations than in contests. Men of talents and learning are sometimes employed to support the cause of others who are young, ignorant, or incapable; but there is no particular order of men who subsist in affluence as lawyers and attornies, or who arrive at dignities like the former. The interests of the emperor are always made the first object. No property can be secure against his claims. The preference thus given to the possessor of unlimitted power, may be considered as the natural consequence of it. Some justification of this preference may likewise be derived from the consideration, that he who is most liable to frauds, ought to have the most effectual means of guarding against, and punishing, the commission of them.

The execution of all capital criminals takes effect but once in the year; and the number, seldom above two hundred, is very small for so vast and populous an empire. Theft and robbery are never punished with death, unless accompanied with personal injury and cruelty. The moderation of those punishments seems to imply the infrequency of the offence; and the fact is really so, except where famine rages, in which case no severity of punishment will prevent the commission of the crime. All criminals for execution are transferred from the several provinces to Pekin, where a revision of the sentence is had before

before the great tribunal allotted for that purpose; and the usages of the empire, which suppose the sovereign to be endowed with every principle of humanity, require that he should formally consult his council, to know whether he can, without danger to the state, avoid ordering the sentence to be executed: thus exercising the powers of the British monarch, in cases of life and death. Instances are reported to have happened where an offender has been allowed to hire another person to undergo punishment in his room. The law, of which the maxims are rational and just, does certainly not allow it, hough the dispensers of it may; and the piety of a son may, more in China than elsewhere, impel him to suffer pain to save a father from it.

In the administration of the vast revenue of the state, the opportunities of committing abuses are not often neglected, as may be inferred from the frequent confiscations to the emperor, in consequence of such frauds. It is indeed affirmed, that much corruption and oppression prevail in most of the public departments, by which considerable fortunes are acquired, notwithstanding the modicity of the public salaries. With respect to the allowances made by the emperor to the principal officers of government, revenue, and justice, it is to be observed, that, though in each city there is a chief judge appointed expressly for trying criminals, all civil suits are decided by the principal or subordinate governors of the places where they arise, without any particular establishment of legal judges, appointed apart and independently for that purpose. The influx of silver from Europe into China, within the thirteenth century, has occasioned such an increase in the prices of all articles of consumption, as greatly to alter the proportion between the fixed salaries of the several officers of government, and the usual expences of their respective stations. The following table exhibits the fixed salaries of the civil establishment of the present Chinese government, as given by sir George Staunton:

A List of the chief Civil Officers of China, distinguishing their Number, Station, and Salaries.

	Tahels.	Total.
Eleven tson-toos, or viceroys, over one or more provinces, salaries	20,000	220,000
Fifteen foyens, or governors, under him, of each province	16,000	240,000
Nineteen hou-poos, or fiscals, the chief officers of revenue	9,000	171,000
Eighteen an-za-tzes, or presidents, of the criminal tribunal	6,000	108,000
Eighty-six tao-quens, or governors, presiding over more than one city of the first order, and their dependencies	3,000	258,000
One hundred and eighty-four fou-quens, or governors, only of one city of the first order, and its dependencies	2,000	368,000
One hundred and forty-nine kiou-quens, or governors, of a city of the second order	1,000	149,000
One thousand three hundred and five sien-quens, or governors, of a city of the third order	800	1,044,000
Seventeen hou-jous, or presidents, of science or examinations; One hundred and seventeen cho-tos, or inspectors-general	3,000	402,000
		2,960,000

The order and administration of the jails in China, are said to be remarkably good. The debtor and felon are confined in separate places, without being permitted to approach each other, as it is thought both impolitic and immoral to associate guilt with imprudence or misfortune, by a promiscuous imprisonment. The two sexes are likewise kept carefully apart. Confinement for debt is only temporary; but if, after the delivery of all a debtor's property to his creditors, the demands against him are still unsatisfied, he is liable to wear a neck-yoke in public for a certain period, in order to induce his family, if able, to discharge the debt, and thus put an end to the disgrace. If his insolvency had been incurred by gaming, or other improper conduct, he is subject to corporal punishment, and exile into Tartary. The emperor's debtors, if fraudulently such, are strangled; if merely by misfortunes, their wives and children and property of every kind are liable to be sold, and themselves sent to the new settlements in Tartary, at the discretion of the emperor.

The prodigious populousness of China may be accounted for from divers causes; one of which, and not the least material, is, that the people are seldom diminished by the calamities of war. No private soldiers, and only a few officers, natives of the ancient provinces of China, were engaged in the conquest of Western Tartary, or in the Thibet war. Celibacy is rare even in the military profession among the Chinese. Accidents sometimes of extraordinary drought, and sometimes of excessive inundations, occasionally produce famine in particular provinces; and famine disease: but there are few drains from moral causes, either of emigration, or foreign navigation. The number of manufacturers, whose occupations are not always favourable to health, and whose residence in towns exposes them to irregularities, bears but a very small proportion to that of husbandmen in China. In general, there seems to be no other bounds to Chinese populousness, than those which the necessity of subsistence may put to it. These bounds are certainly more enlarged than in other countries. The whole surface of the empire is, with trifling, exceptions, dedicated to the production of food for man alone. There is no meadow, and very little pasture; nor are fields cultivated with oats, beans, or turnips, for the support of cattle of any kind. Few parks or pleasure grounds are seen, excepting those which belong to the emperor. Little land is taken up for roads, which are few, and never unnecessarily wide; their chief communication being by water. There are no commons, or lands, suffered to lie waste by the neglect, or the caprice, or for the sport, of great proprietors. No arable land lies fallow. The soil, under a hot and fertilizing sun, yields annually, in most instances, double crops, in consequence of adapting the culture to the soil; and of supplying its defects by mixture with other earths, by manure, by irrigation, by careful and judicious industry of every kind. The labour of man is little diverted from that industry, to minister to the luxuries of the opulent and powerful; or in employments of no real use. Even the soldiers of the Chinese army, except during the short intervals of the guards which they are called to mount, or other occasional services which they perform, are mostly employed in agriculture. The quantity of subsistence is increased also, by converting more species of animals and vegetables to that purpose than is usual in other countries; and even in the preparation of their food, the Chinese have economy and management. In raising and collecting manure for the land, Chinese industry seems to surpass every other part of the world; and it is to them an object of the utmost attention. In this business the old and decrepid are employed, and little boys capable of no other labour. They rummage every street, road, river, and canal, and also pick up in baskets the ordure of animals, and offals of every kind which can answer the purpose of manure. Wherever this is deficient, they unite various kinds of earth together; if the earth be too compact or adhesive, they mix with it sand; if too loose, clay or loam, until the soil becomes fit for the intended purpose of vegetation. Their industry is such in the southern provinces, that the gentlemen

tlemen of the embassy noticed a farmer, who with one hand drove his plough, to which his wife was yoked, while he sowed the seed with the other hand in drills. This task imposed upon the woman appeared to an European eye altogether unbecoming; yet a labouring female is there prized so much by the other sex, that wherever they are known to be in greatest plenty, farmers will travel from distant provinces to purchase what they call a working wife. The wives are distinguished from the maidens, by the latter allowing the hair near the forehead to hang down towards the eye-brows; while the former have all theirs bound together upon the crown of the head. From the united influence of these concurrent circumstances, it will not, perhaps, appear surprising, that it should be asserted, that every square mile in China contains, upon an average, about one-third more inhabitants, being upwards of three hundred, than are found upon an equal quantity of land, also upon an average, in the most populous country in Europe. Thus the number and increase of this people seems to be such as almost to stagger belief, and exhibits to the mind a grand and curious spectacle of so large a proportion of the whole human race, connected together in one great system of polity, submitting quietly, and through so considerable an extent of country, to one great sovereign; and uniform in their laws, their manners, and their language; but differing essentially in each of these respects, from every other portion of mankind; and neither desirous of communicating with, nor forming any designs against, the rest of the world.

In the article of dress, the Chinese seem never to have been the slaves of fancy or fashion: whatever is thought suitable to the condition of the wearer, or to the season of the year, continues generally, under similar circumstances, to be the same. Even among the ladies, there is little variety in their dresses, except, perhaps, in the disposition of the flowers or other ornaments of the head. In lieu of shifts, the ladies wear a sort of silk netting; next to which they have a waistcoat and drawers of silk, trimmed or lined, in cold weather, with fur; in warm, with thin cotton. Above this is worn a long sattin robe, which is gracefully gathered round the waist, and confined with a sash. These different parts of thin apparel are usually each of a different colour, in the selection and contrast of which, the wearers chiefly display their taste. The lower orders of women wear cotton nettings instead of silk; and their other garments are of the coarser fabrics of the country. Though the ladies reckon corpulence a beauty in man, they consider it as a palpable blemish in their own sex, and aim at preserving a slimness and delicacy of shape. They suffer thier nails to grow, but reduce their eye-brows to a beautiful arched line. The frail females, who in this country are few, compared with those of other nations, aim to make themselves agreeable, and deck themselves out to the best advantage, in the double view of obtaining lovers, or husbands; for these women very frequently marry. Some poor parents, therefore, seem to feel little reluctance in devoting their daughters to the profits of the one employment, with a view to more permanent advantage in the other. The Chinese women, especially in the lower walks of life, are bred with little other principle than that of implicit obedience to their fathers or their husbands. To them they are taught to refer the good or bad qualities of their actions, without any idea of virtue in the abstract. Nor do the men seem to value chastity, except what may tend to their own personal gratification. The case is probably somewhat otherwise in the upper classes of life in China. There is, in fact, a greater difference often between different ranks in the same country, than between the same ranks in different countries. The Chinese women, of whatever condition in life, are, for the most part, deprived of the benefit of reading, or of acquiring knowledge by observation. Their ignorance, their inexperience, their retirement, their awe also of those whom they consider as their superiors, disqualify them, in a great measure, from becoming the friends or habitual companions of the leisure of their husbands. Even a relish for their personal charms is subject gradually to diminish; and less horror is felt against unnatural practices, which, however they are, as well as all perverse and impure desires, justly reprobated by the Chinese moralists, are seldom or ever punished by the law, at least when committed by the mandarins. Where the ladies never form a part of society with men, mutual improvement, or delicacy of taste and sentiment, the softness of address, the graces of elegant converse, the refinement and play of passions, cannot take place; and unguarded manners in the men, are liable to degenerate into coarse pleasantry or broad allusions. The exterior demeanour of the Chinese is, indeed, very ceremonious; but when these ceremonies have passed, the performers of them mutually relapse into ease and familiarity. Their good manners and complaisance is entirely systematic. The greatest mandarin, or even the emperor, in speaking of himself, contradistinguished from any of his ancestors or predecessors, uses the most modest, and, indeed, humble expressions, in every thing that relates to his own person. Hence the excess of precaution against egotism is so great in China, that, in the mention of one's self, the most abject terms are employed, and the most exalted towards those unto whom they are speaking. In their address to strangers, however, they are not restrained by any bashfulness, but present themselves with an easy confident air, as if they considered themselves as the superiors, and as if nothing in their manners and appearance could be deficient or inaccurate. This habit of confidence in themselves arose originally from a consciousness of surpassing their neighbours in merit of every kind. Before the period of the Mongol invasion of their country, in the midst of the dark ages of Europe, when China was visited by Marco Polo, the natives of it had already reached their highest pitch of civilization, in which they were certainly superior to their conquerors, as well as their European cotemporaries; but, not having since advanced, whilst the nations of Europe have been every day improving in manners, and in arts and knowledge of every kind, the Chinese are seen by the latter with less admiring eyes than they were by the first travellers who gave accounts of them. The Chinese themselves felt lately, in their intercourse with the embassy, some of the advantages which the English had confessedly over them, even in their own country; particularly in those gifts which are derived from uncontrouled literature and science.

One of the most curious and not the least interesting descriptions with which sir George Staunton has favoured us, is that of the burial-place belonging to the city of Han-choo-foo. This sacred district occupies both hills and dales, to a very considerable extent, and is covered with many thousand monuments or tombs, generally built in the form of small houses, about six or eight feet high, painted mostly blue, and fronted with white pillars, the whole ranged in the form of pigmy streets. The tombs of persons of high rank were situated apart, generally on the slope of hills, on terraces of a semicircular form, and supported by breast-walls of stone, and doors of black marble, inscribed with the names, qualities, and virtues, of the deceased; and oftentimes obelisks are erected upon the terraces. The chief monuments of departed greatness are surrounded by trees, such as different species of the lofty cypress, whose deep and melancholy hue seems to have pointed them every where out, as well suited for scenes of woe. In this solemn and lonely retirement, scarcely a night passes without a visit by persons accompanied by torches, to pay fresh tributes of sorrow to their deceased relations, whose monuments they decorate with slips of silk or painted paper, besides strewing a profusion of flowers,

and

and burning perfumes before them. No persons are allowed to be interred within the walls of their cities or towns; but in villages many are buried in gardens, or by the way-sides.

What has been suggested by professor Beckmann, under the article CHIMNEY, seems to be corroborated and confirmed by sir George Staunton, with respect to the modern date of that invention. He says the Chinese have no chimneys, nor open fire-places, nor grates, but burn their fuel in close stoves, very similar to the Persian style; for which purpose they commonly char their coal, previously to its being employed for fuel; and for this purpose deep pits are dug in the vicinity of the mines. And in the spirit of Chinese economy, rendered perhaps necessary by the immensity of their population, the dust even of the coals is not lost by them. A livelihood is obtained by gathering this dust, and mixing it with equal quantities of boggy earth; which, when moulded into pieces of a square form, and hardened in the sun, are transported to districts where no coal is found.

Hospitality to strangers, is the assumed characteristic of the Chinese nation, the moment any such are suffered to come within their dominions; and surely no country on earth could have chosen a more worthy or more effectual method to dignify its name. It was this principle, and this custom, which alone influenced the Chinese emperor to take the gentlemen of the British embassy under his own immediate protection, to supply them in abundance with provisions, and to defray every expence attending them and their retinue, both by land and water, during their continuance within his territory, which was from the time they landed at Chu-san, until their departure from Canton. The police of China is likewise conducted upon a most admirable plan, since every traveller passes, as it were, secure from thieves and robbers, few such being known in the country; and, in their cities and towns, in their villages, or by their way-sides, not a beggar is to be seen, nor any wretched object of distress. Neatness and decency is seen in all their abodes; yet they have not the use of linen. Their dining-tables, which the strong body of varnish laid upon them always secures from dirt and moisture, are not covered with cloths. They spread no sheets upon their beds; and white cotton, the growth of their country, is applied to but very few of the purposes to which linen is destined in England. The rules of external decency are strictly guarded by the manners and sentiments of all persons of education and refinement; and whatever similitude may be drawn betwixt the paganism of China and that of its neighbour Hindoostan, the former seems not to have borrowed from the latter, any of the obscene postures sometimes carved on the outside of the Indian temples. If, from the loose expressions familiarly introduced by some of the most elegant writers in antiquity, and from the indecent images discovered among ancient buildings; as, for example, at Pompeia, as well as from some remains of obscene worship, in an obscure part of the same country, and the shameless practice of some distant savage tribes, it be inferred that decency is not a strong, innate, and necessary, sentiment of nature, it must be acknowledged, that it is at least a happy artifice of society, not, indeed, precluding vice, but covering its exterior turpitude, and adding refinement and delicacy to natural enjoyments. And in this species of factitious virtue, the Chinese have proceded, as well as surpassed, most other nations. Even so delicate are their sensations, that no male physician is permitted to attend a pregnant woman, and still less to practise midwifery; in the indelicacy of of which both sexes seem to agree in China. Nor can the pretence of its utility, on the gound of preventing cripples, or crooked or distorted limbs, by improper treatment in the act of parturition, be there of any weight, since very few deformed persons are to be found in China: not one such was seen by the gentlemen of the embassy among any of the crowds of spectators, nor through their whole route, from the northern to the southern extremity of China. But, notwithstanding the vigilant and scrutinizing police of the Chinese magistrates, books disapproved by them are sometimes privately printed and disseminated in China. It is not easy to prevent, or even always to detect, the operations of a trade which, beside paper and ink, require little more than some pieces of board, and a knife to cut out characters upon them. The books thus published furtively, are chiefly those which are offensive to decency, and inflame the imagination of young minds.

The amusements of the Chinese appear to be but few, and very simple; as is evinced by those that were exhibited before the gentlemen of the embassy at the court of Zhe-hol, on the celebration of the emperor's birth-day. Their most favourite, and most rational, source of relaxation, is in the drama. Plays are for ever performing in all the provinces of China; insomuch that an entertainment is never given by a mandarin of even moderate rank, without a dramatic performance in his own house, by way of solace and pleasure to his guests. We have noticed that plays were exhibited on the river sides, wherever the British embassy stopped, in their way to Pekin, by order of the mandarins, for the amusement of the English strangers; and we have also said, that, during certain festivals, plays are performed in the streets to exhilarate the common people, at the expence of the emperor. And as their drama seems really calculated to inculcate virtue and morality, and shews, perhaps, more than any thing else, the established manners of the people, we shall give the cast of one of their plays, entitled CHON-FON-KAU, or Fidelity Rewarded; which has been lately translated by E. Van Braam Houckgeest, second person in the recent Dutch embassy to the court of Pekin. The term included in the action of this play, comprises an interval of eighteen years.

ACT I.—Thaye, a mandarin of letters, has two wives. The second (Alaya) is brought to bed of a son called Siou-ye. On occasion of this birth a grand feast is given in the house of the mandarin. The relations who compose the family, repair to it to bless the child, and to partake of the common joy. During this festival, which lasts many days, there comes an order to the mandarin from the emperor, who, informed of his great merit and his talents, invites him to court. The mandarin, wishing to obey, assembles all his family, among which appears his father and mother. He communicates to them the order of the sovereign, and his design to conform to it as soon as possible. His two wives and his relations appear very much alarmed at this departure; but he consoles them, and gives counsels and instructions to his wives and domestics. He maintains, in his discourse, the necessary obligation which he lies under to serve the monarch and his country with all his might, and to be faithful to them. Then his father, a venerable old man, strongly recommends to him a faithful regard to his duties. He exhorts him never to deviate from the path of honour and virtue, the only one which can lead to renown, and render him worthy to please the divinity. After this discourse, which the mandarin hears in an upright posture, because a son in China never sits down before his father, he prostrates himself at the feet of the author of his days, and, with his head bent under, implores their benediction; which they give him, each being seated, and in a tone breathing somewhat of majesty. The father especially impresses veneration; but the mother also lets fall expressions of her tenderness and sensibility. Thaye rises, thanks his parents, and parts from them, as well as from his wives, with marks of reciprocal attachment. His last movement of regret is for his old domestic Atay, and for his female servant Aouana; to whom he recommends obedience and submission towards their two mistresses, the care of whatever concerns the house, and, above all, attachment to his son, during his own abscence. He promises them to supply their wants.—[Exit.—The curtain falls.]

ACT II.—After a space of four or five years without any news from the mandarin, whose father and mother are dead, and the family in the greatest uneasiness, the two wives become very discontented. They deliberate together, and form the project to abandon the house of their husband, and go, while they are yet young and beautiful, to seek a better destiny, persuaded that the mandarin has perished in an expedition with which it was said the emperor had charged him. Having well concerted their design, and being firmly decided in their resolution to execute it, they impart the same to the old domestic, as well as to Aouana. These last express the greatest astonishment, and a just indignation at the shame with which these two wives would cover their master, or his manes, if he be really dead. Both these two faithful domestics address the strongest representations to the two wives. They draw an energetic picture of the sublime sentiments with which chastity inspires the women in China; but their cares are of no avail, they only obtain from these degraded women a smile of disdain. Aouana, who is touched still more by this inflexibility, runs, takes up the infant and presents it to its mother, as a bond which ought to attach her for ever to the house of her husband. She conjures her to have compassion at least on her own blood, and not to complete the disgrace of both the son and the father by an insensate desertion. The two wives, already seduced by the idea which they had conceived of a liberty without bounds, persevere in their project. The mother rejects the child she has given birth to, and stifling in her heart the sweetest sentiments of nature, recommends it in a tone of raillery to the faithful cares of Aouana. These two vagabonds, constantly mocking the two domestics, take their jewels and clothes which they had already packed up, and quit the house, bidding an adieu to Atay and Aouana, which serves to complete their distress and despondency. After having given bitter tears to this fatal event, these two valuable servants, finding it was impossible to remedy it, mutually encourage each other; and at the instant when their soul is bowed down with grief, they swear to consecrate the remainder of their strength to labour for the relief of their necessities, and those of the innocent infant of their worthy master, and, above all, to furnish him with the means of devoting himself to the study of letters. The second act terminates with this laudable design.

ACT III.—The child has arrived at his thirteenth year.—The curtain rises, and we see old Atay busily employed in making straw sandals, the only trade which he knows. Aouana is sitting near a table covered with garments, and is sewing very diligently. The old domestic sings at his labour the melancholy history of his master, and with so much sensibility, that at last his eyes are suffused, and tears run down his cheeks. To shew courage, he wipes his tears, and affects to laugh, as if to reproach his pusillanimity. Aouana then speaks to him, and observes how sweet and consoling it is for a virtuous soul to fulfil its duties, because the gods never withdraw their benefits from those who love to execute them. She goes on to express all their happiness in having succeeded for so many years not only in escaping misery, but in having procured instruction for their young master, who is making such progress, that he will assuredly become a man of rare merit, and be induced from gratitude to take care of their extreme old age. This discourse consoles and re-animates the good Atay. He shews Aouana his pair of sandals finished, and says he is going to sell them, or rather exchange them, for some lamp-oil, by the light of which they were accustomed to labour very far in the night. At the moment in which the old man is about to set out, arrives young Siou-ye from his college, with books under his arm. He salutes Atay with an affecting and ingenious air, who caresses him with eulogiums and encouragements. He then goes towards the table where Aouana is at work, and salutes her as if she was his mother. He lays his books on the table, and places himself beside her. Aouana questions him with much affability on what he has learned. She mentions to him the lessons which he has had to recite, and he repeats them with a loud voice. She commends his application, and profits of this moment to shew him that it is only by these means that he can acquire glory enough to give real satisfaction to the manes of his father: she recommends to him to dread the loss of time, and to pursue his studies without ceasing night and day, in order to arrive at the end of so many labours. Excited by this discourse, the youth takes up his books and reads in them attentively, till at length, sleep weighing down his eye-lids, his head drops on his book. In this interval Atay returns with a pot full of oil, some of which he pours into the lamp; he adjusts it that it might give the better light; afterwards he goes to prepare the supper. Aouana, who perceives the young student asleep, awakes him and invites him, after her example, to break off his repose. He really makes efforts to do so, but yieding at length to a call, imperious at his age, he again falls fast asleep. Aouana remarks him; and, in a song of a touching nature, she paints the contrast of the painful situation of a soul where inquietude has penetrated, and that of an innocent heart where reigns tranquillity which the thought of evil has not sullied. She touches, lastly, on the happiness which is the portion of youth, because it is yet unacquainted with the torments of maturer years. In this last part, she has her eyes fixed on the child. A truly maternal tenderness is in her looks, and she lengthens out her song by couplets on the lot of this unfortunate. She is now moved to the bottom of her heart. Although she would respect his repose, she, nevertheless, judges it indispensable to awake him. She wipes her tears, and at last resolves to call her young master; but, too profoundly asleep, he cannot hear her. Then she takes a ferule of leather which is on the table, and gives him a slight blow on the cheek. Siou-ye awakes, rises up in a passion, and abuses Aouana, asking her what made her so bold as to dare to strike him, since she very well knows she is not his mother, but only a slave of his father? He manifests in all his gestures a degree of resentment for that action, which he thinks impertinent. Aouana, who has considered Siou-ye with the expression which a slight fit of anger inspires, rises when she perceives the effects of that storm drawing to an end, and comes to place herself before him. The youth is yet letting fall reproaches from his mouth; but it is already easy to remark that he has a sentiment of his fault. At length Aouana addresses him, and tells him, in a tone full of tenderness, that she well knows she is not his mother. "But," adds she, "where can you now find her from whom you received life, and by whom you have been so cruelly abandoned in your tender infancy? Since that fatal period, who has taken care of your days? who has provided for all your wants? Without doubt nature has not made me your mother; but has my heart ever ceased to have the tenderness and solicitudes of one? Have not old Atay and I laboured, day and night, for a great number of years, to succour all your necessities, in order to give you the most useful of all benefits, that education which in time was to make you a valuable man? Who can be sure that your true father is yet alive? Ah! I now feel it cruelly, I have only taken so much pains, have only experienced so much anguish, for an ungrateful wretch! Already I become the object of your contempt and of your haughty humour. It must be so, since you force me to it; I renounce, for the future, inquietudes which I see are likely to be so unavailing. No, I am not your mother. I restore you to yourself, and will rigidly abstain for the future from all the duties of a sensible soul, of a nurse. May the gods forget your ingratitude, as I do." Siou-ye, who has heard all this tirade without daring to interrupt her (according to the custom of the Chinese children,) and who has listened to all her expressions with a painful attention, through which he discovered from time to

to time movements which expressed repentance, throws himself at the feet of Aouana when she has done speaking. He prostrates himself with his face against the earth. He invokes her pardon; he swears that he has no other mother, and promises her, with a thousand sobs, to have the obedience and respect for her which that title commands. Aouana is overcome, she raises him, promises to forget what is past, and, in mild language, exhorts him to subdue his passions, and thus to render himself, by his moderation, worthy to bear the name of his father. [They both retire afterwards into the interior of the house, and the act finishes.]

ACT IV.—At the moment in which the curtain rises, we see the mandarin Thaye in a vessel which is coming down the river; and he is returning to his dwelling covered with marks of honour and dignities by the emperor, who has raised him to one of the first ranks. He details all that has taken place in his expedition, and terminates by the picture of all the enjoyments which await him on his return to the bosom of his family, after having been separated from it for so great a number of years. He paints to himself the joy which his presence will give rise to, especially at the instant when nothing has announced him. Full of these delicious thoughts, he perceives, on one of the banks of the river, a woman washing linen, surrounded with all that can denote misery. This woman raises her head, looks at the mandarin, thinks she sees a spectre, imagines he is going to pursue her, sets up a cry, abandons her linen, and runs away. While the mandarin is himself moved at this scene, and his ideas are thrown into confusion by this singular rencounter, he is seeking for the explication of it; there comes a second woman that appears as miserable as the former one, and who, bearing a yoke, at which were suspended two buckets, comes to draw water at the river. This woman sees the mandarin, cries out, throws down her buckets, and runs to a distance off. The mandarin now experiences a greater trouble. He reasons on these two circumstances, inexplicable for him, and arrives, full of thought and pensive, at the place which he inhabited.

ACT V.—The curtain rises.—Old Atay appears in a movement and in a disposition of mind very extraordinary, from having learned that his master, become a mandarin of an elevated rank, was approaching. He is occupied, with two young persons, in making ready the hall of reception of the house. At a distance is heard a trumpet, the noise of the gomgom, and successively the sound of other instruments, which announce the arrival of the mandarin, now seen to enter with a part of his suite. He places himself in a great chair at the upper end of the saloon. Old Atay prostrates himself before his master to felicitate him on his return, and sheds tears of joy. His master orders him to rise, and makes his suite retire. Alone with his faithful servant, he enquires into the state of his house; the wives, the child, every thing is the object of his questions. Atay gives him a faithful account; and, in his recital, informs him, that the two wives, after having quitted the spousal house, and having spent some years in a kind of life offensive to good manners, had only reaped shame and misery as the fruit of their deviations; and they had been seen reduced to the occupation of servants to subsist. These details explain to the mandarin the surprise and fear which his presence caused to the two women whom he found by the river side, and who fled at his approach. Atay speaks afterwards, but with brevity, of his zeal and his application. He excuses himself for having done so little, at an age which disenabled him from undertaking more. He extols to the highest degree the cares and the fidelity of Aouana. He relates all her expressions of tenderness for the infancy of her master's son, and the address which she had displayed to excite his emulation, and encourage him in his studies. He praises her activity, her industrious disposition, which nothing could weary night and day, while she was labouring for them. "The gods," added he, "have loaded us with favour by granting to Aouana an unalterable health." At length the old man comes to what concerns the son of his master. He cannot enough praise his ardour for study, and cites as a proof, that the day before he has been nominated licentiate. The mandarin, after having listened with the greatest attention, and a lively sensibility, but without interrupting (a very wise custom of the Chinese) the recital of his old servant, gives him, in his turn, the eulogiums which his attachment merited, and promises to give notice of his conduct to the emperor. He declares that his wives are, for the future, unworthy of his remembrance, and that he is resolved to elevate Aouana to the dignity of spouse, and to invest her with all the marks of honour which the emperor had given him for his wife. He consequently orders Atay to go and seek for Aouana. Aouana appears soon after, and, with an embarrassment which she cannot conceal, salutes her master, and wishes him all the happiness that his fortunate return promises, and the honours which he had received. The mandarin rises from his chair, advances towards her, thanks her for the incomparable cares which she has taken of his son, and of his house. He gives her a thousand applauses for the fidelity which covers her with glory. Aouana defends herself with a rare modesty, and only sees in her own conduct the simple accomplishment of the duty which her master had imposed on her. The mandarin, touched still more at this procedure, assures her that the obligation which he feels from it is so great, that he thinks he has no other method of acknowledging it, than to take her for his wife. He proclaims her then by this title, and taking her by the hand, he conducts her towards a seat where he places her beside him, that she may thus enjoy a right which only belongs to the lawful spouse. Aouana, confused in amazement, obeys, makes a reverence, without uttering a word, (which is, moreover, a striking trait of the submission in which the Chinese manners hold women,) and goes to take the place which is presented to her. A little after arrives Siou-ye, who has just finished the ceremony of his licentiateship, the habit of which he has now on. He throws himself at his father's feet, and remains in that situation until he is ordered to rise. His father testifies for him all the satisfaction which his conduct and his progress had given him, and particularly the respectful regard which he had shewn to Aouana, in whom he had found a true mother. He enjoins him to retain it for her, as she is now really become so, being the legitimate spouse of his father. At these words Siou-ye, full of joy, prostrates himself before Aouana, and pays her homage. The mandarin afterwards orders some domestics to bring the habits of ceremony which the emperor had presented to him for his wife; and he himself decorates Aouana with them, who afterwards repairs with her spouse to make the salute of honour to the emperor, and thank him for his benefits; when Aouana is solemnly proclaimed as spouse of the mandarin, in recompence for her persevering fidelity. In the sequel, the emperor raises old Atay to the rank of mandarin. But this success, perhaps exaggerated, raises this estimable man, as it were, out of himself; and he commits faults which prove that education ought to concur with the finest qualities; and that the virtues which render a domestic worthy of general esteem, do not always suffice to make a mandarin. The emperor ordains, moreover, the erection of a triumphal arch of marble, which, even during the life of Aouana, shall be destined to celebrate her fidelity, and to transmit the same to posterity as an example for them. Feasts, which last many days, terminate the drama.

The original Chinese are described as being rather low than tall in stature, with brown or muddy complexions, and thick lips; though, in the northern provinces, ladies were seen as fair as any Europeans. Beauty, with the native Chinese, consists of a large forehead, broad ears, small eyes, arched eye-brows, a short blunt nose, somewhat turned up, and a chin broad and bulky; the hair is

is universally black, which induces a strong national character in their general appearance. The men encourage the growth of a whisker; but amongst the Chinese there is a great paucity of beard; a few straggling hairs form a pendent beard from the chins of those advanced in life, though it is never greatly conspicuous but in the very aged: the long queue, formed with the hair left to grow from the crown of the head, belongs not to the original Chinese, it is a Tartar custom, introduced only with the present dynasty. The proper names of the original Chinese, independently of the additions which designate their quality, as we are informed by sir George Staunton, are all of one syllable; as is every word in the Chinese language. The additions are the more necessary, as a simple name implies no distinction in favour of the family which bears it. Sir George observes, that there are not above one hundred family names known throughout the empire; and the expression of the hundred names, is often used as a collective term for the whole Chinese nation. Individuals, however, occasionally assume, at different periods, or under different circumstances of their lives, other appellations, expressive of some quality or event. Each family name is borne by persons of all classes. Identity of such names, however, implies some connection. All who bear it, may attend the hall of their supposed common ancestor. A Chinese seldom, if ever, marries a woman of his own family name; but the sons and daughters of sisters married to husbands of two different names, marry frequently: those of two brothers bearing the same name, cannot. The names do not always denote distinctions; and though no hereditary nobility exists in China, pedigree is there an object of much attention. He who can reckon his ancestors to a distant period, as if distinguished by their private virtues, or public services, and by the honours conferred upon them in consequence by the government, is much more respected than new men. The supposed descendants of Confucius are always treated with particular regard; and immunities have been granted to them by the emperors. The ambition of an illustrious descent is so general, that the emperors have often granted titles to the *deceased* ancestors of a living man of merit. Indeed, every means are tried to stimulate to good, and to deter from evil actions, by the reward of praise, as well as by the dread of shame.

Although the customs and manners of the original Chinese bespeak great simplicity, and betray much ignorance with respect to many European inventions and improvements; yet their general or native knowledge is confessedly such, as to prove them always to have been a civilized and enlightened people. Their cycle of sixty years, mentioned at the beginning of this article, as evidence of their high antiquity, is also an irrefragible proof of their early powers of calculation, and knowledge in astronomy. This people are said to have possessed, three hundred years before the birth of Christ, a treatise of Clepsydras and Gnomons, the latter of which directs how to find the latitude of a place, and to draw a meridian line: a degree of knowledge not attained, at that period, even by the Romans, who, for a considerable time, had no other way of determining the meridian, or mid-day, at Rome, than that of observing when the sun came between the senate house and the tribune; and who used for many years a sun-dial calculated for another latitude, imagining that it was equally applicable to all places: an error into which some of the Chinese have been since accused of falling themselves. Ingenious, however, as these people are, they do not seem to have any idea of the earth's motion; but imagine that the sun actually moves through the fixed stars. Their day is divided, as by the ancient Egyptians, into twelve parts only, consisting each of two European hours; the first beginning at eleven at night, and ending at one. These portions of time are measured with tolerable accuracy, by means of a lighted taper made from the pith of a particular tree, of which the consumption by ignition is so regular, that divided into twelve equal parts, each continues burning during the twelfth part of the twenty-four hours. The gradual motion of sand, and the descent of liquids, have been likewise applied to the same purpose. To announce the hour, even at present, in Pekin, they have no better method than that of striking with a mallet upon a large bell a number of strokes corresponding to that of the hour, by a person who must wait and watch the progress of time, as indicated by some of the methods above described. In this state they were found when conquered by the Tartar tribes; and in it they seem ever since to have continued.

The preference shewn to the Tartar race in the present day, has been already noticed. The native Tartar princes usually marry the daughters and nieces of the imperial family, and then hold a distinguished place at court, in consequence of such alliance. Their education is usually directed to the use of the bow and scimitar; weapons which they prefer to all others. These princes are at the head of all the military departments, as being those only in whom the emperor can with safety confide. On their part, they hold the emperor in the greater veneration; as considering him descended from the Tartar prince who conquered China in the thirteenth century. His descendants, being afterwards driven out by Chu, fled into the country of the Manchoos in Eastern Tartary; and from their intermarriages with the natives, sprung the Bog-doi-khans, who, in the seventeenth century, entered China, and formed the present dynasty, under Shun-chi, great grandfather of Tchien-lung, at whose death, in 1799, it had continued one hundred and fifty-five years; the longest dynasty of any four princes in an uninterrupted succession, that can be remembered in any country, except those of the four last reigning princes of the ancient monarchy of France, which had continued one hundred and eighty-three years, when the last sovereign, Louis XVI. was cut off by an untimely death. But the four Chinese reigns, viz. those of Shun-chi, Kaung-hi, Yong-tchien, and Tchien-lung, though extended over a people whose subjection was completed only in the course of them, and who, perhaps, are not yet perfectly reconciled, were not only long but almost beyond example, prosperous. The first, indeed, though begun in a minority, had all the vigour and exertion of a new dynasty; and those which succeeded, were equally remarkable for wisdom, firmness, and activity. That year, which in the British annals is justly termed the glorious 1759, was glorious also to Tchien-lung. He completed in that year the conquest of the Eleuths, who possessed a great portion of what formerly was called Independent Tartary.

It is a singular fact, that although the three last Chinese emperors, as well as the present, Ka-hing, who succeeded to the throne in March 1799, were all born at Pekin, yet they are universally regarded by their subjects, and indeed by themselves, as Tartars. Their principal ministers, their confidential servants, the chiefs of their armies, most of their wives, concubines, domestics, and eunuchs, are of that race. Every male in China, of Tartar parents or descent, is allowed a stipend from his birth, and is registered among the soldiers or servants of the emperor. These form his body guards, to whom his personal safety is confided. Such a preference of Tartars, apparently partial and impolitic, was deemed absolutely necessary in the commencement of the dynasty, when the conquest of the country was not complete, and little reliance was to be placed on the fidelity of those who had been vanquished. It became, however, the source of additional disaffection, which, in its turn, called for the continuance of the measure which produced it. No change in the circumstances of the Tartar and Chinese nations since they became subject to one sovereign, has contributed to their union, or to overcome the opposition approaching to antipathy, which must have

have previously subsisted between a warlike people ever endeavouring to invade, and a civilized people always struggling to exclude, their neighbours. It is still a common saying in the provinces of China where those invaders most abound, that no half dozen of natives are assembled together for an hour, before they begin to clamour against the Tartars. The sovereigns of the present dynasty have, hitherto, ostensibly conformed to, rather than exclusively adopted, the Chinese manners, laws, and language. It is, perhaps, scarcely to be expected, that it will continue long enough upon the throne to melt entirely into Chinese. Sir George Staunton says the mandarins asserted, that a sect had for ages subsisted in the country, whose chief principles were founded upon an antipathy to monarchy, and who nourished hopes of at last subverting it. Their meetings were held in the utmost secrecy, and no man avowed any knowledge of them; but a sort of inquisition was said to be established in order to find them out. Those who were proved to hold or to avow such sentiments, were sentenced to be cut in a thousand pieces; and those only suspected of it, were hunted out of society. It is a singular fact, that in the French zeal for propagating principles of democracy, their declaration of the Rights of Man had been translated into one of the languages in India, and circulated in Hindoostan; from whence it had found its way into China. It is not, indeed, likely to cause any fermentation in the tranquil, submissive, and resigned, minds of the Hindoos, who are of a weak and delicate constitution; but it might be otherwise among the Chinese people, who are more susceptible of such impressions, their disposition being more consonant to enterprize. They are a more bold and hardy race. Their more northern climate tends to render them able as well as resolute. They are abundantly more husbandmen than manufacturers; and, by being exposed to the open air in all seasons, are apt to feel a more undaunted spirit. The minds of many of them, also, are not altogether satisfied with their condition, nor with the tribute claimed for the emperor, which is always the same whether the harvest be scarce or plentiful, which lays them perpetually, both as to their fortunes and their persons, at the mercy of the mandarins. Yet it should seem that the Chinese have in truth but little to complain of on the score of taxation, since they are obviously more favoured than any subjects are in Europe, supposing silver to represent property, and to bear the same proportion to the consumable productions among the former which it does among the latter; for in this way, says sir George Staunton, if the whole revenue were to be reduced to a capitation, it would not amount to more than five shillings a head on the population of the empire; whereas, by an analogous computation, the people of Ireland, before the union, would pay to the government eight shillings a head; those of France, under the monarchy, sixteen shillings a head; and each individual in Great Britain, at least, thirty-four shillings!

The propagation of the gospel, under the Roman catholic missionaries in China, considering the many centuries they have been employed, has certainly made no great progress. Not above one hundred and sixty thousand Christians are calculated to be spread over all the Chinese empire; where both they and their priests are watched with strictness, and are exposed occasionally to persecutions. The missionaries every where, except perhaps at Pekin, lead a laborious, indigent, precarious, and, as to this world, a hopeless, life. Their pittance from Europe is truly trifling; and this pittance they divide frequently with their flock, more miserable, sometimes, than themselves. The chief comforts of the former are dervied from a consciousness of the personal attachment and veneration of those disciples towards them. Some of the missionaries may, indeed, prefer this independent mode of life, such as it is, to the cloisters, to which they had been formerly confined; but, in general, their conduct implies sentiments and maxims rarely to be found, and scarcely suspected to exist, by the more worldly-minded portion of mankind.

The city of Canton, at which the embassy finally terminated its route, being the only Chinese port allotted for general commerce, it has in consequence a number of foreigners mixed with the natives. The factories belonging to different European nations, each of which has its peculiar flag flying, are handsome buildings, arranged in a line along the river, without the city walls; and around the neighbourhood are warehouses for the reception of articles for sale, as well as for Chinese merchandize for exportation. Whatever purchases are made for the English East-India company, is done by agents, whose liberal emoluments place them above the temptation of fraudulent or dishonourable practices; and who are bred in the habits of method, punctuality, and probity, the characteristics of a good merchant. Besides all which the superiority of their returns, over and above every competitor, fails not to gain them respect and esteem, even in spite of malevolence and envy. The present state of the trade between England and China, as stated by sir George Staunton, is as follows:—A few years ago, the exports to China, on the company's account, in English goods and in English bottoms, scarcely exceeded 100,000l. per annum. The private trade was nearly as much. The balance for teas and other goods was paid in silver. Since the commutation act, the exports have been gradually rising, but are yet far from having reached their highest point. There were imported into Canton in 1792, from England, in sixteen company's ships, to the amount of nearly 1,000,000l. in lead, tin, woollens, together with furs, and other articles of private trade. The order for woollens only the following year, was 250,000l. higher than the preceding year. The value of exports from China to England in 1794, was above 1,500,000l. prime cost, besides freight and charges of merchandize, and will have probably produced above 3,000,000l. The legal trade from the British dependencies in India to Canton, in 1792, amounted to very near the sum of 700,000l. besides opium, which is clandestinely imported there, to the amount of about 250,000l. The articles legally imported consisted of cotton, tin, pepper, sandal-wood, elephants teeth, and bees-wax. The exports from Canton to India, amounted only, in 1792, to 330,000l. leaving a vast balance in favour of India, which is paid in cash. The articles purchased for India, consist chiefly of raw and wrought silk, sugar, and sugar-candy, tutenag, alum, porcelain, camphor, Nankeen cloth, quicksilver, and turmeric. The total imports from foreign European nations to Canton, in 1792, amounted to 200,000l. and their exports to upwards of 600,000l. Many of the imports were of British manufacture.

From a recent regulation at Canton, three commissioners have constant residence at the English factory, exclusive of the former number of supercargoes and writers. They were delegated by the company to notify, in form, at the court of Pekin, the embassy intended from Great Britain, as well as to superintend and direct the company's affairs at Macao and Canton. These gentlemen having furnished the ambassador with a particular statement of the oppressions and personal indignities experienced by their agents, enabled him to add to the remonstrances before presented to the viceroy. In consequence of this, two edicts were forthwith issued against the frauds practised on foreigners in their commercial transactions, as well as the insults offered to their persons; in virtue whereof several offenders were severely punished. Among the grievances stated by the commissioners, and which was included in the remonstrance of the ambassador, was that of the natives being prohibited from instructing Europeans in the Chinese language. The viceroy was at a loss to judge on what principle such a prohibition could have taken place, which deprived foreigners of the means of transacting their own affairs, as

well as that of acquiring a knowledge of, in order to conform themselves to, the laws and customs of the country. In this particular the viceroy assured his excellency that no farther obstruction should be given on the part of government.

The real disposition of the viceroy to cherish and protect the English, was countenanced by recent dispatches from the emperor, who therein expressed the welcome which would be given at his court to another embassy from the king of Great Britain, and his desire that notice might be timely given of the minister's arrival at Canton, that proper persons might be dispatched thither to conduct him to Pekin. And by an extract from another letter it was stated, that as his imperial majesty intended to resign the reins of government in the fifty-seventh year of their current cycle, corresponding to our year 1796, he wished to see such minister at, or as soon as convenient after, that time. "Thus," says the learned secretary, "the embassy, according to the expectations which led to the undertaking, but contrary to the prospects which clouded it sometimes in its progress, succeeded, at length, not only in obtaining permission, but in receiving an invitation, for a similar intercourse with the court of China, whenever the government of Great Britain and the company shall deem expedient to renew it."

All the buildings erected for the purposes of commerce, and for transactions in trade with any foreigner, are obliged to be without the city walls. This necessarily renders the out-buildings unusually extensive. The vast numbers of strangers always to be seen in the suburbs, while their ships are unloading and loading in the river; their various languages, dresses, and characteristic deportment, would leave it almost a doubt, if a judgment were to be formed from a view on this side of the city, to what particular nation it belonged. The Chinese artists at this place are very skilful and ingenious. They manufacture a number of trinkets in gold, silver, and particularly in their white copper, which the Chinese do not wear; but which are sold in Europe as Chinese ornaments. Their white copper takes a beautiful polish; and many articles which have the appearance of silver, are formed only of this metal. An accurate analysis of it lately made, has determined it to consist of copper, zinc, a little silver, and, in some specimens, a few particles of iron, and some nickel, have been found. Tu-te-nag is, properly speaking, zinc, extracted from a rich ore, or calamine. The Chinese make early and great use of spectacles, which are manufactured at Canton, and formed of crystal. The glass beads and buttons of various shapes and colours, worn by persons of rank in China, are chiefly made at Venice; and this is among the remnants of the great and almost exclusive trade which the Venetians formerly carried on with the east. Canton seems to be almost the only place in China where any house is to be seen with glass windows, or chimnies; a style of building evidently introduced there by the Europeans, who first erected them in the suburbs. Within the city, indeed, very few windows are to be seen but what are constructed of paper, as is the custom throughout China; nor are there many houses with chimneys, although the Chinese at Canton seemed very fond of indulging in the comforts of an open fire-side, while engaged at the ambassador's hotel. The business of the embassy having been concluded, as stated above, the ambassador and his suite took their final departure from Canton; and, after some stay at the Portuguese settlement of Macao, they set sail for Europe on the 17th of March 1794, and arrived safe at Portsmouth on the 6th of September following.

CHI'NA, *s.* [from *China*, the country where it is made.] China ware; porcelain; a species of vessels made in China, dimly transparent, partaking of the qualities of earth and glass. See PORCELAIN.

Spleen, vapours, or small-pox, above them all;
And mistress of herself, tho' *china* fall. *Pope.*

CHI'NA, *s.* in botany; see SMILAX.

CHI'NA ORANGE, *s.* The sweet orange; brought originally from China.—Not many years has the *China orange* been propagated in Portugal and Spain. *Mortimer.*

CHI'NA PINK, *s.* in botany; see DIANTHUS.

CHI'NA ROOT, *s.* A medicinal root, brought originally from China. See SMILAX.

CHI'NA ROSE, *s.* in botany; see HIBISCUS.

CHIN'CA, a valley of South America, in Peru, where the ancient incas had formerly built a temple, dedicated to the sun. It once contained 25,000 inhabitants, now reduced to about 500 families; the town, which gives name to a valley, lies sixteen miles north of Pisco. When this country was conquered by the Spaniards, Pizarro desired the king of Spain that this might be the limits of his government on the south, and that the river St. Jago should bound it on the north. The valley bears good wheat, and Spanish vines thrive well in it.

CHINCHIL'LA, a town of Spain, in the province of Murcia: twenty-five leagues south-west of Valencia. Lat. 38.48. N. lon. 14.53. E. of the Peak of Teneriffe.

CHIN'CHINA, *s.* in botany; see CINCHONA.

CHIN'CHIO, a town of European Turkey, in the province of Dalmatia: six miles east of Spalatro.

CHIN'CON, a town of Spain, in New Castile: eighteen miles east-south-east of Madrid.

CHIN'COUGH, *s.* [perhaps more properly *kincough*, from *kinckin*, to pant, Dut. and *cough*.] A violent and convulsive cough, to which children are subject. See MEDICINE.

CHINE, *s.* [*eschine*, Fr. *schiena*, Ital. *spina*, Lat. *cein*, Arm.] The part of the back in which the spine or backbone is found:

He presents her with the tusky head,
And *chine* with rising bristles roughly spread. *Dryden.*

A piece of the back of an animal.—He had killed eight fat hogs for this season, and he had dealt about his *chines* very liberally amongst his neighbours. *Addison.*

To CHINE, *v. a.* To cut into chines.—He that in his line did *chine* the long-ribb'd Apennine. *Dryden.*

CHINE (La), a town of Lower Canada, in British America, situated in a bay of lake St. Louis, which is a broad part of the river St. Lawrence. Here are considerable storehouses belonging to the king of Great Britain, and also to the merchants of Montreal. In the former, the presents occasionally distributed among the neighbouring Indian chiefs, are deposited as soon as they arrive from England; and prior to their being sent up the country, they are inspected by the commanding officer of the garrison of Montreal, and a committee of merchants, who are bound to make a faithful report to government, whether the presents are agreeable to the contract. Opposite La Chine stands a village of the Cochenonaga Indians, containing a Roman-catholic church, built in the Indian style, and ornamented with pictures, lamps, &c. in such a manner as to attract the eye as forcibly as possible. The outward show, and numerous ceremonies of the Roman-catholic religion, are particularly suited to the capacities of the Indians. In this and all the other Indian villages situated in Lower Canada, a great mixture of the blood of whites with that of the aborigines, is observable in the persons of the inhabitants; there are also considerable numbers of the French Canadians living in these villages who have married Indian wives, and have been adopted into the different nations with whom they reside. Many of the French Canadians bear such a close resemblance to the Indians, owing to their dark complexions, black eyes, and long black hair, that when attired in the Indian habit, it is only a person intimately acquainted with the features of the Indians, that can distinguish the one race of men from the other. The dispositions of the two people also accord in a very striking manner; both are averse to a settled life, and to regular habits of industry; both

both are fond of roving about, and procuring sustenance by hunting, rather than by cultivating the earth. Nature seems to have implanted in their hearts a reciprocal affection for each other; they associate together, and live on the most amicable terms; and to this one circumstance, more than to any other cause, is to be attributed that wonderful ascendency which the French were ever known to have over the Indians, whilst they had possession of Canada. It is very remarkable indeed, that in the upper country, notwithstanding that presents to such a very large amount are given amongst the Indians through the hands of the English inhabitants, and that their natural rights are protected, yet an Indian, even at this day, will always go to the house of a poor French farmer, in preference to that of an Englishman.

CHINE'SE, *adj.* Any thing belonging to China, or its inhabitants.

CHINE'SE SHADES, an ingenious amusement, in imitation of dramatic performances; the artifice of which consists in moving, by means of pegs or wires fastened to them, a variety of figures cut out of pasteboard, the joints of which are made pliable by turning on a pin or pivot. These figures are exhibited so as to represent various scenes, behind a partition of fine painted gauze, fixed before an opening in a curtain, the shadows of which are thrown on the gauze by means of a light reflected from a mirror, towards the apartment where the spectators sit. When it is required to cause these figures to perform a variety of movements, it is necessary to have several persons, who must be exceedingly expert. This amusement, which can hardly be seen the first time without pleasure, is really a Chinese invention, mostly used at their well-known feast of lanterns, when they exhibit an infinite variety of tragic and comic scenes, feats of agility, combats between men and animals, ships and vessels moving on the water, &c. That these amusements were common in Egypt, we are told by Prosper Alpinus, who admired them much; though he was not able to discover the method by which they were performed, it being then kept a profound secret. The magic lantern is an optical illusion arising out of this Asiatic invention. See DIOPTRICS.

CHI'NEY, or CINEY, a town of Germany, in the circle of Westphalia, and bishopric of Liege, in the country of Condroz: ten miles north-east of Dinant, and twenty-eight south-south-west of Liege.

CHING, a town of China, of the second rank, in the province of Pe-tche-li, 125 miles south-south-west of Pekin. Lat. 38. 4. N. lon. 133. 6. E. Ferro.

CHING, a town of China, of the third rank, in the province of Tche-kiang, ten leagues south of Chao-hing.

CHING-CONGO, a river of Hindoostan, which rises in the Ellichpour country, and runs into the Godavery, sixteen miles south-west of Neermul.

CHING-HAI, a town of Asia, in the kingdom of Corea, sixty miles east-south-east of Kang-tcheou.

CHING-KIEOU, a town of China, of the third rank, in the province of Ho-nan, fifteen leagues north-east of Yun-hing.

CHING-LI, a town on the north-west coast of the Chinese island of Hai-nan, of the third rank, twelve miles west of Kiong-tcheou.

CHING-MOU, a town of China, of the third rank, in the province of Chen-si, on the river Kiu, fifty miles north-north-west of Kia.

CHING-TCHEN, a town of China, of the third rank, in the province of Chen-si, twenty miles north of Tong.

CHING-YANG, or MOUCDAN HOTUN, a town of Chinese Tartary, 120 leagues east-north-east of Pekin. Lat. 41. 52. N. lon. 141. 3. E. Ferro.

CHINGOLEAGU'L, a small island of America, near the east coast of Virginia. Lat. 37. 56. N. lon. 75. 26. E. Greenwich.

CHI'NIZ, a town of Persia, in the province of Farsistan, situated on the gulf of Persia, 140 miles west of Schiras.

CHINK, *s.* [cinan, to gape, Sax.] A small aperture longwise; an opening or gap between the parts of any thing.—Though birds have no epiglottis, yet they so contract the *chink* of their larinx, as to prevent the admission of wet or dry indigested. *Brown.*

In vain she search'd each cranny of the house,
Each gaping *chink* impervious to a mouse. *Swift.*

To CHINK, *v. a.* [derived by Skinner from the sound.] To shake so as to make a sound:

He *chinks* his purse, and takes his seat of state;
With ready quills the dedicators wait. *Pope.*

To CHINK, *v. n.* To sound by striking each other.—Lord Strutt's money shines as bright, and *chinks* as well, as 'squire South's. *Arbuthnot.*

CHIN'KY, *adj.* Full of holes; gaping; opening into narrow clefts:

Grimalkin, to domestic vermin sworn
An everlasting foe, with watchful eye
Lies nightly brooding o'er a *chinky* gap. *Philips.*

CHIN'NA BALABARAM', a town of Hindoostan, in the Mysore country, eighty-five miles north-east of Seringapatam. Lat. 13. 25. N. lon. 77. 56. E. Greenwich.

CHINNOR', *s.* A musical instrument among the Hebrews, consisting of thirty-two chords.

CHINON', a town of France, and principal place of a district, in the department of the Indre and Loire, situated on the Vienne, and defended by a strong castle; it contains about 5000 inhabitants. It is eight leagues west-south-west of Tours, and four and a half south-east of Saumur.

CHIN'QUAPINE, *s.* in botany; see FAGUS.

CHINSU'RA, a town of Hindoostan, in the country of Bengal, situated on the west side of the Ganges, belonging to the Dutch. The houses are built in the European stile; the town is populous and commercial. The fortress is defended by four bastions and a ditch, according to the European form of military architecture; twenty-four cannons defend the passage of the river. It is seventeen miles north of Calcutta.

CHINTS, *s.* Cloth of cotton made in India, and printed with colours:

Let a charming *chints*, and Brussels lace,
Wrap my cold limbs, and shade my lifeless face. *Pope.*

CHINY', a town of the Netherlands, in the duchy of Luxemburg, on the Semoy, the capital of a comté; it was first surrounded with walls about the year 950, by Arnold de Bourgogne, and was heretofore celebrated for its beauty and riches, but has suffered greatly in different wars. The comté is of great extent, including thirteen cities or capital towns, viz. Battogne, Chiny, Dierich, Durbuy, Honfalize, Marche-en-Famine, Neufchateau, Roche, St. Hubert, St. Vit, Schleyden in the diocese of Treves, Vianden, and Virton, with all the villages depending thereon; in a word, this comté comprehends more than some maps describe under the name of the duchy of Luxemburg. A peasant of Condroz, being asked what was the extent of the comté of Chiny, answered very ingenuously, he had heard at Metz that it comprehended one-half of the world, and that the other half was dependant on it. Neither the city nor comté are dependant on the duchy of Luxemburg, having its own particular jurisdiction. The comté sometimes is called imperial, and has been at all times considerable. Bruno, the twenty-seventh archbishop of Cologn, and chancellor of the empire, erected it into a comté, about the same time the city was surrounded with walls. It passed afterwards to the house of Looz, by the marriage of Jane, comtesse de Chiny, with Arnold, comte de Looz, whose youngest son Louis became comte of Chiny; but he dying without a son, the comté passed to Thierry, lord of Hinsberg, and afterwards to Margaret, only daughter of Louis comte of Chiny, and Jeanne de Blamont. After the death

death of Margaret, widow of John duke of Lorrain, who died in 1372, without children, the comté passed to Charles IV. emperor and comte of Luxemburg, who invested his brother Wenceslaus with the sovereignty, united with the duchy of Luxemburg, only reserving the title in all public acts, which was observed till the comté was yielded to France, in 1681, under the pretext that it was a fief of the duchy of Bar. It at present belongs to the house of Austria, being adjudged to it by the treaty of Ryswick. It is five leagues west of Arlon, and nine west of Luxemburg.

CHI'O, or CHIOS, in ancient geography, an island near the coast of Natolia, opposite to the peninsula of Ionia. It was known to the ancients by the name of Æthalia, Macris, Pithynsa, &c. as well as that of Chios. According to Herodotus, the island was peopled originally from Ionia. It was at first governed by kings; but afterwards the government assumed a republican form, which by the direction of Isocrates was modelled after that of Athens; during which it was celebrated as not having had the sin of adultery committed in it for seven hundred years! It is now called Scio, which see.

CHIOCOC'CA, *s.* [from χιων, snow, and κοκκος, a berry.] In botany, a genus of the class pentandria, order monogynia, natural order of aggregatæ. The generic characters are—Calyx: perianthium five-toothed, superior, permanent. Corolla: monopetalous, funnel-form; tube long, spreading; border five-parted; divisions equal, acute, reflected. Stamina: filaments five, filiform, length of the corolla; antheræ oblong, erect. Pistillum: germ inferior, roundish, compressed; style filiform, length of the stamens; stigma simple, obtuse. Pericarpium: berry roundish, compressed, crowned with a calyx, one-celled. Seeds: two, roundish, compressed, distant.—*Essential Character.* Corolla funnel-form, equal; berry one-celled, two-seeded, inferior.

Species. 1. Chiococca racemosa, or climbing snowberry-tree, or David's root: scandent, leaves broad-lanceolate, flowers lateral, panicle-racemed, one stipular tooth. Stem a fathom in height and more, with smooth loose branches spreading out horizontally; leaves petioled, opposite, oblong, acuminate, nerved, glittering on the upper surface, and smooth; berry snow-white; seeds two, oblong, acuminate. This plant is very nearly allied to the genus psychotria; but it differs not only in the manner of flowering, which is always in a raceme, but also in the form of the corolla, the berry, and the seeds. According to Browne's account, it begins to branch immediately above the root, and rises by many shoots and slender twigs from four to seven or eight feet, then requiring support. The racemes are very slender and numerous towards the top of the branches, and are both terminating and axillary. The snow-white berries are of a loose texture, and very numerous. The root has much the same bitter acrid taste with the Seneka snake-root, and has been long used as a strong resolutive and attenuant: it is administered with great success in obstinate rheumatisms, and old venereal taints; nor is it entirely useless even in the spina ventosa: it is best given in a decoction. Native of the West Indies; as in woods, on the lower mountains of Jamaica. It flowered in Mr. Sherard's garden at Eltham in 1729, and was sent thither by Mr. Warner, a merchant of London, who received it from Barbadoes. Jacquin observed it in St. Domingo, and also at Carthagena. There is a variety of this, (Browne's Jam. No. 2.) which grows to a considerable height, and throws some of its slender twigs again to the ground. The leaves are very like those of the foregoing, but smaller, subconvex, somewhat rigid, and glittering; the racemes are short and simple; the corollas a little larger, pale-coloured, but purple at the corners.

2. Chiococca barbata: erect, leaves ovate, peduncles axillary, one-flowered, corollas bearded in the throat. This is a native of the Marquesas, Society, and Friendly, Islands, in the South Seas.

Propagation and Culture. The first species is propagated by seeds procured from the West Indies: to be sown in pots plunged in a moderate hot-bed, where they may remain till the autumn, when they should be removed into the stove for the winter, and the following spring placed on a fresh hot-bed, to bring up the plants, for they rarely come up the first year. When they are fit to remove, plant them each in a separate small pot filled with light earth, and plunge them in a fresh hot-bed, shading them from the sun till they have taken new root, and then treating them as other tender plants from hot countries. As they obtain strength, the plants may be set abroad in a sheltered situation for two months or ten weeks, in the warmest part of the summer, and in the winter they may be placed in a dry stove, kept to a moderate degree of warmth, where they will thrive, and produce flowers in autumn. See CESTRUM NOCTURNUM and PSYCHOTRIA.

CHIONAN'THUS, *s.* [from χιων, snow, and ανθος, a flower.] In botany, the FRINGE or SNOWDROP-TREE; a genus of the class diandria, order monogynia, natural order sepiariæ. The generic characters are—Calyx: perianthium one-leafed, four-parted, erect, acuminate, permanent. Corolla: monopetalous, funnel-form; tube very short, length of the calyx, spreading; border of four divisions, which are linear, erect, acute, oblique, most extremely long. Stamina: filaments two, very short, subulate, inserted into the tube; antheræ cordate, erect. Pistillum: germ ovate; style simple, length of the calyx; stigma obtuse, trifid. Pericarpium: drupe round, one-celled. Seed: nut striated. The number of stamens is often three.—*Essential Character.* Corolla quadrifid, with the divisions extremely long; drupe with a striated nut.

Species. 1. Chionanthus Virginica, or Virginia fringe-tree, or snowdrop-tree: peduncles three-cleft, three-flowered. This shrub is common in South Carolina, where it grows by the sides of rivulets, and seldom is more than ten feet high: the leaves are as large as those of the laurel, but are of a much thinner substance; the flowers come out in May, hanging in long bunches, and are of a pure white, from whence the inhabitants call it snowdrop-tree; and, from the flowers being cut into narrow segments, they give it the name of fringe-tree. After the flowers have fallen away, the fruit appears, which becomes a dark-coloured drupe, about the size of a sloe, having one hard seed in it. It varies with a four, five, and six, cleft corolla, and four stamens: also, with broader or ovate-elliptic, and with narrower or lanceolate, leaves. Introduced in 1736 by Peter Collinson, esq.

2. Chionanthus Zeylanica, or Ceylon snowdrop-tree: peduncles panicled, many-flowered. Leaves smooth on both sides, thicker than in the first species. The panicle has often forty flowers, and the petals are much shorter. The fruit is a berried drupe, superior, obovate, smooth, black; the shell is bony, thin, marked on the outside with six or eight raised filiform streaks; within it is very smooth, and it does not open with valves. The seed is an oblong spheroid, and bay-coloured.

3. Chionanthus compacta: panicles trichotomous, the last flowers subcapitate, calyxes villose, leaves lanceolate-oblong, antheræ acuminate. This is a tree fifteen feet in height, covered with a dusky ash-coloured bark. Leaves opposite, on short petioles, sharp at the base, narrowed into a long sharp and sometimes sickle-shaped termination, quite entire, thickish, firm, shining, about half a foot in length, and an inch and half in breadth. The first species differs from this in having smooth calyxes; and the second differs from both in having the leaves villose underneath. Native of the Caribbee islands.

4. Chionanthus mayepea: panicles axillary, trichotomous, all the flowers distinct, antheræ obtuse. This is a middle-sized tree, five or six feet high, and five inches in diameter, the wood and bark whitish. Leaves thin, firm, long, oval, ending in a point; the largest seven inches long and two wide, on a short petiole. Fruit the size of an olive; rind violet, succulent, two lines thick, bitter.

The

The flowers exhale a sweet and pleasant odour. Native of the forests of Guiana.

Propagation and Culture. The best way to obtain good plants is from the seeds, which must be procured from America, for they never have produced any fruit in this country. The seeds should be sown in small pots filled with fresh loamy earth soon after they arrive, and should be placed under a hot-bed frame, where they may remain till the beginning of May, when they must be removed to a situation exposed to the morning sun, and screened from the sun in the middle of the day. In dry weather the pots must be watered, and kept clean from weeds; for, as these seeds lie in the ground a whole year before the plants will come up, they should not be exposed to the sun the first summer, but the following autumn they should be removed, and placed under a frame, to protect the seeds from being injured by the frost; and, if the pots are plunged into a moderate hot-bed the beginning of March, it will bring up the plants much sooner than they will otherwise rise; by which means they will get more strength the first summer, and be better able to resist the cold of the next winter. While these plants are very young, they will be in danger of suffering by severe frost; but when they have obtained strength, they will resist the greatest cold of our climate in the open air; therefore, for the two or three first winters, it will be proper to keep them under shelter; so that the young plants may remain in the seed-pots all the first summer, and the following winter; and in the spring, before they begin to shoot, they should be shaken out of the pots, and carefully separated so as not to break off their roots, and each planted in a small pot filled with light loamy soil, and plunged into a very moderate hot-bed, just to forward their taking fresh root; then they should be gradually inured to the open air, and during the following summer the pots should be plunged into the ground, to prevent the earth from drying, in a situation where they may enjoy the morning sun, but screened from the great heat of noon. During the summer season, they will require to be frequently watered, and kept clean from weeds. The autumn following they should be again placed under a hot-bed frame to screen them from frost; but they should enjoy the free air at all times, when the weather is mild. The April following the plants may be shaken out of the pots, with the ball of earth to their roots, and planted where they are designed to remain.

CHI'ONE, a daughter of Dædalion, of whom Apollo and Mercury became enamoured. To enjoy her company, Mercury lulled her to sleep with his caduceus, and Apollo, in the night, under the form of an old woman, obtained the same favours as Mercury. From this embrace Chione became mother of Philammon and Autolycus, the former of whom, as being son of Apollo, became an excellent musician; and the latter was equally notorious for his robberies, of which his father Mercury was the patron. Chione grew so proud of her commerce with the gods, that she even preferred her beauty to that of Juno, for which impiety she was killed by the goddess, and changed into a hawk. *Ovid.*

CHIOP'PINE, *s.* [from *chapin*, Span.] A high shoe, formerly worn by ladies.—Your ladyship is nearer heaven than when I saw you last, by the altitude of a *chioppine*. *Shakespeare.*

CHIOURLIC', a town of European Turkey, in Romania, the see of a Greek bishop, situated on a river of the same name: fifty miles north-west of Constantinople.

CHI'OZ, a town of Poland, in the palatinate of Sandomirz: thirty-six miles north of Malogocz.

CHIOZ'ZA, a small island in the Adriatic, near the coast of Italy, not far from the mouth of the Brenta, with a town of the same name, the see of a bishop, suffragan of Venice: the town contains three churches and eight monasteries. It is thirteen miles south of Venice. Lat. 45. 15. N. lon. 30. E. Ferro.

CHIP, CHEAP, CHIP'PING, in the names of places, imply a market; from the Saxon cyppan, ceapan, to buy. *Gibson.*

To CHIP, *v. a.* [probably corrupted from *chop*.] To cut into small pieces; to diminish by cutting away a little at a time.—Industry taught to *chip* the wood, and hew the stone. *Thomson.*

His mangled myrmidons,
Noseless, handless, hackt and *chipt*, come to him,
Crying on Hector. *Shakespeare.*

CHIP, *s.* A small piece taken off by a cutting instrument:

The straw was laid below;
Of *chips* and serewood was the second row. *Dryden.*

A small piece however made.—The manganese lies in the vein in lumps wrecked, in an irregular manner, among clay, spar, and *chips* of stone. *Woodward.*

CHIP'PENHAM, or CHIPPINGHAM, a borough town in the county of Wilts, situated on the river Avon, over which it has a handsome stone bridge of sixteen arches; distant ninety-three measured miles from London, thirteen from Bath, and twenty-two from Bristol. Chippenham is governed by a bailiff and twelve burgesses; and is said to have been, in the days of Alfred, one of the finest and strongest cities of the kingdom; the taking of which by the Danes, about the year 880, was a principal cause of the memorable retreat of that great and good king. The chief trade of the place is the manufacture of superfine woollen-cloths. It has four fairs annually; on the 17th of May, 22d of June, 29th of October, and 11th of December. Here is an established and very considerable market for corn, &c. on Saturdays.

CHIP'PING, *s.* A fragment cut off.—They dung their land with the *chippings* of a sort of soft stone. *Mortimer.*

CHIP'PING, *s.* An operation used in the China manufactory, for which see PORCELAIN.

CHIP'PING NORTON, a borough town in Oxfordshire, with a market on Wednesday for corn, &c. and seven annual fairs, viz. March 7th, May 6th, last Friday in May, July 18th, September 4th, November 8th, and the last Friday in November. It is governed by two bailiffs and twelve burgesses. Here is a free grammar-school, founded by Edward VI. The church is a noble structure in the Gothic taste, 98 feet long by 87 feet wide, the middle aisle 46 feet high, and much noticed for its light and curious workmanship in the windows. On Chapelheath, near the town, are the Rollrich-stones, a Stonehenge in miniature, being a circle of stones standing upright, some of them from five to seven feet high, and probably the vestigia of an old British temple. The town is situated on the turnpike-road from London to Worcester; distant from London seventy-four miles, and from Worcester thirty-seven. There is a considerable manufactory carried on here for horse-clothing, tilting, harrateens, &c.

CHIPPIO'NA, a town of Spain, in the country of Seville, situated on a rock near the coast of the Atlantic: five miles south-west of San Lucar de Barremeda.

CHIQUI'TOS, a province of South America, in the government of Buenos Ayres, inhabited in 1732 by seven Indian nations, each composed of about 600 families.

CHI'RAC, a town of France, in the department of the Lozere, and chief place of a canton, in the district of Marvejols: one league south-west of Marvejols.

CHIRA'GRICAL, *adj.* [from *chiragra*, Lat.] Having the gout in the hand; subject to the gout in the hand.—*Chiragrical* persons do suffer in the finger as well as in the rest, and sometimes first of all. *Brown.*

CHI'RAS. See SCHIRAS.

CHI'RENS, a town of France, in the department of the Isere, and chief place of a canton, in the district of La Tour-du-Pin: five leagues north-north-west of Grenoble.

CHIREZOUR', a town of Asiatic Turkey, in the province of Kurdistan: fixty miles east of Mosul, and one hundred south of Betlis.

CHIRIQUI', or CHIRIQUITA, a town of Mexico, in the province of Veragua, on the coast of the Pacific Ocean, with a harbour, about a league from the sea, and eight miles from the town: thirty leagues west of St. Jago. Lat. 11. 20. N. lon. 65. 50. W. Ferro.

CHIRIVICO'LA, a town of Italy, in the kingdom of Naples, and province of Capitanata: nine miles south-west of Viesta.

CHI'ROGRAPH, *s.* [*chirographum*, or *scriptum chirographatum*.] Any public instrument or gift of conveyance, attested by the subscription and crosses of witnesses, was in the time of the Saxons called *chirographum*; which being somewhat changed in form and manner by the Normans, was by them stiled *charta*: in following times, to prevent frauds and concealments, they made their deeds of mutual covenant in a *script* and *rescript*, or in a part and counter-part, and in the middle, between the two copies, they drew the capital letters of the alphabet, and then tallied or cut asunder in an indented manner, the sheet or skin of parchment; which being delivered to the two parties concerned, were proved authentic by matching with, and answering to, one another: and when this prudent custom had for some time prevailed, then the word *chirographum* was appropriated to such bipartite writings or indentures. Anciently when they made a *chirograph* or deed, which required a counter-part, they ingrossed it twice upon one piece of parchment contrariwise, leaving a space between, in which they wrote in great letters the word CHIROGRAPH; and then cut the parchment in two, sometimes even and sometimes with indenture, through the midst of the word: this was afterwards called *dividenda*, because the parchment was so divided or cut; and it is said the first use of these *chirographs* was in Henry the Third's time.

Chirograph was of old used for a fine; the manner of ingrossing whereof, and cutting the parchment in two pieces, is still observed in the Chirographer's office: but as to deeds, that was formerly called a *Chirograph*, which was subscribed by the proper hand-writing of the vendor or debtor, and delivered to the vendee or creditor: and it differed from *syngraphus*, which was in this manner, viz. Both parties, as well the creditor as debtor, wrote their names and the sum of money borrowed, on paper, &c. and the word SYNGRAPHUS in capital letters in the middle thereof, which letters were cut in the middle, and one part given to each party, that upon comparing them (if any dispute should arise) they might put an end to the difference.

CHIRO'GRAPHER, *s.* [χειρ, the hand, and γραφω, to write.] He that exercises or professes the art or business of writing.—Thus passeth it from this office to the *chirographer*'s, to be engrossed. *Bacon.*

CHIRO'GRAPHER OF FINES, [*chirographus finium & concordiarum*; of the Greek χειρογραφος, a compound of χειρ, *manus*, the hand, and γραφω, *scribo*, I write; a writing of a man's hand.] In law, that officer in the common pleas who ingrosseth fines, acknowledged in that court into a perpetual record, after they are examined and passed in the other offices, and that writes and delivers the indentures of them to the party: and this officer makes out two indentures, one for the buyer, another for the seller; and also makes one other indented piece, containing the effect of the fine, which he delivers to the *custos brevium*, which is called the *foot of the fine*. The chirographer likewise, or his deputy, proclaims all the fines in the court every term, according to the statute, and endorses the proclamations upon the backside of the foot thereof; and always keeps the writ of covenant, and note of the fine. The chirographer shall take but 4s. fee for a fine, on pain to forfeit his office, &c. Statutes 2 Hen. IV. c. 8. 23 Eliz. c. 3. 2 *Inst.* 468.

CHIRO'GRAPHIST, *s.* This word is used in the following passage, Johnson says, improperly, for one that tells fortunes by examining the hand: the true word is *chirosophist* or *chiromancer*.—Let the physiognomists examine his features; let the *chirographists* behold his palm; but, above all, let us consult for the calculation of his nativity. *Arbuthnot.*

CHIRO'GRAPHY, *s.* The art of writing.

CHI'ROMANCER, *s.* One that foretels future events by inspecting the hand:

The middle sort, who have not much to spare,
To *chiromancers'* cheaper art repair,
Who clap the pretty palm, to make the lines more fair.
Dryden.

CHI'ROMANCY, *s.* [from χειρ, the hand, and μαντις, a prophet.] The art of foretelling the events of life, by inspecting the hand. See the article DIVINATION.

CHI'RON, a famed personage in antiquity, styled by Plutarch *the wise Centaur*. Sir Isaac Newton places his birth in the first age after Deucalion's deluge, commonly called *the golden age*; and adds, that he formed the constellations for the use of the Argonauts, when he was eighty-eight years old; for he was a practical astronomer, as well as his daughter Hippo: he may, therefore, be said to have flourished in the earliest ages of Greece, as he preceded the conquest of the Golden Fleece, and the Trojan war. He is generally said to have been born in Thessaly among the Centaurs, who were the first Greeks that had acquired the art of breaking and riding horses; whence the poets, painters, and sculptors, have represented them as a compound of man and horse; and perhaps it was at first imagined by the Greeks, as well as the Americans, when they first saw cavalry, that the horse and the rider constituted the same animal. Chiron was represented by the ancients as one of the first inventors of medicine, botany, and chirurgery, a word which some etymologists have derived from his name. He inhabited a grotto or cave in the foot of mount Pelion, which, from his wisdom and great knowledge, became the most famous school throughout Greece. Almost all the heroes of his time were fond of receiving his instructions; and Xenophon, who enumerates them, names the following illustrious personages among his disciples: Cephalus, Æsculapius, Melanion, Nestor, Amphiaraus, Peleus, Telamon, Meleager, Theseus, Hippolitus, Palamedes, Ulysses, Mnestheus, Diomedes, Castor and Pollux, Machaon and Podalirius, Antilochus, Æneas, and Achilles. From this catalogue it appears, that Chiron frequently instructed both fathers and sons; and Xenophon has given a short eulogium on each. In the heathen mythology, Chiron is represented as half a man and half a horse, son of Philyra and Saturn, who had changed himself into a horse, to escape the enquiries of his wife Rhea. He was wounded in the knee by a poisoned arrow shot by Hercules, in his pursuit of the Centaurs. Hercules flew to his assistance; but as the wound was incurable, and the cause of the most excruciating pains, Chiron begged Jupiter to deprive him of immortality. His prayers were heard, and he was placed by the god among the constellations, under the name of Sagittarius. *Hesiod.* Mr. Bryant represents Chiron as a tower or temple personified by that name. He says, "this temple stood at Nephele in Thessaly, and was inhabited by a set of priests, called *Centauri*. They were so denominated from the deity they worshipped, who was represented under a particular form. They stiled him *Cahen-taur*; he was the same as the Minotaur of Crete, and the Tauromen of Sicilia. Chiron is a compound of *Chir-on*, in purport the same as *Kir-on*, the tower and temple of the sun. In places of this sort people used to study the heavenly motions; and they were made use of for seminaries, where young people were instructed, on which account they were stiled παιδοτροφοι. Hence Achilles and others were supposed to have been taught by Chiron: but this

this could not be true of Chiron as a person; he could not have had pupils of such different ages, and so many different countries; besides many of them were manifestly ideal personages: such as the god Apollo, and Æsculapius in the medicinal arts. Those who were instructed partook only of Chironian education, and were taught in the same academy, but not by one person, nor probably in the same place, for there were many such temples for the purpose of education in the sciences. These places were likewise courts of judicature, where justice was administered; whence Chiron was said to have been φιλοφρωσαν, και δικαιώλες."

CHIRO'NIA, *s.* [from the centaur *Chiron.*] In botany, a genus of the class pentandria, order monogynia, natural order rotaceæ. The generic characters are—Calyx: perianth one-leafed, five-parted, erect, acute, permanent; leaflets oblong. Corolla: monopetalous, equal; tube narrower; border five-parted, spreading; divisions ovate, equal. Stamina: filaments five, broad, short, growing from the tip of the tube; anthers oblong, erect, large, converging, and (after having shed the pollen) spirally twisted. Pistillum: germ ovate; style filiform, a little longer than the stamens, declinate; stigma headed, ascending. Pericarpium: ovate, bilocular. Seeds: numerous, small; in some species the pericarpium is a berry, in others a capsule.—*Essential Character.* Corolla, rotated; pistillum, declinate; stamina on the tube of the corolla; antheræ, finally spiral; pericarpium, two-celled. The drooping stigma seems to constitute the essence of this genus.

Species. 1. Chironia trinervia: herbaceous; leaflets of the calyx membranaceous-keeled. Stem annual, quadrangular, acute: leaves opposite, lanceolate, acuminate at each end, smooth, quite entire, three-nerved; flowers from the upper axils opposite, solitary, peduncled. Burman adds, that the stem is glossy, ash-coloured, furrowed, with four joints or more; at each joint a pair of sessile leaves; flowers elegant, blue; capsule one-celled. Native of Ceylon and the Cape.

2. Chironia jasminoides: herbaceous; leaves lanceolate; stem four-cornered. Native of the Cape.

3. Chironia lychnoides: stem simple, leaves linear-lanceolate. Stem entirely simple, round, stiff and straight, two feet high. Native of the Cape.

4. Chironia campanulata: herbaceous; leaves sublinear, calyxes the length of the corolla. Stem a foot high, round with long branches; flowers terminal, solitary, wheel-shaped, purple, on a long peduncle. Observed in Canada by Kalm.

5. Chironia angularis: herbaceous; stem acute-angled, leaves ovate stem-clasping. This has the appearance of lesser centaury. Found in Virginia by Kalm.

6. Chironia linoides, or flax-leaved chironia: herbaceous; leaves linear. An undershrub, with filiform, round, smooth, branches. Leaves an inch or more in length, succulent, smooth, sessile, frequent, longer than the internodes; flowers scarlet, solitary at the ends of the branches, peduncled. Native of the Cape; introduced in 1787 by Masson.

7. Chironia nudicaulis: herbaceous; leaves oblong bluntish, stems subdiphyllous quite simple one-flowered, calyxes with setaceous teeth. This is singular for its oblong leaves frequently rooted into a tuft. Stems many, elongated, with two leaves in the middle, or two pairs of leaves. Discovered at the Cape by Thunberg.

8. Chironia tetragona: shrubby; leaves ovate three-nerved bluntish, leaflets of the calyx bluntish keeled. Corolla yellow, large. It differs from the first species in being shrubby; in having shorter and more obtuse leaves. Native of the Cape.

9. Chironia baccifera, or berry-bearing chironia: shrubby, berry-bearing. This plant grows to the height of a foot and half or two feet, and becomes very bushy, rather too much so in point of ornament. It produces both flowers and fruit during most of the summer. The stem is quadrangular. The seeds are numerous, small, ovate-globular, pitted, dark chesnut colour. It is a native of Africa, and was cultivated in 1759 by Mr. Miller.

10. Chironia frutescens: shrubby; leaves lanceolate subtomentose; calyxes bell-shaped. Branches round, tomentose, ash-coloured, mostly alternate, subdividing a little at top. Leaves opposite, obtuse, fleshy, about two inches in length, sessile, frequent, twice as long as the internodes. Peduncles two or three together, terminating, each having two or three flowers, arising from the axils, with a pair of linear folioles in the middle. Native of Africa; cultivated in 1756 by Mr. Miller.

Propagation and Culture. The seeds should be sown in small pots filled with light sandy earth, soon after they are ripe, and plunged into a moderate hot-bed, and must be frequently but gently watered; sometimes the seeds will lie a long time in the ground, so that if the plants do not appear the same season, the pots should not be disturbed, but preserved in shelter, till the following spring, and then plunged into a fresh hot-bed, which will bring up the plants in a short time, if the seeds are good. When the plants are fit to remove, they should be transplanted into small pots, four or five in each pot; then plunge the pots into a moderate hot-bed, and sprinkle them with water, and shade them every day from the sun till they have taken new root; after which they must have a large share of air in warm weather, to prevent their drawing up weak: when the plants have obtained some strength, they must be gradually inured to bear the open air; but when they are exposed abroad, if there should happen much rain, the plants must be screened from it, otherwise it will cause them to rot: when the plants have filled the pots with their roots, they should be parted, and each put into a separate pot filled with light sandy earth, not rich with dung, placing them in the shade till they have taken fresh root; then they may be removed to a warm sheltered situation, and mixed with such other plants as require but little water; in which situation they may remain till autumn, when they must be placed in a dry airy glass-case; and in the winter should have very little wet, but must enjoy the sun as much as possible; and in mild weather should have fresh air admitted to them, but must be protected from frost: with this management, the plants will thrive and produce flowers the second year from seed. The cuttings also will take root with proper management, but not very readily. See GLORA, and GENTIANA.

CHIRO'NIUM, *s.* in botany. See LASERPITIUM.

To CHIRP, *v. n.* [perhaps contracted from *cheer up.* The Dutch have *circken.*] To make a cheerful noise; as birds, when they call without singing.—No *chirping* lark the welkin sheen invokes. *Gay.*

The careful hen
Calls all her *chirping* family around. *Thomson.*

To CHIRP, *v. a.* [This seems apparently corrupted from *cheer up.*] To make cheerful:

Sir Balaam now, he lives like other folks;
He takes his *chirping* pint, he cracks his jokes. *Pope.*

CHIRP, *s.* The voice of birds or insects:

Winds over us whisper'd, flocks by us did bleat,
And *chirp* went the grasshopper under our feet. *Addison.*

CHIRP'ER, *s.* One that chirps; one that is cheerful.

To CHIRRE, *v. n.* [ceopian, Sax.] To coo as a pigeon. *Junius.*

CHIRUR'GEON, *s.* [χειρουργος, from χειρ, the hand, and εργον, work.] One that cures ailments, not by internal medicines, but outward application. One who amputates or sets fractured limbs. In modern writing it is spelt *surgeon.*

CHIRUR'GERY, *s.* The art of curing by external applications; amputation; the reducing of fractures. This is called SURGERY.

CHIRUR'GIC, or CHIRURGICAL, *adj.* Having qualities useful in outward applications to hurts. Relating to the manual part of healing. Manual in general, consisting in operations of the hand. This sense, though the first according to etymology, is now scarcely found.—The *chirurgical* or manual part doth refer to the making instruments, and exercising particular experiments. *Wilk.*

CHI'RY, a town of France, in the department of the Oise, and chief place of a canton, in the district of Noyon: three miles south-south-west of Noyon.

CHI'SEL, *s.* [*ciseau*, Fr. of *scissum*, Lat.] An instrument with which wood or stone is cut or pared away.—What fine *chisel* could ever yet cut breath?

Imperfect shapes: in marble such are seen,
When the rude *chisel* does the man begin. *Dryden.*

To CHI'SEL, *v. a.* To cut with a chisel.

CHIS'ME, or CISME, a seaport town of Asiatic Turkey, on the west coast of Natolia, opposite the island of Scio, between which and the continent is a narrow strait; where the Turkish fleet was destroyed by the Russians, in 1770. The ancient name of this town was Cyssus. In the year 191 before Christ, the fleet of Antiochus, furnamed the Great, was defeated near this town by the Roman fleet, under the command of C. Livius, with the loss of thirty ships taken, and ten sunk in the engagement: forty miles west of Smyrna. Lat. 38. 24. N. lon. 44. 2. E. Ferro.

CHISO'IN, or CHOINO, a town of Flanders, with an abby, where Louis XV. took up his residence during the campaign of 1744: two leagues north-north-west from Orchies.

CHI'SON, KISON, or KISSON, (Judges iv. and v.), a river of Gallilee; said to rise in mount Tabor, to run by the town of Naim, and to fall into the Mediterranean between mount Carmel and Ptolemais, 1 Kings xviii. 40.

CHISSA'MO, a town of the island of Candia, situated on the north side of the island, in a bay to which it gives name: twenty-five miles west of Canea.

CHIT, *s.* [according to Dr. Hickes, from *kind*, Germ. child; perhaps from *chico*, little, Span.] A child; a baby. Generally used of young persons in contempt. The shoot of corn from the end of the grain. A cant term with maltsters.—Barley, couched four days, will begin to shew the *chit* or sprit at the root-end. *Mortimer.*—A freckle, [*from chick-pease.*] In this sense it is seldom used.

To CHIT, *v. n.* To sprout; to shoot at the end of the grain: cant.—I have known barley *chit* in seven hours after it had been thrown forth. *Mortimer.*

CHIT'CHAT, *s.* [corrupted by reduplication from *chat.*] Prattle; idle prate; idle talk. A word only used in ludicrous conversation.—I am a member of a female society, who call ourselves the *chitchat* club. *Addison.*

CHI'TIM, according to Le Clerc, Calmet, and others, was the same with Macedonia, peopled by Kittim the son of Javan, and grandson of Noah.

CHI'TON, *s.* in zoology, a genus of the order of vermes testaceæ, or shell-fish. The name *chiton* is from χιτων, *lorica*, a coat of mail. The shell is plated, and consists of many parts lying upon each other transversely. They are common on the shores of Scarborough, Aberdeen, and Lochbroom. Of this genus there are twenty-eight species. See CONCHOLOGY.

CHITPOU'R, or CHITTIPUR, a town of Hindoostan, in the country of Guzerat, celebrated for its manufacture of chintzes: 172 miles south-west of Amedabad. Lat. 23. 45. N. lon. 73. 3. E. Ferro.

CHI'TRO, a town of European Turkey, in the province of Macedonia: thirty-six miles south-south-east of Edessa.

CHITTELDROOG', a town of Hindoostan, in the Mysore country. Here is a fort, immensely strong, seated on a stupendous rock, said to be two thousand six hundred and forty yards high. In it were confined the crew of the Hannibal, taken by the French admiral Suffrein, in August 1782; who, contrary to every law of war and of humanity, were delivered over to Hyder Ali, to fall a sacrifice to his savage resentment against the English. It was taken, with infinite difficulty, by a detachment from the marquis Cornwallis's army, in 1792: eighty-five miles north-north-west of Seringapatam, and ninety-five east of Bednore.

CHIT'TENDEN, a county in Vermont; near lake Champlain, between Franklin county on the north, and Addison south; La Moille river passes through its north-west corner, and Onion river divides it nearly in the center. Its chief town is Burlington. This county contained, by the census of 1791, forty-four townships, and 7301 inhabitants. Since that time the northern counties have been taken from it, so that neither its size or number of inhabitants can now be ascertained.

CHIT'TENDEN, a town of the American States in Rutland county, Vermont. The road over the mountain passes through this township. It lies seven miles east from the fort on Otter creek, in Pittsford, and about sixty north by east from Bennington.

CHITTEPUT', a town of Hindoostan, in the Carnatic: fourteen miles north of Gingee.

CHIT'TERLINGS, *s. without singular.* [from *schyterlingh*, Dut. *Minshew*; from *kutteln*, Germ. *Skinner.*] The intestines or bowels.

CHITTIGO'NG, a district of Hindoostan, in the country of Bengal, between the Burrampooter river, and the country of Roshnan and Aracan, where the Portuguese made the first settlement. The capital is Islamabad.

CHITTOOR', a town of Hindoostan, in the Carnatic: twenty-eight miles north-west of Arcot, and seventy west of Madras.

CHITTRA', a town of Hindoostan, in the Bahar country: eighty-five miles south of Patna, and seventy-two south-south-west of Bahar.

CHIT'TY, *adj.* Childish; like a baby.

CHI'VA, a town of Spain, in the province of Valencia: fifteen miles west-north-west from Valencia.

CHI'VALROUS, *adj.* Relating to chivalry, or errant knighthood; knightly; warlike; adventurous; daring. *A word now out of use:*

And noble minds of yore allied were
In brave pursuit of *chivalrous* emprise. *Spenser.*

CHI'VALRY, *s.* [*chevalerie*, Fr. knighthood, from *cheval*, a horse; as *eques* in Latin.] Knighthood; a military dignity.—There be now, for martial encouragement, some degrees and orders of *chivalry*; which, nevertheless, are conferred promiscuously upon soldiers and no soldiers. *Bacon.*—The qualifications of a knight; as, valour, dexterity in arms:

Thou hast slain
The flow'r of Europe for his *chivalry*. *Shakespeare.*

The general system of knighthood:

Solemnly he swore,
That, by the faith which knights to knighthood bore,
And whate'er else to *chivalry* belongs,
He would not cease till he reveng'd their wrongs. *Dryd.*

An adventure; an exploit. *Not now in use.*—They four doing acts more dangerous, though less famous, because they were but private *chivalries*. *Sidney.*—The body or order of knights:

And by his light
Did all the *chivalry* of England move
To do brave acts. *Shakespeare.*

The age to which we must look for the origin of chivalry, as a system or order of knighthood, was singularly rude and illiterate. Even the principal events of that period, emigrations, wars, and the establishment of systems of laws and forms of government, have been but imperfectly, and in many instances unfaithfully, recorded. But the

the tranſactions which took place in the ordinary courſe of civil and domeſtic life, and which, though leſs ſtriking, muſt have always prepared the way for the more remarkable events, have been generally thought unworthy of tranſmiſſion to poſterity, and have very ſeldom found an hiſtorian. Add to theſe difficulties which oppoſe our reſearches on this ſubject, that the nations of Europe were in that age a mixed multitude, conſiſting of the aboriginal inhabitants, who, though either ſubdued by the Roman arms, or at leaſt compelled to retire to the woods and mountains, ſtill obſtinately retained their primitive manners and cuſtoms; Roman colonies, and ſuch of the original inhabitants of the countries in which theſe were eſtabliſhed, as had yielded not only to the arms of the Romans, but alſo to the influence of their laws, arts, and manners; and the barbarians who, proceeding from the northern regions of Aſia and Europe, the wilds of Scythia and Germany, diſſolved the fabric of the Roman empire, and made themſelves lords of Europe. Amid this confuſion of nations, inſtitutions, and cuſtoms, it becomes almoſt impoſſible to trace any regular ſeries of cauſes and effects. Yet as the hiſtory of that period is not entirely unknown to us, and the obſcure and imperfect records in which it is preſerved, while they commemorate the more remarkable events, throw a faint light on the cuſtoms, manners, and ordinary tranſactions, of the age; we can at leaſt collect ſome circumſtances, which, if they did not of themſelves give riſe to the inſtitution of chivalry, muſt certainly have co-operated with others to that end. We may even be allowed, if we proceed with due diffidence and caution, to deduce, from a conſideration of the effect, ſome inferences concerning the cauſe; from thoſe particulars of its hiſtory which are known to us, we may venture to carry imagination backwards, under a proper reſtraint, to thoſe which are hid under the darkneſs of a rude and illiterate age.

Diſtinction of ranks appears to be eſſentially neceſſary to the exiſtence of civil order. Even in the ſimpleſt and rudeſt ſocial eſtabliſhments, we find not merely the natural diſtinctions of weak and ſtrong, young and old, parent and child, huſband and wife; theſe are always accompanied with others which owe their inſtitution to the invention of man, and the conſent, either tacit or formal, of the ſociety among whom they prevail. In peace and in war, ſuch diſtinctions are equally neceſſary: they conſtitute an eſſential and important part of the mechaniſm of ſociety.

One of the earlieſt artificial diſtinctions introduced among mankind, is that which ſeparates the bold and ſkilful warrior from thoſe whoſe feebleneſs of body and mind renders them unable to excel in dexterity, ſtratagem, or valour. Among rude nations, who are but imperfectly acquainted with the advantages of ſocial order, this diſtinction is more remarkably eminent than in any other ſtate of ſociety. The ferocity of the human character in ſuch a period produces almoſt continual hoſtilities among neighbouring tribes; the elements of nature, and the brute inhabitants of the foreſt, are not yet reduced to be ſubſervient to the will of man; and theſe, with other concomitant circumſtances, render the warrior, who is equally diſtinguiſhed by cunning and valour, more uſeful and reſpectable than any other character. On the ſame principles, as the boundaries of ſociety are enlarged, and its form becomes more complex, the claſſes into which it is already diſtinguiſhed are again ſubdivided. The invention of arts, and the acquiſition of property, are the chief cauſes of the new diſtinctions which now ariſe among the orders of ſociety; and they extend their influence equally through the whole ſyſtem. Difference of armour, and different modes of military diſcipline, produce diſtinction of orders among thoſe who practiſe the arts of war; while other circumſtances, originating from the ſame general cauſes, occaſion ſimilar changes to take place amid the intervals of peace.

None of the new diſtinctions which are introduced among men, with reſpect to the diſcipline and conduct of war, in conſequence of the acquiſition of property and the invention of arts, is more remarkable than that occaſioned by the uſe of horſes in military expeditions, and the training of them to the evolutions of the military art. Fire-arms, it is true, give to thoſe who are acquainted with them a greater ſuperiority over thoſe to whom their uſe is unknown, than what the horſeman poſſeſſes over him who fights on foot. But the uſe of fire-arms is of ſuch importance in war, and the expence attending it ſo inconſiderable, that wherever theſe have been introduced, they have ſeldom been confined to one particular order in an army; and, therefore, they produce indeed a remarkable, though tranſient, diſtinction among different nations; but eſtabliſh no permanent diſtinctions in the armies of any one nation. But to maintain a horſe, to equip him with coſtly furniture, to manage him with dexterity and vigour, are circumſtances which have invariably produced a ſtanding and conſpicuous diſtinction among the military order, wherever bodies of cavalry have been formed. The Roman equites, who, though they became at length a body of uſurers and farmers general, were originally the only body of cavalry employed by the ſtate, occupied a reſpectable rank between the ſenators and the plebeians; and the elegance and humanity of their manners were ſuitable to their rank. In ancient Greece, and in the celebrated monarchies of Aſia, the ſame diſtinction prevailed at a ſimilar period. And ſince the circumſtances and principles on which this diſtinction depends are not ſuch as muſt be confined in their influence to one particular nation, or one region of the globe, we may hope to trace their effects among the ſavage warriors of Scythia and Germany, as well as among the Greeks or Romans. From the valuable treatiſe of Tacitus de Moribus Germanorum, we learn, that among the German warriors a diſtinction ſomewhat of this nature did actually ſubſiſt; not ſo much indeed a diſtinction between the warriors who fought on horſeback and thoſe who fought on foot, as between thoſe whom vigour of body and energy of mind enabled to brave all the dangers of war, and ſuch as, from the imbecility of youth, the infirmities of age, or the natural inferiority of their mental and bodily powers, were unequal to ſcenes of hardſhip and deeds of valour.

Another fact worthy of notice reſpecting the manners of the barbarians of Germany before they eſtabliſhed themſelves in the cultivated provinces of the Roman empire is, that their women, contrary to what we find among many other rude nations, were treated with an high degree of reſpect. They did not generally vie with the men in deeds of valour, but they animated them by their exhortations to diſtinguiſh themſelves in the field; and virgins eſpecially were conſidered with a ſacred veneration, as if endowed with prophetic powers, capable to foreſee events hid in the womb of futurity, and even to influence the will of the deities. Hence, though domeſtic duties were their peculiar province, yet they were not harſhly treated nor confined to a ſtate of ſlavery. There appears indeed a ſtriking analogy between the condition of the women among the rude ſoldiers of Sparta, and the rank which they occupied among the warlike cantons of Germany. Perhaps, indeed, the German were ſtill more honourable than the Spartan women; as they were taught to wield the magic weapons of ſuperſtition, which in Greece were appropriated to the prieſts. It appears, therefore, that, in the foreſts of Germany at leaſt, if not in the more northern regions of Aſia and Europe, the conquerors of the Roman empire, before they penetrated into its provinces, treated their women with a degree of reſpect unknown to moſt of the nations of antiquity; that the character of the warrior was likewiſe highly honourable, being underſtood to unite all thoſe qualities which were in the higheſt eſtimation.

When thoſe nations ſallied from their deſerts and foreſts, over-ran the Roman empire, and eſtabliſhed themſelves

felves in its provinces, the change which took place on their circumstances was remarkable; and, by a natural influence, it could not but produce an equally remarkable change on the habits, customs, and manners. The great outlines might still remain; but they could not now fail to be filled up in a different manner. Here, however, the records of history are peculiarly imperfect. We have no Cæsar or Tacitus to supply facts or direct our reasonings; the Gothic nations had not yet learned to read and write; and the Romans were so depressed under the sense of their own miseries, as to be negligent of the changes which happened around them. But, as soon as the light of history begins again to dawn, we find that the leading features of the barbarian character were not effaced, but only modified in a particular manner, in consequence of their mixing among a more polished people, becoming acquainted with the luxuries of life, and acquiring extensive power and property. Those who fought on horseback now began to be distinguished with peculiar honours. The manners of the warrior too were become more cultivated, and his spirit more humane. Leisure and opulence, with the influence of a polished people, even though in a state of slavery, taught those barbarians to aspire after more refined pleasures and more splendid amusements than those which they had been before satisfied with. The influence of Christianity too, which, though grossly corrupted, was still favourable to the social happiness of mankind, concurred to polish their manners and exalt their character. Hence, in the end of the tenth and in the beginning of the eleventh century, we see knighthood, with that romantic gallantry, piety, and humanity, by which it was principally distinguished, make its appearance.

The passion for arms among the Germanic states, was now carried to extremity. It was amidst scenes of death and peril that the young were educated: it was by valour and feats of prowess that the ambitious signalized their manhood. All the honours they knew were allotted to the brave. The sword opened the path to glory. It was in the field that the ingenious and the noble flattered most their pride, and acquired an ascendancy. The strength of their bodies, and the vigour of their counsels, surrounded them with warriors, and lifted them to command. But, among these nations, when the individual felt the call of valour, and wished to try his strength against an enemy, he could not of his own authority take the lance and the javelin. The admission of their youth to the privilege of bearing arms was a matter of too much importance to be left to chance or their own choice. A form was invented by which they were advanced to that honour. The council of the district, or of the canton to which the candidate belonged, was assembled. His age and his qualifications were enquired into; and, if he was deemed worthy of being admitted to the privileges of a soldier, his father, or one of his kindred, adorned him with a shield and the lance. In consequence of this solemnity, he prepared to distinguish himself; his mind opened to the cares of the public; and the domestic concerns, or the offices of the family from which he had sprung, were no longer the objects of his attention. To this ceremony, so simple and so interesting, the institution of knighthood is indebted for its rise.

Knighthood, however, as a system, known under the denomination of chivalry, is to be dated only from the eleventh century. All Europe being reduced to a state of anarchy and confusion on the decline of the house of Charlemagne, every proprietor of a manor or lordship became a petty sovereign; the mansion-house was fortified by a moat, defended by a guard, and called a castle. The governor had a party of seven or eight hundred men at his command; and with these he used frequently to make excursions, which commonly ended in a battle with the lord of some petty state of the same kind, whose castle was then pillaged, and the women and treasures borne off by the conqueror. During this state of universal hostility, there was no friendly communications between the provinces, nor any high roads from one part of the kingdom to another: the wealthy traders, who then travelled from place to place with their merchandize and their families, were in perpetual danger; the lord of almost every castle extorted something from them on the road; and at last, some one more rapacious than the rest, seized upon the whole of the cargo, and bore off the women for his own use. Thus castles became the warehouses of all kinds of rich merchandize, and the prisons of the distressed females whose fathers or lovers had been plundered or slain, and who, being therefore seldom disposed to take the thief or murderer into favour, were in continual danger of a rape. But, as some are distinguished by virtue even in the most general defection, it happened that many lords insensibly associated to repress those sallies of violence and rapine, to secure property, and protect the ladies. Among these were many lords of great fiefs; and the association was at length strengthened by a solemn vow, and received the sanction of a religious ceremony. As the first knights were men of the highest rank, and the largest possessions, such having most to lose, and the least temptation to steal, the fraternity was regarded with a kind of reverence, even by those against whom it was formed. Admission into the order was deemed the highest honour; many extraordinary qualifications were required in a candidate, and many new ceremonies were added at his creation. After having fasted from sun-rise, confessed himself, and received the sacrament, he was dressed in a white tunic, and placed by himself at a side-table, where he was neither to speak, to smile, nor to eat; while the knights and ladies, who were to perform the principal parts of the ceremony, were eating, drinking, and making merry, at the great table. At night his armour was conveyed to the church where the ceremony was performed; and here having watched it till the morning, he advanced with his sword hanging about his neck, and received the benediction of the priest. He then kneeled down before the lady or patroness who was to put on his armour, who, being assisted by persons of the first rank, buckled on his spurs, put an helmet on his head, and accoutred him with a coat of mail, a cuirass, bracelets, cuisses, and gauntlets. Being thus armed cap-a-pee, the knight who dubbed him struck him three times over the shoulder with the flat-side of his sword, in the name of God, St. Michael, and St. George. He was then obliged to watch all night in his armour, with his sword girded, and his lance in his hand. From this time the knight devoted himself to the redress of those wrongs which "patient merit of the unworthy takes;" to secure merchants from the rapacious cruelty of banditti, and women from ravishers, to whose power they were, by the particular confusion of the times, continually exposed.

From this view of the origin of chivalry, it will be easy to account for the castle, the moat, and the bridge, which are found in romances; and as to the dwarf, he was a constant appendage to the rank and fortune of those times, and no castle therefore could be without him. The dwarf and the buffoon were then introduced to kill time, as the card-table is at present. It will also be able to account for the multitude of captive ladies whom the knights, upon seizing a castle, set at liberty; and for the prodigious quantities of useless gold and silver vessels, rich stuffs, and other merchandize, with which many apartments in these castles are said to have been filled.

The principal lords who entered into the confraternity of knights, used to send their sons to each other to be educated, far from their parents, in the mysteries of chivalry. These youths, before they arrived at the age of twenty-one, were called bachelors, or *bas chevaliers*, inferior knights, and at that age were qualified to receive the order. Thus honourable was the origin of an institution, commonly considered as the result of caprice and the source of extravagance; but which, on the contrary, rose naturally from the state of society in those times, and had

had a very serious effect in refining the manners of the European nations. Valour, humanity, courtesy, justice, honour, were its characteristics: and to these were added religion; which, by infusing a large portion of enthusiastic zeal, carried them all to a romantic excess, wonderfully suited to the genius of the age, and productive of the greatest and most permanent effects both upon policy and manners. War was carried on with less ferocity, when humanity no less than courage came to be deemed the ornament of knighthood, and knighthood a distinction superior to royalty, and an honour which princes were proud to receive from the hands of private gentlemen: more gentle and polished manners were introduced, when courtesy was recommended as the most amiable of knightly virtues, and every knight devoted himself to the service of a lady: violence and oppression decreased, when it was accounted meritorious to check and to punish them: a scrupulous adherence to truth, with the most religious attention to fulfil every engagement, but particularly those between the sexes as more easily violated, became the distinguishing character of a gentleman, because chivalry was regarded as the school of honour, and inculcated the most delicate sensibility with respect to that point; and valour, seconded by so many motives of love, religion, and virtue, became altogether irresistable.

That the spirit of chivalry sometimes rose to an extravagant height, and had often a pernicious tendency, must, however, be allowed. In Spain, under the influence of a romantic gallantry, it gave birth to a series of wild adventures; for the ardour of redressing wrongs seized many knights so powerfully, that, attended by esquires, they wandered about in search of objects whose misfortunes and misery required their assistance and succour. And, as ladies engaged more particularly their attention, the relief of unfortunate damsels was the achievement they most courted. This was the rise of knights-errant, whose adventures produced so many romantic novels; but the love of the marvellous came to interfere; fancy was indulged in her wildest exaggerations; and poetry gave her charms to the most monstrous fictions, and to scenes the most unnatural and gigantic, until they were deservedly ridiculed in the character of Don Quixote, &c. Yet in the train of Norman ambition, it extinguished the liberties of England, and deluged Italy in blood: and at the call of superstition, and as the engine of papal power, it desolated Asia under the banner of the cross. But these ought not to be considered as arguments against an institution laudable in itself, and necessary at the time of its foundation: and those who pretend to despise it, the advocates of ancient barbarism and ancient rusticity, ought to remember, that chivalry not only first taught mankind to carry the civilities of peace into the operations of war, and to mingle politeness with the use of the sword; but roused the soul from its lethargy, invigorated the human character even while it softened it, and produced exploits which antiquity cannot parallel. Nor ought they to forget, that it gave variety, elegance, and pleasure, to the intercourse of life, by making woman a more essential part of society; and is therefore entitled to our gratitude, though the point of honour, and the refinements in gallantry, its more doubtful effects, should be excluded from the improvement of modern manners.

Women, among the ancient Greeks and Romans, seem to have been considered merely as objects of sensuality, or of domestic convenience: they were devoted to a state of seclusion and obscurity, had few attentions paid them, and were permitted to take as little share in the conversation as in the general commerce of life. But the northern nations, who paid a kind of devotion to the softer sex, even in their native forests, had no sooner settled themselves in the provinces of the Roman empire, than the female character began to assume new consequence. Those fierce barbarians, who seemed to thirst only for blood, who involved in one undistinguished ruin the monuments of ancient grandeur and ancient ingenuity, and who devoted to the flames the knowledge of ages, always forbore to offer any violence to the women. They brought along with them the respectful gallantry of the north, which had power even to restrain their savage ferocity; and they introduced into the west of Europe a generosity of sentiment, and a complaisance toward the ladies, to which the most polished nations of antiquity were strangers. These sentiments of generous gallantry were fostered by the institution of chivalry, which lifted woman yet higher in the scale of life. Instead of being nobody in society, she became its *primum mobile*. Every knight devoting himself to danger, declared himself the humble servant of some lady, and that lady was often the object of his love. Her honour was supposed to be intimately connected with his, and her smile was the reward of his valour: for her he attacked, for her he defended, and for her he shed his blood. Courage, animated by so powerful a motive, lost sight of every thing but enterprize: incredible toils were cheerfully endured, incredible actions were performed, and adventures seemingly fabulous were more than realized. The effect was reciprocal. Women, proud of their influence, became worthy of the heroism which they had inspired: they were not to be approached but by the high-minded and the brave; and men then could only be admitted to the bosom of the chaste fair, after proving their fidelity and affection by years of perseverance and of peril.

As to the change which took place in the operations of war, it may be observed, that the perfect hero of antiquity was superior to fear, but he made use of every artifice to annoy his enemy: impelled by animosity and hostile passion, like the savage in the American woods, he was only anxious of attaining his end, without regarding whether fraud or force were the means. But the true knight or hero of chivalry, who seems in all his rencounters to have had his eye on the judicial combat, had an equal contempt for stratagem and danger. He disdained to take advantage of his enemy: he desired only to see him, and to combat him upon equal terms, trusting that heaven would declare in behalf of the just; and as he professed only to vindicate the cause of religion, of injured beauty, or oppressed innocence, he was further confirmed in this enthusiastic opinion by his own imagination. Strongly persuaded that the decision must be in his favour, he fought as if under the influence of divine inspiration rather than of military ardour. Thus the system of chivalry, by a singular combination of manners, blended the heroic and sanctified characters, united devotion and valour, zeal and gallantry, and reconciled the love of heaven with the love of the ladies.

At the court of every prince, count, or baron, jousts and tournaments, the military evolutions of chivalry, became the favourite amusements. Instead of the gladiators and naked spectacles which corrupted the manners of the Greeks and Romans, and banished from the stadium the virgins and matrons, the pompous decorations of the lists was crowned with the presence of chaste and high-born beauty, from whose hands the conqueror received the prize of his dexterity and courage. The skill and strength that were exerted in wrestling and boxing bear a distant and doubtful relation to the merit of a soldier; but the tilts and tournaments, as they were invented in France, and practised in England, and eagerly adopted both in the east and west, presented a lively image of the business of the field. The single combats, the general skirmish, the defence of a pass or castle, were rehearsed as in actual battle; and the contest, but in real and mimic war, was decided by the superior management of the horse and lance. At these entertainments, skill in arms, devotion to the fair, and generous courtesy, were all at once cultivated. The asperity of national prejudice was softened; and the community of religion and arms spread a similar colour and generous emulation over the face of Christendom. Abroad, in enterprize and pilgrimage; at home, in martial exercise, the warriors of

every country were perpetually associated; and impartial taste must prefer tilts and tournaments to the Olympic games of classic antiquity. At these martial entertainments, each knight was attended to the tournament by his faithful squire, a youth of equal birth and similar hopes; he was followed by his archers and men at arms; and four, or five, or six, soldiers, were computed as the furniture of a complete lance. The lance was the proper and peculiar weapon of the knight: his horse was of a large and heavy breed; but his charger, till he was roused by approaching danger, was usually led by an attendant, and he quietly rode a pad or palfrey of a more easy pace. His helmet and sword, his greaves and buckler, it would be superfluous to describe; but we may remark, that at the period of the crusades the armour was less ponderous than in later times; and that, instead of a massy cuirass, his breast was defended by an hauberk or coat of mail. When their long lances were fixed in the rest, the warriors furiously spurred their horses against the foe; and the light cavalry of the Turks and Arabs could seldom stand against the direct and impetuous weight of their charge. In the expeditions to the neighbouring kingdoms or the Holy Land, the duties of the feudal tenure no longer subsisted; the voluntary service of the knights and their followers was either prompted by zeal or attachment, or purchased with rewards and promises; and the numbers of each squadron were measured by the power, the wealth, and the fame, of each independent chieftain. They were distinguished by his banner, his armorial coat, and his cry of war; and the most ancient families of Europe must seek in these achievements the origin and proof of their nobility. From what has been said, we might trace a strong resemblance between the manners of the age of chivalry, and those of the old heroic ages delineated by Homer.

The military enthusiasm of the barons is but of a piece with the fanaticism of the heroes. Hence the same particularity of description in the accounts of battles, wounds, deaths, in the Greek poet as in the Gothic romances. Hence that minute curiosity in the display of their dresses, arms, and accoutrements. The minds of all men, being occupied with warlike images and ideas, were much gratified by those details, which appear cold and unaffecting to modern readers. We hear much of knights-errant encountering giants, and quelling savages, in books of chivalry. These giants were oppressive feudal lords; and every lord was to be met with, like the giant, in his strong hold or castle. Their dependents of a lower form, who imitated the violence of their superiors, and had not castles, but lurking places, were the savages of romance. The greater lord was called a giant for his power; the less, a savage for his brutality. Another terror of the Gothic ages were monsters, dragons, and serpents. Their stories were received in those days for several reasons: 1. from the vulgar belief of enchantments: 2. from their being reported on the faith of eastern tradition, by adventures from the Holy Land; 3. in still later times, from the strange things told and believed on the discovery of the new world. In all these respects, Greek antiquity resembles the Gothic. For what are Homer's Læstrigons and Cyclops, but bands of lawless savages, with each of them a giant of enormous size at their head? And what are the Grecian Bacchus, Hercules, and Theseus, but knights-errant, the exact counterparts of sir Launcelot du Lake, and Amadis de Gaul?

With the greatest fierceness and savageness of character, the utmost generosity, hospitality, and courtesy, were imputed to the heroic ages. Achilles was at once the most relentless, vindictive, implacable, and the friendliest, of men. We have the very same representation in the age of chivalry. As in those lawless times dangers and distress of all kinds abounded, there would be the same demand for compassion, gentleness, and general attachments to the unfortunate, as of resentment, rage, and animosity, against their enemies.

The martial games celebrated in ancient Greece, on great and solemn occasions, had the same origin and the same purpose as the tournaments of the Gothic warriors; and the passion for adventures, being so natural in their situation, would be as naturally attended with the love of praise and glory. Hence the same encouragement, in the old Greek and Gothic times, to panegyrists and poets, which made it of mighty consequence who should obtain the favour of a rich heiress. And though, in the strict feudal times, she was supposed to be in the power and at the disposal of her superior lord, yet this rigid state of things did not last long. Hence we find some distressed damsel was the spring and mover of every knight's adventure. She was to be rescued by his arms, or won by the fame and admiration of his prowess. The plain meaning of all which was this: that as, in these turbulent times, a protector was necessary to the weakness of the sex, so the courteous and valorous knight was to approve himself fully qualified for that purpose.

It may be observed, that the two poems of Homer were intended to expose the mischiefs and inconveniences arising from the political state of Old Greece: the Iliad, the dissentions that naturally spring up among independent chiefs; and the Odyssey, the insolence of their greater subjects, more especially when unrestrained by the presence of their sovereign. And can any thing more exactly resemble the condition of the feudal times, when, on occasion of any great enterprize, as that of the crusades, the designs of the confederate Christian states were perpetually frustrated, or interrupted at least, by the dissentions of their leaders; and their affairs at home as perpetually distressed and disordered by the rebellious usurpations of their greater vassals? Jerusalem was to the European knights what Troy had been to the Grecian heroes; for chivalry never flourished so much as during the time of the crusades. From these holy wars it followed, that new fraternities of knighthood were invented; hence the knights of the Holy Sepulchre, the Hospitallers, Templars, and an infinite number of religious orders. Various other orders were at length instituted by sovereign princes: the Garter, by Edward III. of England; the Golden Fleece, by Philip the Good, duke of Burgundy; and St. Michael, by Louis XI. of France. From this time ancient chivalry declined to an empty name; when sovereign princes established regular companies in their armies, knights bannerets were no more, though it was still thought an honour to be dubbed by a great prince or victorious hero; and all who professed arms without knighthood assumed the title of Esquire. There is scarce a prince in Europe that has not thought fit to institute an order of knighthood; and the title of Knight-service, which the kings of Britain conferred on private subjects, is a derivation from ancient chivalry, although very remote from its source. See the articles FEUDAL SYSTEM, and KNIGHT.

CHI'VALRY, *s.* [*servitium militare*, from the Fr. *chevalier*.] A tenure of lands by knights service; whereby the tenant was bound to perform service in war unto the king, or the mesne lord of whom he held by that tenure. See TENURES. Chivalry was of two kinds, either regal, held only of the king, or common, held of a common person: that which might be held only of the king was called *servitium* or *serjeantia*, and was again divided into grand and petit serjeanty; the grand serjeanty was where one held lands of the king by service, which he ought to do in his own person, as to bear the king's banner or spear, to lead his host, or to find a man at arms to fight, &c. Petit serjeanty was when a man held lands of the king to yield him annually some small thing towards his wars, as a sword, dagger, bow, &c.

CHIVAZ'ZO, a town of Piedmont, situated in a plain, near the union of the river Orco with the Po. It is defended with walls, bastions, and large fosses filled with water: it is well supplied with artillery and a numerous garrison, especially in time of war. The situation is so advantageous,

advantageous, that whoever are masters of this town are said to possess the key of the country of Turin, the Canavois, the country of Vercelli, Monferrat, and Lombardy. It was taken by Thomas, prince of Savoy, in 1639, which induced Christina, duchess of Savoy, to send her son and sisters to Chambery, to preserve them from insult till the prospect of affairs might change. It was soon after taken by the French, but restored to the duke of Savoy in 1649. It has several churches and convents. Eleven miles north-east of Turin, and twelve south of Ivrea. Lat. 45. 1. N. lon. 25. 29. E. Ferro.

CHI'VERNY, a town of France, in the department of the Loir and Cher, on the south side of the Conon: three leagues south-east of Blois.

CHIVES, *s.* [*cive*, Fr. Skinner.] The threads or filaments rising in flowers. Also a species of small onion.

CHI'UM MARMOR, *s.* the ancient name of a black marble, called also the *lapis opsidianus*. See MINERALOGY.

CHIU'SA (La), a town of Italy, in the Friuli, on a small river called Fella, which runs into the Tajamento; taken by the French republican army under Bonaparte in 1797: fourteen miles north of Friuli.

CHIU'SA (La), a town of Italy, in the Veronese, belonging to the state of Venice: nine miles north-west of Verona.

CHIUSA'NO, a town of Italy, in the kingdom of Naples, and province of Principato Citra: thirteen miles south-south-east of Benevento.

CHIUSEL'LE, a river of Piedmont, which runs into the Orco: one mile west-south-west of Foglisso.

CHIU'SI, a town of Italy, in the country of Sienna, containing about 1000 inhabitants, the see of a bishop: thirty-one miles south-south-east of Sienna.

CHIUSLEN'GI, a town of European Turkey, in the province of Bulgaria: seventy miles east of Silistria.

CHIUTA'YA, or KIUTAJA, or CUTAJA, a town of Asiatic Turkey, and capital of a district in Natolia, situated at the foot of a mountain, in a fertile and healthy country, defended by a castle built on a rock. It contains several mosques, and three Armenian churches: 136 miles south-south-east of Constantinople. Lat. 39. 14. N. lon. 48. 30. E. Ferro.

CHIZE', a town of France, in the department of the Two Sevres, and chief place of a canton, in the district of Niort, situated near the Boutonne: three leagues and a half south of Niort, and three and a quarter south-west of Melle.

CHIZILARABAD', a town of Asia, in the kingdom of Kurdistan: seventy miles south-south-east of Kerkuk.

CHLAMY'DIA, *s.* in botany. See PHORMIUM.

CHLA'MYS, *s.* A military habit worn by the ancient Romans over the tunica. It belonged to the patricians, and was the same in the time of war that the toga was in the time of peace. This sort of gown was called *picta*, from the rich embroidery with figures in Phrygian work; and *purpurea*, because the ground-work was purple. The chlamydes of the emperors were all purple, adorned with a golden embroidered border.

CHLENN, a town of Bohemia, in the circle of Konigingratz: eighteen miles south-east of Konigingratz.

CHLIAS'MA, *s.* [from χλιαινω, to make warm.] Tepefaction, or the act of making any thing warm. A fomentation, or application, which makes warm the parts to which it is applied.

CHLO'E, a surname of Ceres at Athens. Her yearly festivals, called Chloeia, were celebrated with much mirth and rejoicing, and a ram was always sacrificed to her. The name of Chloe is supposed to bear the same signification as Flava, so often applied to the goddess of corn. The name, from its signification, (χλοη, *herba virens*,) has generally been applied to women possessed of beauty, and of simplicity.

CHLO'PAN, a town of Poland, in the palatinate of Volhynia: seventy-two miles east-north-east of Lucko.

CHLO'RA, *s.* [from χλωρος, pale, because the flowers are of a pale yellow colour.] In botany, a genus of the class octandria, order monogynia, natural order rotaceæ. The generic characters are—Calyx: perianthium eight-leaved; leaflets linear, spreading, permanent. Corolla: monopetalous, salver-shaped; tube shorter than the calyx, coating the germ; border eight-parted; divisions lanceolate, longer than the tube. Stamina: filaments eight, very short, seated on the throat; antheræ linear, erect, shorter than the divisions. Pistillum: germ ovate-oblong; style filiform, length of the tube; stigmas four, oblong, cylindric. Pericarpium: capsule ovate-oblong, one-celled, somewhat compressed, furrowed, two-valved; valves incurvated on the side. Seeds: numerous, minute. This genus is allied to gentiana; but differs in the number of stamens, and segments of the calyx and corolla.—*Essential Character*. Calyx, eight-leaved; corolla, one-petalled, eight-cleft; capsule, one-celled, two-valved, many-seeded; stigma, four-cleft.

Species. 1. Chlora perfoliata, or perfoliate yellow-wort, or yellow centaury: leaves perfoliate. The whole plant generally very glaucous. Stem cylindric, smooth, from three inches to three feet high; root-leaves oval, sessile, spreading in form of a star; lowest stem-leaves oval-lanceolate; the rest perfoliate, as if composed of two lanceolate or cordate leaves running into each other at the base, all of a glaucous colour. Flowers in a kind of umbel, of three rays, encompassed by the uppermost leaf; the middle one bearing one flower without any leaves; the outer ones terminated by a leaf similar to the stem-leaves, from which arises an umbellule supporting one or more flowers. Calyx sometimes equal to, sometimes longer, and sometimes shorter than, the corolla; leaflets eight to ten. Corolla gold-coloured, with a milky juice; segments sometimes nine, slightly emarginate; stamens six to nine or ten; style cloven, yellow, thickest towards the top; stigmas two, shaped like a horse-shoe, yellow; capsule more rounded than in the gentians. Annual. Pastures, in chalky and limestone soils; flowering from June through the autumn. It was first separated from the gentians by Mr. Hudson. He gave it the name of *Blackstonia*, from Mr. Blackstone, an apothecary, author of Fasciculus Plantarum circa Harefield, and Specimen botanicum; but Linnæus has adopted Reaumur's name of *Chlora*, after Adanson; and Mr. Hudson has given up the title of Blackstonia, in the second edition of his Flora. Haller affirms that it is more bitter than the red, *gentiana centaurium*, and that it seems to possess the same qualities.

2. Chlora imperfoliata: corollas six-cleft. Stem erect: four-cornered, glossy, a hand in height; the internodes longer than the leaves; leaves oposite, sessile, inclined to stem-clasping, ovate, glossy, acute. Flower peduncled, terminal, full yellow, larger than the leaf. It has the appearance of the foregoing, but differs in having the calyx divided to the base, and the divisions not linear; in the corolla also being six-cleft, and the styles glued together. It is a native of the extreme part of Italy, and is annual.

3. Chlora quadrifolia: leaves in fours. Produced from *gentiana perfoliata* and *linum quadrifolium*. Stem simple, a span in height, somewhat quadrangular, jointed; leaves in whorls, linear, only a little broader towards the end, bluntish, the length of the internodes. Found in the south of Europe, by Alstroemer.

4. Chlora dodecandra: leaves opposite. Corolla longer than the calyx, divided into twelve lanceolate segments; stamens twelve, growing to the corolla, the length of the calyx; antheræ oblong, spiral; germ roundish; style long, intorted; stigma simple. Native of Virginia.

Propagation and Culture. These may easily be propagated from seeds, and require only common care in the cultivation. Our common yellow centaury, however, does not thrive well in a garden; and though rather impatient of cold, yet, if sheltered, it becomes mildewed.

CHLORAN'THUS, *s.* [from χλωρος, pale, and ανθος, a flower.] In botany, a genus of the class tetrandria, order monogynia,

monogynia, natural order aggregatæ. The generic characters are—Calyx: none, but an ovate, acute, concave scale, on which the germ is placed. Corolla: one three-lobed convex petal, inserted into the outside of the germ. Stamina: filaments none; antheræ four, inserted into the lobes of the petal on the edges towards the inside and bivalve. Pistillum: germ obovate, prominent in front, and bearing the petal; style unequal, very short, angular; stigmas three, very minute, erect. Pericarpium: drupe oblong. Seed: nut oblong, smooth.—*Essential Character.* Calyx, none; corolla, a petal three-lobed by the side of the germ; antheræ growing to the petal; drupe one-seeded.

Only one species, viz. Chloranthus inconspicuus. As described by Swartz, it is an herbaceous plant. Stems many from the root, half a foot high, spreading, suberect, a little branching, round, striated, smooth; leaves petioled, decussated, opposite, lanceolate-ovate, serrate, nerved, veiny, rather succulent, very smooth, pale green; petioles shortish, channelled above, smooth; stipules between the petioles, having two minute teeth on each side, membranaceous, permanent. Flowers panicled; panicle terminal, erect, simple; racemes or spikes opposite, decussated, erectish, subfastigiate. Flowers opposite, decussated, sessile, solitary, minute, the size of a pin's head, somewhat succulent, whitish yellow; pollen yellow; stigmas whitish; berry black, the size of pepper. According to l'Heritier, it is a stoloniferous undershrub. Stems procumbent at the base, knotted, grey; the knots near the ground rooting, sometimes alternately leafless, but annulated with stipules like the rest. Leaves oblong-ovate, acute, the serratures mortified at the end, revolute, somewhat wrinkled, the same colour on both sides, spreading, flat, permanent, from two to three inches long, and from eighteen to twenty lines broad. Petioles one-fourth of the length of the leaves, ending at the base in a ring, connecting two subulate erect stipules. Panicles lax, composed of spreading decussated spikes, an inch and a half long. Flowers herbaceous, a line in length. Bractes sessile, lanceolate, acute, concave, pressed close, permanent, under the spikes. Perianthium double; the lower more properly a bracte, the upper only a scale; style scarcely any; stigma capitate, sub-bivalved, sometimes two-lobed; fruit an oval berry, acuminated with the style, pellucid at the base. This plant has long been introduced into the royal garden at Kew as a native of China, where we are told it is cultivated in their gardens, though it seems not to have any qualities either palatable or odoriferous, nor has it a beautiful appearance. Dr. Lind asserted, that the Chinese mix it with their tea, to give it a pleasant smell; but this plant in itself has no smell whatever. Introduced 1781, by James Lind, M. D. It flowered on-board the Atlas on the voyage. It is preserved in the stove, and may be increased readily by its runners.

CHLO'RIS, the goddess of flowers, who married Zephyrus. She is the same as Flora. *Ovid.*—A daughter of Amphion, son of Jasus and Persephone, who married Neleus king of Pylos, by whom she had one daughter and twelve sons, who all, except Nestor, were killed by Hercules. *Homer.*

CHLORO'SIS, [from χλωρος, green,] The green sickness; a disease so called from the yellow greenish look which those have who are afflicted with it. For the regimen and cure, see MEDICINE.

CHLORO'XYLON, *s.* in botany. See LAURUS.

CHLU'METZ, a town of Bohemia, in the circle of Konigingratz: five miles south of Konigingratz.

CHMIELOW'KA, a town of Poland, in the palatinate of Braclaw: forty-six miles east-north-east of Braclaw.

CHNIM, a strong town of Bosnia, belonging to the Venetians: fifteen miles south of Banjaluka.

CHO-YANG, a town of China, of the third rank, in the province of Hou-quang: ten leagues east-north-east of Siang-yang.

To CHOAK. See CHOKE.

CHO'AM-YU-SO, a town of China, in the province of Quang-tong: sixteen leagues east-south-east of Kao-tcheou.

CHOBOL'TIVO, a town of Poland, in the palatinate of Volhynia: thirty-six miles west of Lucko.

CHOC-BAY, a bay on the west coast of the island of St. Lucia, a little to the north of Carenage bay.

CHOCCHAR'MO, a town of Asia, in Thibet: twenty-seven miles north-east of Toson-hotun.

CHOCK'BAR, a town of Hindoostan, situated near the confluence of the Indus and Delta, or rather where the Indus divides its branches.

CHO'CO, a province of South America, in the government of Terra Firma, bounded on the north by the provinces of Darien and Carthagena, on the east and south by Popayan, and on the west by the Pacific Ocean. The soil, climate, &c. are similar to those of Popayan.

CHO'COLATE, *s.* [*chocolate*, Span.] The nut of the cacao-tree, or theobroma. The cake or mass, made by grinding the kernel of the cacao-nut with other substances, to be dissolved in hot water. The Spaniards were the first who brought chocolate into use in Europe, to promote the consumption of their cacao-nuts, achiot, and other drugs, which their West Indies furnish, and which enter the composition of chocolate. See THEOBROMA. The liquor made by a solution of chocolate in hot water.—*Chocolate* is certainly much the best of the three exotic liquors: its oil seems to be both rich, alimentary, and anodyne. *Arbuthnot.*

In fumes of burning *chocolate* shall glow,
And tremble at the sea that froths below! *Pope.*

CHO'COLATE-NUT-TREE. See THEOBROMA.

CHOCOLO'COCA, which the Spaniards call Castro Virreyna, a town of Peru, sixty leagues south-east of Lima, famous for its silver mines, which are at the top of a high mountain, always covered with snow, and but two leagues from the town. The stones of the mines are of a dark blue colour; these being calcined and powdered, then steeped in water and quicksilver, the filth is separated, and the silver melted and formed into bars. These veins are not very rich, but the metal is extremely fine. They make plenty of wine here, where it attains a greater degree of perfection, owing to the pureness of the air, than it is observed to have elsewhere.

CHO'COPE, a town in the jurisdiction of Truxillo, in South America, in Peru; fourteen leagues south of St. Pedro. Here are about sixty or seventy families, chiefly Spaniards, with some of the other casts, but not above twenty-five families. It has a church built of brick, both large and decent. The people here mention a rain that fell in 1726, which lasted forty nights, beginning constantly at four or five in the evening, and ceasing at the same hour the next morning, which laid most of the houses in ruins. Lat. 7. 46. S.

CHOCUI'TO, or rather CHUCUITO, or TITI CACA, a large lake near Paria, in South America, and in Peru, into which a great number of rivers empty themselves. It is 240 miles in circumference, and in some parts eighty fathoms deep; yet the water cannot be drunk, it is so very turbid. It abounds in fish, which they dry and salt, and exchange with the neighbouring provinces for brandy, wines, meal, or money. It is said the ancient incas, on the conquest of Peru by the Spaniards, threw into this lake all their riches of gold and silver. It was this lake into which the inca Huana Capac threw the famous chain of gold, the value of which was immense. It abounds with flags and rushes, of which Capac Vaupanchi, the fifth inca, built a bridge for transporting his army to the other side.

CHOC'ZIM, or COKZIM, a town of European Turkey, in Moldavia, situated on the south side of the Dniester, near the frontiers of Poland, remarkable for two victories gained here by the Poles over the Turks, one in 1621, the other in 1683. The suburbs were burned down in 1769; twelve miles south-south-west of Kaminiek, and sixty-

ſixty-eight miles weſt-north-weſt of Mogilov. Lat. 48. 52. N. lon. 44. 45. E. Ferro.

CHODE, [the old preterite from *chide.*]—And Jacob was wroth, and *chode* with Laban. *Geneſis.*

CHODIVO'JA, a town of Walachia: thirty-two miles ſouth-ſouth-weſt of Buchoreſt.

CHODOROS'LAU, a town of Poland, in the palatinate of Lemberg: twenty miles ſouth-eaſt of Lemberg.

CHŒ'NIX, *ſ.* [χοινιξ, Gr.] An ancient dry meaſure, containing the 48th part of a *medimnus*, or ſix buſhels.

CHŒ'RILUS, a tragic poet of Athens, who wrote 150 tragedies, of which thirteen obtained the prize. An hiſtorian of Samos. Two other poets, one of whom was very intimate with Herodotus. He wrote a poem on the victory which the Athenians had obtained over Xerxes, and, on account of the excellence of the compoſition, he received a piece of gold for each verſe from the Athenians, and was publicly ranked with Homer as a poet. The other was one of Alexander's flatterers and friends. It is ſaid the prince promiſed him as many pieces of gold as there ſhould be good verſes in his poetry, and as many flaps on the forehead as there were bad; and, in conſequence of this, ſcarce ſix of his verſes in each poem were entitled to gold, while the reſt were rewarded with the caſtigation. *Plutarch. Horace.*

CHO'HAN, a circar of Hindooſtan, in the country of Alla-Habad.

CHOH'REN, or KOHREN, a town of Germany, in the circle of Upper Saxony, and territory of Leipſic: twenty miles ſouth-ſouth-eaſt of Leipſic.

CHOICE, *ſ.* [*choix*, Fr.] The act of chooſing; determination between different things propoſed; election:

Gentle or ſharp, according to thy *choice*,
To laugh at follies, or to laſh at vice. *Dryden.*

The power of chooſing; election.—*Choice* there is not, unleſs the thing which we take be ſo in our power, that we might have refuſed it. If fire conſume the ſtable, it chooſeth not ſo to do, becauſe the nature thereof is ſuch that it can do no other. *Hooker.*—Care in chooſing; curioſity of diſtinction.—Julius Cæſar did write a collection of apophthegms: it is pity his book is loſt; for I imagine they were collected with judgment and *choice.* *Bacon.*—The thing choſen; the thing taken, or approved, in preference to others:

Your *choice* is not ſo rich in birth as beauty;
That you might well enjoy her. *Shakeſpeare.*

The beſt part of any thing, that is more properly the object of choice.—Thou art a mighty prince: in the *choice* of our ſepulchres bury thy dead. *Geneſis.*—Several things propoſed at once, as objects of judgment and election:

A braver *choice* of dauntleſs ſpirits
Did never float upon the ſwelling tide. *Shakeſpeare.*

To make CHOICE *of.* To chooſe; to take from ſeveral things propoſed:

Wiſdom of what herſelf approves makes *choice*,
Nor is led captive by the common voice. *Denham.*

CHOICE, *adj.* [*choiſi*, Fr.] Select; of extraordinary value:

Thus, in a ſea of folly toſs'd,
My *choiceſt* hours of life are loſt. *Swift.*

Chary; frugal; careful. Uſed of perſons.—He that is *choice* of his time, will alſo be *choice* of his company, and *choice* of his actions. *Taylor.*

CHOICE'LESS, *adj.* Without the power of chooſing; without right of choice; not free.

CHOICE'LY, *adv.* Curiouſly; with exact choice:

A band of men,
Collected *choicely* from each county ſome. *Shakeſpeare.*

Valuably; excellently.—It is certain it is *choicely* good. *Walton.*

CHOICE'NESS, *ſ.* Nicety; particular value.—Carry into the ſhade ſuch auriculas, ſeedlings, or plants, as are for their *choiceneſs* reſerved in pots. *Evelyn.*

CHOIR, *ſ.* [*chorus*, Lat.] An aſſembly or band of ſingers:

They now aſſiſt the *choir*
Of angels, who their ſongs admire. *Waller.*

The ſingers in divine worſhip:

The *choir*,
With all the choiceſt muſic of the kingdom,
Together ſung *Te Deum.* *Shakeſpeare.*

The part of the church where the choriſters or ſingers are placed. It was in the time of Conſtantine that the choir was ſeparated from the nave. In the twelfth century, they began to incloſe it with walls; but the ancient baluſtrades have been ſince reſtored, from a view to the beauty of architecture.

CHOI'SEUL (Stephen Francis duc de), born in 1719, and died in 1785. After having been ambaſſador at Vienna, miniſter of war, and of the marine, and having had the entire confidence of Louis XV. he was diſgraced, yet enjoyed great conſequence in his retirement. The late king of Pruſſia uſed to call him the coachman of Europe. To his dexterity in negociation was partly owing the peace of 1763. He experienced the common lot of all whoſe talents are remarkably brilliant; much good has been ſaid of him, and much ill. But his bittereſt enemies could never deny that he had a ſtrong underſtanding, and was diligent in buſineſs; that he poſſeſſed the art of penetrating into the characters of men, and of taking advantage of events. Thoſe men of letters and poets of his time, who were in his intereſt, have painted him in glowing colours, as the moſt magnanimous of mankind; while ſuch as had no ſhare in his favours have endeavoured to weaken this praiſe, by cenſuring his adminiſtration for the want of economy. But, if he was ſometimes laviſh of the public money, he certainly was not ſparing of his own. From whence we may conclude, that generoſity was a virtue to which he was naturally inclined.

CHOI'SEUL, a town of France, in the department of the Upper Marne: four leagues north-eaſt of Langres.

CHOI'SEUL-BAY, on the north-weſt coaſt of the iſlands of the Arſacides, weſt of Port Praſlin. The inhabitants of this bay, like thoſe of Port Praſlin, have a cuſtom of powdering their hair with lime, which burns it and gives it a red appearance.

CHOI'SI (Francis Timoleon de), dean of the cathedral of Bayeux, and one of the forty of the French academy, was born at Paris in 1644. In 1685, he was ſent with the chevalier de Chaumont to the king of Siam, and was ordained prieſt in the Indies by the apoſtolical vicar. He wrote a great number of works, in a polite, florid, and eaſy, ſtyle; the principal of which are, 1. Four Dialogues on the Immortality of the Soul, &c. 2. Account of a voyage to Siam. 3. An Eccleſiaſtical Hiſtory, in 11 vols. 4to. 4. Life of David, with an Interpretation of the Pſalms. 5. Life of Solomon, &c. He died at Paris in 1724.

CHOI'SY, a town of France, in the department of the Seine and Marne: four leagues north of Provins.

CHOI'SY-BELLEGARDE, a town of France, in the department of the Loiret: four leagues weſt of Montargis.

CHOI'SY-LE-ROY, or CHOISY-SUR-SEINE, a town of France, in the department of Paris, and chief place of a canton, in the diſtrict of Bourg-la-Reine, on the Seine: ſix miles ſouth of Paris.

To CHOKE, *v. a.* [aceocan, Sax. from ceoca, the cheek or mouth. According to Minſhew, from חכ; from whence, probably, the Spaniſh *ahogar.*] To ſuffocate; to kill by ſtopping the paſſage of reſpiration:

While you thunder'd, clouds of duſt did *choke*
Contending troops. *Waller.*

To ſtop up; to obſtruct; to block up a paſſage.—They are at a continual expence to cleanſe the ports, and keep them

them from being *choked* up. *Addison.*—To hinder by obstruction and confinement:

The fire, which *chok'd* in ashes lay,
A load too heavy for his soul to move,
Was upward blown below, and brush'd away by love. *Dryd.*

To suppress:

And yet we ventur'd; for the gain propos'd
Chok'd the respect of likely peril fear'd. *Shakespeare.*

To overpower.—And that which fell among thorns, are they which, when they have heard, go forth, and are *choked* with cares, and riches, and pleasures of this life, and bring no fruit to perfection. *Luke.*

CHOKE, *s.* The filamentous or capillary part of an artichoke. *A cant word.*

CHOKE', a town of Asia, in the country of Thibet; 345 miles east-south-east of Lassa.

CHOKE-PEAR, *s.* A rough, harsh, unpalatable, pear. Any aspersion or sarcasm, by which another is put to silence. *A low term.*—Pardon me for going so low as to talk of giving *choke-pears. Clarissa.*

CHO'KER, *s.* One that chokes or suffocates another. One that puts another to silence. Any thing that cannot be answered.

CHO'KY, *adj.* That which has the power of suffocation.

CHOLA'WIA, a town of Lithuania, in the palatinate of Minsk: forty-two miles south-east of Minsk.

CHOLEDO'CHUS, *s.* [from χολη, bile, and δεχομαι, to receive.] In anatomy, it is a common name for the gall-bladder, the biliary ducts, and the common gall-duct, which communicates with the duodenum, called *choledochus ductus.* It seems to be a continuation of the ductus cysticus; for it is often observed, that the ductus hepaticus runs, for some space, within the side of the ductus cysticus, before it opens into its cavity: also at the opening of the hepatic duct into the cystic, there is a small loose membrane to hinder the bile from regurgitating.

CHO'LER, *s.* [*cholera*, Lat. from χολη.] The bile. See MEDICINE. The humour which, by its superabundance, is supposed to produce irascibility:

It engenders *choler*, planteth anger,
And better 'twere that both of us did fast,
Since, of ourselves, ourselves are choleric,
Than feed it with such over-roasted flesh. *Shakespeare.*

Anger; rage:

He, methinks, is no great scholar,
Who can mistake desire for *choler.* *Prior.*

CHO'LERA MOR'BUS, *s.* A sudden reaching, or overflowing of the bile. See MEDICINE.

CHO'LERIC, *adj.* [*cholericus*, Lat.] Abounding with choler. Angry; irascible: of persons.—Bull, in the main, was an honest, plain-dealing fellow, *choleric*, bold, and of a very unconstant temper. *Arbuthnot.*—Angry; offensive: of words or actions.—There came in *choleric* haste towards me about seven or eight knights. *Sidney.*—Becanus threateneth him, using his confident, or rather *choleric*, speech. *Raleigh.*

CHO'LERICNESS, *s.* Anger; irascibility; peevishness.

CHOL'LET, a town of France, and principal place of a district, in the department of the Mayne and Loire: six leagues west of Argenton, and nine south-south-west of Angers. Near this town, in February 1794, the French royalists were defeated by the republican army, with great loss. Lat. 47. 3. N. lon. 16. 47. E. Ferro.

CHOLM, a town of Russia, in the government of Pskov, on the river Lovat: 180 miles south of Petersburg. Lat. 57. 0. N. lon. 49. 0. E. Ferro.

CHOLMOGO'RI, a town of Russia, in the government of Archangel, on the west side of the Dwina: twenty-eight miles south of Archangel, and 360 north-east of Petersburg.

CHOLO'MA, *s.* [from χωλος, lame.] Any halting, lameness, or distortion of the leg.

CHO'LONG, a town of Asia, in the country of Thibet: fifty-seven miles north-north-west of Chao-mahing-Hotun.

CHOLO'SIS, *s.* [from χωλος, lame.] Lameness; halting; particularly that which is occasioned by one leg being shorter than the other.

CHOL'TITZ, a town of Bohemia, in the circle of Chrudim: six miles north-west of Chrudim.

CHOLU'LA, a town of Mexico, in the province of Tlascala, which formerly formed an independent state. It was held by the people of Mexico as a sacred spot, and the sanctuary of the gods; with a temple, in which they offer more victims than in that of Mexico.

CHO'MELIS, a town of France, in the department of the Upper Loire: four leagues and a half north of Le Puy.

CHOM'MERAC, a town of France, in the department of the Ardeche, and chief place of a canton, in the district of Coiron: three miles south-east of Privas.

CHOMON'CHOUAN, a lake of Canada: seventy-three leagues north-west of Quebec. Lat. 49. 20. N. lon. 75. 40. W. Greenwich.

CHOMSK, a town of Lithuania, in the palatinate of Brzesc: fifty-six miles east of Brzesc.

CHO'NAD, a town of Hungary, situated on the Marosch, the see of a bishop, suffragan of Colocza: twenty-five miles north of Temeivar.

CHO'NAS, a town of France, in the department of the Isere, and chief place of a canton, in the district of Vienne: thirteen miles south of Vienne.

CHOND, a town of Arabia: 190 miles south-west of Amanzirifdin.

CHONDRIL'LA, *s.* [χονδρος, a hillock of earth, a clot or cluster.] In botany, a genus of the class syngenesia, order polygamia æqualis, natural order compositæ semiflosculosæ. The generic characters are—Calyx: common calycled, cylindric; scales of the cylinder very many, parallel, linear, equal; those of the base few, very short. Corolla: compound imbricate, uniform; corollets hermaphrodite, very many, equal, in several rows; proper monopetalous, strap-shaped, linear, truncated, four or five-toothed. Stamina: filaments five, capillary, very short; antheræ cylindric, tubular. Pistillum: germ subovate; style filiform, length of the stamens; stigmas two, reflex. Pericarpium: none; calyx cylindric, oblong. Seeds: solitary, ovate, compressed, muricated; pappus hairy, stipe long, attenuated above. Receptaculum: naked.—*Essential Character.* Calyx calycled; florcules in many rows; seeds muricated; pappus simple, stipitated.

Species. 1. Chondrilla juncea, or rushy gum-succory: radical leaves runcinate, stem leaves linear, entire. Root perennial. Stem much branched, from two to three feet high, erect; at bottom strigose, towards the top smooth, bright green. Radical and lower leaves ovate-lanceolate, pinnatifid, sinuate-toothletted, decurrent, scabrous with few hairs; leaves higher on the stem, and on the branches linear, tongue-shaped, obtuse, quite entire, sessile, smooth, glaucous-green. Native of France, Swisserland, Germany, Austria, Italy, and Spain; flowering in July, and ripening its seeds in September. Cultivated in 1633. The juice of the whole plant is extremely bitter; in Spain, however, it is used as a salad herb.

2. Chondrilla crepoides: leaves sagittate, stem-clasping; flowers subsessile, lateral. Stem simple, a foot and a half high, purple at the base, striated, set with a few white bristles. Annual.

3. Chondrilla nudicaulis: scape naked, flowers panicled. Native of the East Indies, not of North America; and by the Egyptian pyramids, as Linnæus supposed.

Propagation and Culture. The first sort is seldom preserved in gardens, because the roots are very apt to spread, and become troublesome weeds. The downy seeds also are carried by the wind to a considerable distance, and

and fill the ground with plants. The roots strike deep, and spread out with thick fibres; each of these, when cut or broken, will shoot up; so that, when this plant has once got possession of the ground, it is very difficult to root it out. The two other species have not been introduced into our gardens. See APARGIA, CACALIA, CATANANCHE, CENTAUREA, CREPIS, ERIGERON, LACTUCA, LAPSANA, LEOTODON, PECTIS, PRENANTHES, SCORZONERA, SONCHUS, and CICHORIUM.

CHONDROPTERY'GII, *s.* in ichthyology, the name of Linnæus's sixth order of fishes, containing those genera which have cartilaginous gills, viz. the Acipenser, Chimæra, Squalus, Raia, and Petromyzon; which see under their respective heads.

CHONG-TCHEOU, a town of Asia, in the kingdom of Corea: twenty-five miles south-west of Ou-tcheou.

To CHOOSE, *v. a.* I *chose*, I *have chosen*, or *chose*; [*choisir*, Fr. ceoran, Sax. *kiesen*, Germ.] To take by way of preference of several things offered; not to reject.—Did I *choose* him out of all the tribes of Israel to be my priest? 1 *Sam.* ii. 28.—To take; not to refuse.—Let us *choose* to us judgment; let us know among ourselves what is good. *Job.*—To select; to pick out of a number.—How much less shall I answer him, and *choose* out my words to reason with him? *Job.*—To elect for eternal happiness; to predestinate to life. A term of theologians.

To CHOOSE, *v. n.* To have the power of choice between different things. It is generally joined with a negative, and signifies *must necessarily be.*—When a favourite shall be raised upon the foundation of merit, then can he not *choose* but prosper. *Bacon.*

Throw down a golden apple in her way;
For all her haste, she could not *choose* but stay. *Dryden.*

CHOO'SER, *s.* He that has the power or office of choosing; elector.—This generality is not sufficient to make a good *chooser*, without a more particular contraction of his judgment. *Wotton.*

CHOOZ, a town of France, in the department of the Ardennes, and chief place of a canton, in the district of Rocroy.

To CHOP, *v. a.* [*kappen*, Dut. *couper*, Fr.] To cut with a quick blow:

What shall we do, if we perceive
Lord Hastings will not yield to our complots?
—— *Chop* off his head. *Shakespeare.*

To devour eagerly: with *up.*—You are for making a hasty meal, and for *chopping up* your entertainment like an hungry clown. *Dryden.*—To mince; to cut into small pieces.—They break their bones, and *chop* them in pieces, as for the pot. *Micah.*—To break into chinks.—I remember the cow's dugs, that her pretty *chapt* hands had milked. *Shakespeare.*

To CHOP, *v. n.* To do any thing with a quick and unexpected motion, like that of a blow: as we say, the wind *chops* about; that is, changes suddenly.—If the body repercussing be near, and yet not so near as to make a concurrent echo, it *choppeth* with you upon the sudden. *Bacon.*—To catch with the mouth.—Out of greediness to get both, he *chops* at the shadow, and loses the substance. *L'Estrange.*—To light or happen upon a thing suddenly: with *upon.*

To CHOP, *v. a.* [ceapan, Sax. *koopen*, Dut. to buy.] To purchase, generally by way of truck; to give one thing for another.—The *chopping* of bargains, when a man buys not to hold but to sell again, grindeth upon the seller and the buyer. *Bacon.*—To put one thing in the place of another.—We go on *chopping* and changing our friends, as well as our horses. *L'Estrange.*

Sets up communities and senses,
To *chop* and change intelligences. *Hudibras.*

To bandy; to altercate; to return one thing or word for another.—You'll never leave off your *chopping* of logic, till your skin is turned over your ears for prating. *L'Estrange.*

CHOP, *s.* A piece chopped off. See CHIP. A small piece of meat, commonly of mutton:

Old Cross condemns all persons to be fops,
That can't regale themselves with mutton *chops*. *King's Cook.*

A crack, or cleft.—Water will make wood to swell; as we see in the filling of the *chops* of bowls, by laying them in water. *Bacon.*

CHOP-CHURCH, *s.* [*ecclesiarum permutatio.*] A word mentioned in a statute of Henry VI. by the sense of which, it was in those days a kind of trade, and by the judges declared to be lawful; but Brooke, in his Abridgment, says, it was only permissable by law: it was without a doubt a nick-name given to those that used to change benefices; as to *chop and change* is a common expression. 9 Hen. VI. c. 65.

CHO'PER, a river of Asiatic Russia, which runs into the Don, near Choperskaia.

CHOPERSK', a town of Asiatic Russia, in the government of Saratov, on the Choper: 140 miles west of Saratov, and 648 south-south-east of Petersburg.

CHOPERSKAI'A, a town of Russian Tartary, in the country of the Cosacs, on the Don: 192 miles north-east of Asoph, and sixty south-west of Archadinskaia.

CHOP'HOUSE, *s.* A mean house of entertainment, where provision ready dressed is sold.—I lost my place at the *chophouse*, where every man eats in public a mess of broth, or *chop* of meat, in silence. *Addison.*

CHO'PIN, *s.* [French.] A French liquid measure, containing nearly a pint Winchester, or statute measure. A term used in Scotland for a quart of wine measure.

CHO'PIN (René), a famous civilian, born at Bailleul in France, in 1537. He was advocate in the parliament of Paris, where he pleaded with great reputation. He composed many works, which have been collected and printed in 6 vols. folio. He died at Paris in 1606.

CHOP'PING, *part. adj.* [in this sense, of uncertain etymology.] An epithet frequently applied to infants, by way of ludicrous commendation; imagined by Skinner to signify *lusty*, from cap, Sax. by others to mean a child that would bring money at a market. Perhaps a greedy hungry child, likely to live:

Both Jack Freeman and Ned Wild
Would own the fair and *chopping* child. *Fenton.*

CHOP'PING-BLOCK, *s.* A log of wood, on which any thing is laid to be cut in pieces.—The straight smooth elms are good for axle-trees, boards, *chopping-blocks. Mortimer.*

CHOP'PING-KNIFE, *s.* A knife with which cooks and butchers chop and mince their meat.

CHOP'PY, *adj.* Full of holes, clefts, or cracks:

By each at once her *choppy* finger laying
Upon her skinny lips. *Shakespeare.*

CHOPS, *s. without a singular*; [corrupted probably from CHAPS, which see.] The mouth of a beast.—So soon as my *chops* begin to walk, yours must be walking too, for company. *L'Estrange.*—The mouth of a man, used in contempt:

He ne'er shook hands, nor bid farewel to him,
Till he unseam'd him from the nape to th' *chops. Shakesp.*

The mouth of any thing in familiar language; as of a river, of a smith's vice, &c.

CHOP'TANK, a river of United America, in the state of Delaware, which runs into the Chesapeak, twenty-five miles south-south-east of Annapolis.

CHO'RAL, *adj.* [from *chorus*, Lat.] Belonging to, or composing, a choir or concert:

All sounds on fret by string or golden wire,
Temper'd soft tunings intermix'd with voice,
Choral or unison. *Milton.*

Singing in a choir.—And *choral* seraphs sung the second day. *Amburst.*

CHO'RAL, [*choralis*, Lat.] Any person that by virtue of the orders of the clergy, was in ancient time admitted to sit and serve God in the choir. Dugdale, in his History of St. Paul's Church, says, that there were formerly six vicars *choral* belonging to that church.

CHO'RAN KIAMEN, a post of Chinese Tartary: twenty miles west-south-west of Nimgouta.

CHORASAN', or KORASAN, a province of Persia, bounded on the north by Charasm and the country of the Usbec Tartars, on the east by Bukharia and Candahar, on the south by Segestan, and on the west by the province of Mezanderan and the Caspian Sea, about one hundred and fifty leagues in length and one hundred and forty in breadth. The principal towns are Heret, Kenef, Talekan, Merwa, Zaweh, &c.

CHORA'ZIM, or CHORAZIN, a town of Galilee, now desolate: two miles distant from Capernaum. *St. Luke.*

CHORD, *s.* [*chorda*, Lat. from χορδη, to roll up or twist.] A cord; a rope. By anatomists it is sometimes used to denote the tendons and intestines of animals. In its primitive or scientific application, it is written *chord*; in its common or vulgar use, the *h* is omitted.

CHORD, *s.* in music, a string formed of dried gut; or of wire of gold, silver, steel, or brass, and applied to the construction of many different musical instruments, both ancient and modern. By the vibrations of these chords the sensation of sound is excited, and by their divisions the several degrees of tune are determined. Chords of gold wire in harpsichords yield a sound almost twice as strong as those of brass; while steel wires give a feebler sound than brass, as being less heavy and less ductile.—By *chord*, in music, is also understood the intervals which are to accompany the bass or fundamental note: thus we say, the common chord, the chord of the sixth, &c. For the Nature, Construction, Inversion, and Resolution, of Chords, see the article MUSIC.

CHORD, *s.* in geometry, a right line, connecting the two extremes of an arch; so called from its resemblance to the chord or string of a bow. It has the following properties: 1. The chord is bisected by a perpendicular drawn to it from the centre. 2. Chords of equal arcs, in the same or equal circles, are themselves equal. 3. Unequal chords have to one another a less ratio than that of their arcs. 4. The chord of an arc is a mean proportional between the diameter and the versed sine of that arc. See GEOMETRY.

To CHORD, *v. a.* To furnish with strings or chords; to string:

What passion cannot music raise and quell?
When Jubal struck the *chorded* shell,
His list'ning brethren stood around. *Dryden.*

CHORDE'E, or CHORDE', *s.* [Fr. from χορδη, a cord.] A painful contraction of the frænum of the penis, as if it were drawn inward with a string.—For the cause and cure, see MEDICINE.

CHO'REA, *s.* [from χορος, a chorus, which of old accompanied dancing.] A convulsive motion of the members as if the person were dancing, is called *chorea sancti Viti*, St. Vitus's dance; because, as Horstius relates, some devotees of St. Vitus exercised themselves so long in dancing that their intellects were disordered, and could only be restored by dancing again at the anniversary of St. Vitus.

CHOREPISCO'PUS, *s.* Formerly a suffragan or local bishop, holding a middle rank between bishops and presbyters, and delegated to exercise episcopal jurisdiction within certain districts, when the boundaries of particular churches, over which separate bishops presided, were considerably enlarged. It is also a dignity still subsisting in some cathedrals in Germany, signifying the same with *chori episcopus*, or bishop of the choir.

CHOR'FAKAN, or CORFUKAN, a town of Arabia, in the country of Oman, pillaged by the Portuguese in 1508: sixty-four miles south-east of Julfar.

CHOR'GES, a town of France, in the department of the Higher Alps, burned by the duke of Savoy in 1692: ten miles west of Embrun.

CHO'RIAMBUS, *s.* in ancient poetry, a foot consisting of four syllables, whereof the first and last are long, and the two middle ones are short; or, which is the same thing, it is made up of a trochæus and an iambus: such is the word *nobilitas*.

CHO'RIN, a town of Germany, in the circle of Upper Saxony, and Ucker Mark of Brandenburg: six miles south of Neu Angermunde.

CHO'RION, *s.* [from χωρειν, to escape.] The external membrane of the fœtus, so named because it always escapes from the womb with the child. See ANATOMY of the Gravid Uterus, vol. i. p. 650.

CHO'RISTER, *s.* [from *chorus*, Lat.] A singer in cathedrals, usually a singer of the lower order; a singing boy. A singer in a concert. This sense is, for the most part, confined to poetry:

And let the roaring organs loudly play
The praises of the Lord in lively notes;
The whiles, with hollow throats,
The *choristers* the joyous anthem sing. *Spenser.*

CHOR'LEY, a market town in Lancashire, situated near a rivulet called Chor, which, issuing from several springs, runs through the town, and flows along the picturesque and pleasant valleys beneath it, communicating with the river Yarrow, after giving motion to several mills, engines, cotton machines, &c. The Yarrow is a larger river, that enriches more than one-half of the extremities of this township lying to the south-east, on whose banks, and for many miles around, are bleaching grounds and printing-works of considerable extent. From *Chor*, and the addition of the word *ley*, (from leaȝ, Sax. signifying a field,) comes Chorley. It is situated near the centre of the county, on the great road from London to Glasgow and Edinburgh. It is distant twenty-two miles from Manchester, ten from Preston, and 201 from London. Its markets are Tuesdays and Saturdays; fairs, March 26, May 5, August 20, and September 4; the three former for horned cattle, and the latter for toys, small wares, and woollen cloths brought from Yorkshire. The cotton-manufacture in all its branches, from the grain to the finished piece, is carried on and flourishes here, and in the neighbourhood for many miles round; as likewise the trade of bleaching and printing cottons, fustians, callicoes, and muslins. The neighbourhood abounds in mines of coal, canel, lead, and alum; in beds of gravel, sand, and marl; and in rocks of stone, and quarries of flag and slate, ashlar, and mill-stone; all of which are articles that tend to establish an advantageous trade on their new canal.—Five miles south-east of Chorley is the village of Rivington, noted for the peak or beacon, which is on a very high hill, commanding a prospect of vast extent, and which served in the civil wars as a watch-tower. It still serves as a land and sea mark, and as the centre mark of Lancashire. Here is a grammar-school founded by James Pilkington, bishop of Durham in the reign of queen Elizabeth.

CHORO'GRAPHER, *s.* [from χωρα, a region, and γραφω, to describe.] He that describes particular regions or countries.

CHOROGRA'PHICAL, *adj.* Descriptive of particular regions and countries; laying down the boundaries of countries.—I have added a *chorographical* description of this terrestrial paradise. *Raleigh.*

CHOROGRA'PHICALLY, *adv.* In a chorographical manner; according to the rule of chorography; in a manner descriptive of particular regions.

CHORO'GRAPHY, *s.* The art of delineating or describing some particular country or province. This differs from geography, as the description of a particular country differs from that of the whole earth; and from topography, as the description of a country differs from that of a town or a district. Chorography, in painting or sculpture,

ture, is represented by a woman in a habit of a changeable colour, plain and short; in her right hand a measuring-square, and in her left a pair of compasses. By her side a globe, with some part of it designed. Her changeable habit denotes the different taking of situations, as the shortness of it does their being taken briefly. The uses of the instrument and compasses are obvious.

CHOROI'DES, *s.* [from χοριον, the chorion, and ειδος, a likeness.] In anatomy, the name of several membranes, which on account of their many blood-vessels resemble the chorion.

CHO'ROL, a town of Russia, on the river of the same name, in the government of Kiov: 100 miles south-east of Kiov, and 252 south of Petersburg.

CHO'ROL, a river of Russia, which runs into the Psol, near Goltva, in the government of Kiov.

CHOROSCIES'SOW, a town of Poland, in the palatinate of Kiov: sixty-four miles west-north-west of Kiov.

CHOROS'KI, a town of Poland, in the palatinate of Volhynia: eighteen miles north-west of Zytomiers.

CHOROSSO'ZA, a town of Poland, in the palatinate of Bielsk: twenty-eight miles north of Bielsk.

CHOR'RO MAN'CAN, a town of Chinese Tartary. Lat. 43. 18. N. lon. 138. 36. E. Ferro.

CHO'RUS, *s.* [*chorus*, Lat.] A number of singers; a concert.—The Grecian tragedy was at first nothing but a *chorus* of singers: afterwards one actor was introduced. *Dryden.*

In praise so just let every voice be join'd,
And fill the general *chorus* of mankind! *Pope.*

The persons who are supposed to behold what passes in the acts of a tragedy, and sing their sentiments between the acts:

For supply,
Admit me *chorus* to this history. *Shakespeare.*

The song between the acts of a tragedy. Verses of a song, in which the company join the singer.

CHOSCIABAD', a town of Persia, in the province of Kirman: fifty-seven miles south-west of Sirgian.

CHOSE, *s.* [Fr. a thing.] In the common law, it is with divers epithets; as *chose local*, *chose transitory*, and *chose in action*. Chose local is such a thing as is annexed to a place, as a mill, and the like; and chose transitory is that thing which is moveable, and may be taken away, or carried from place to place: chose in action is a thing incorporeal, and only a right, as an annuity, obligation for debt, &c. And generally all causes of suit for any debt, duty, or wrong, are to be accounted choses in action; and it seems chose in action may be also called *chose in suspence*, because it hath no real existence or being, nor can properly be said to be in our possession. 1 *Lil. Abr.* 264. A person disseises me of land, or takes away my goods; my right or title of entry into the lands, or action and suit for it, and so for the goods, is a *chose in action*; so a debt on an obligation, and power and right of action to sue for the same. 1 *Brownl.* 33. And a condition and power of re-entry into land upon a feoffment, gift, or grant, before the performance of the condition, is of the nature of a *chose in action*. *Co. Lit.* 214. If one have an advowson, when the church becomes void, the presentation is but as a *chose in action*, and not grantable; but it is otherwise before the church is void. *Dyer* 296. Where a man hath a judgment against another for money, or on a statute, these are *choses in action*. An annuity in fee to a man and his heirs, is grantable over: but it has been held, that an annuity is a *chose in action*, and not grantable. 5 *Rep.* 89. *Fitz. Grant*, 45. A *chose in action* cannot be transferred over; nor is it desirable: nor can a *chose in action* be a satisfaction, as one bound cannot be pleaded to be given in satisfaction for another; but in equity *choses in action* may be assignable; and the king's grant of a *chose in action* is good. *Cro. Jac.* 170. *Chan. Rep.* 169.

Charters, where the owner of the land hath them in possession, are grantable: a possibility of an interest or estate in a term for years, is near to a *chose in action*, and therefore may not be granted: but a possibility, joined with an interest, may be a grantable chattel. *Co. Lit.* 265. And this the law doth provide, to avoid multiplicity of suits, and the subversion of justice, which would follow if these things were grantable from one man to another. But by release *choses in action* may be released and discharged for ever; but then it must be to parties and privies in the estate, &c. for no stranger may take advantage of *things in action*; save only in some special cases. *Co. Lit.* 214.

CHOSE, [the preter tense, and sometimes the participle passive, from *to choose*.]

Our sovereign here above the rest might stand,
And here be *chose* again to rule the land. *Dryden.*

CHO'SEN, [the participle passive, from *to choose*.]

If king Lewis vouchsafe to furnish us
With some few bands of *chosen* soldiers,
I'll undertake to land them on our coast. *Shakespeare.*

CHOS'KOES, the name of two very distinguished Persian monarchs. See PERSIA.

CHOS'SESO, a town of Poland, in the palatinate of Volhynia: sixty-four miles east of Lucko.

CHOST'LARN, a town of Germany, in the circle of of Bavaria: twenty-two miles west-south-west of Passau.

CHO'TA, a town of the American States, in the district of Georgia: fifty-five miles west of Tugeloo.

CHO'TA, a town of South America, in Peru, and jurisdiction of Caxamarca: sixty miles north-west of Caxamarca.

CHOTAS'TITZ, a town of Bohemia, in the circle of Czaslau: two miles north of Czaslau.

CHO'TIEBOR, a town of Bohemia, in the circle of Czaslau: eight miles north-north-east of Teutsch-Brod.

CHOT'MIZSK, a town of Russia, in the government of Charkov: fifty-two miles north-north-west of Charkov, and 588 south-south-east of Petersburg.

CHO'TOW, a town of Lithuania, in the palatinate of Minsk: twenty-two miles south-west of Minsk.

CHOTU'SITZ, a town of Bohemia, in the circle of Czaslaw, where the king of Prussia obtained a signal victory in 1742.

CHOT'ZEMITS, a town of Bohemia, in the circle of Cauzim, near the Elbe. The Austrians obtained a victory here over the king of Prussia, in 1757.

CHOT'ZEN, a town of Bohemia, in the circle of Chrudim: three miles north-north-east of Hohenmaut.

CHOU-LOU, a town of China, of the third rank, in the province of Pe-tche-li: twelve miles south-west of Ching.

CHOU-TCHUEN, a town of Asia, in Corea: thirty miles south of Haimen.

CHOU'ANG-LEOU, a town of China, of the third rank in the province of Se-tchuen: ten miles south-west of Tching-tong.

CHOU'ANGTAL, a town of Tartary, in the country of Hami: nine miles north-north-west of Tchontori.

CHOUAN'NA-MANDARU', *s.* See BAUHINIA.

CHOU'ANS, a people of la Vendée, in France, the casual offspring of a renegado blacksmith of the name of Chouan; who, with a large family, retired to the wilds of la Vendée, where for ages they multiplied amongst themselves living by plunder, theft, and every species of lawless depredation; retreating with equal celerity and address into the strong holds and fastnesses of the woods, or into caves and fissures of the rocks on the sea shore. Thus they bade defiance to the civil officers, and eluded every attempt to apprehend or dislodge them. They became so numerous, that not being able to subsist by plunder on shore, they became rovers on the seas, and formed a considerable part of the French smugglers. In this situation they were found by Charette, the celebrated leader of the royalists in France, who persuaded them to make atonement

atonement for their past lives, by taking up arms in support of their sovereign. They are said to have formed an army of thirty thousand men, and to have fought some of the most desperate battles with the republican army, that the history of the French revolution will have to record. The Chouans who so lately waged an unequal war against the republicans in France, are however said to have their name from *chouan (for chathuant)*, an owl, from their appearing at first only in the night; and the royalists of la Vendée had owls impressed on the button of their uniform. See the article CHARETTE, p. 109, of this volume.

CHOU'CHA, a town of Africa, in Upper Guinea, on the river Maguiba, surrounded with rocks.

CHOUG, or SHOGLE, a town of Asia, in Syria, on the Orontes, where all travellers without distinction are entertained in an excellent caravansera gratis for three days: it is in the road from Aleppo and Sayd.

CHOUGH, *s.* in ornithology, the trivial name of a species of crow. See CORVUS.

CHOU'I-CHAN, a town of Asia, in the kingdom of Corea: twelve miles north-west of Hiamen.

CHOU'I-FONG, a town of China, of the third rank, in the province of Kiang-si: twenty-five miles north-east of Ki-ngan.

CHOU'I-KING, a town of China, of the third rank, in the province of Kiang-si: sixty-five miles east of Kan-cheou.

CHOU'I-NGAN, a town of China, of the third rank, in the province of Tche-kiang: four leagues south of Ouen-tcheou.

CHOU'I-TCHANG, a town of China, of the third rank, in the province of Tche-kiang: twelve leagues west-north-west of Tchu-tcheo.

CHOU'I-TCHANG, a town of China, of the third rank, in the province of Kiang-si: six leagues west of Kieou-kiang.

CHOU'I-TCHEOU, a city of China, of the first rank, in the province of Kiang-si, 712 miles south of Pekin. Lat. 28. 25. N. lon. 132. 39. E. Ferro.

CHOU'I-YNG, a town of Asia, in the kingdom of Corea: twenty miles south-south-west of Haimen.

CHOU'I-YUEN, a town of Asia, in the kingdom of Corea: thirty-seven miles north-east of Haimen.

CHOULE, *s.* [commonly pronounced and written *jowl*.] The crop of a bird.—The *choule* or crop, adhering unto the lower side of the bill, and so descending by the throat, is a bag or sachel. *Brown.*

CHOULE', a town of India, on the coast of Concan, with a harbour for small vessels, belonging to the Portuguese: twenty-five miles south of Bombay. Lat. 18. 37. N. lon. 72. 46. E. Greenwich.

CHOUL'TRY, *s.* A kind of inn or house of relief in India. These public buildings are found all over Hindoostan, and are usually erected contiguous to pagodas or temples. They are supposed to have been erected and endowed by the liberality of ancient princes, or from the benevolence and piety of rich individuals. A bramin generally attends them, who administers relief to the poor and distressed, who are frequently supplied also with a mat to lie on. Tanks or reservoirs of water, or wells, are commonly near them. One of these choultries stands near the fort of Madras, on a plain which takes its name from the building.—For a further account of choultries, and an engraving of two of the pillars with which they are usually decorated, see under ARCHITECTURE, vol. ii. p. 66 and 67.

CHOUPATOU', a town of Asia, in the country of Thibet: 235 miles east of Lassa.

CHOURAGUR', a town of Hindoostan, in the country of Gurry Mundella: fifty-seven miles south-west of Gurrah.

CHOURTONG', a town of Asia, in the country of Thibet: 265 miles east of Lassa.

To CHOUSE, *v. a.* [The origin of this word is much doubted by Skinner, who tries to deduce it from the French *gosser*, to laugh at; or *joncher*, to wheedle; and from the Teutonic *kosen*, to prattle. It is, perhaps, a fortuitous and cant word, without etymology.] To cheat; to trick; to impose upon:

Freedom and zeal have *chous'd* you o'er and o'er;
Pray give us leave to bubble you once more. *Dryden.*

It has *of* before the thing taken away by fraud:

When geese and pullen are seduc'd,
And sows *of* sucking pigs are *chous'd.* *Hudibras.*

CHOUSE, *s.* [from the verb. This word is derived by Henshaw from *kiaus*, or *chiaus*, a messenger of the Turkish court; who, says he, is little better than a fool.] A bubble; a tool; a man fit to be cheated. A trick or sham:

A sottish *chouse*,
Who, when a thief has robb'd his house,
Applies himself to cunning men. *Hudibras.*

CHOUSGIMYAN', a town of Persia, in the province of Chorasan: 220 miles north-north-east of Herat.

CHOUYANG', a town of Asia, in the kingdom of Corea: forty miles north-east of King-ki tao.

CHOUZE', a town of France, in the department of the Indre and Loire: five leagues north-west of Tours.

CHO'WAN, a county of the American States, in Edenton district, North Carolina, on the north side of Albemarle Sound. It contained by the census 5011 inhabitants. Chief town, Edenton.

CHO'WAN, a river of America, in North Carolina, which falls into the north-west corner of Albemarle Sound. It is three miles wide at the mouth, but narrows fast in its ascent. It is formed five miles from the Virginia line, by the confluence of Meherrin, N.ttaway, and Black, rivers, which all rise in Virginia.

CHOW'DRY, *s.* in Bengal, the possessor of several talooks. It is also used as synonymous with talookdar, anciently a collector. See the article TALOOK.

CHOW'RY, one of the Nicobar islands, in the Indian Sea. Lat. 8. 27. N. lon. 92. 32. E. Greenwich.

To CHOW'TER, *v. n.* To grumble or mutter like a froward child. *Phillips.*

CHOZEV'KA, a town of Siberia, on the river Tchiuna: 180 miles east-south-east of Eniseisk.

CHRAST, a town of Bohemia, in the circle of Boleslau: six miles south-east of Melnik.

CHRAST, a town of Bohemia, in the circle of Chrudim: five miles south-east of Chrudim.

CHRE'BET CHAND-B'GA, a range of mountains between Russian Tartary and Chinese Tartary. Lat. 52. N. lon. 114. to 119. E. Ferro.

CHRE'BET DIR'GAK, a range of mountains between Russian Tartary and Chinese Tartary. Lat. 52. to 53. N. lon. 114. E. Ferro.

CHRES'TOIA, a town of Istria: nine miles east-south-east of Capo d'Istria.

CHRISM, *s.* [χρίσμα, an ointment.] Oil consecrated by the bishop, and used in the Romish and Greek churches, in the administration of baptism, confirmation, and extreme unction; and which they prepare on Holy Thursday, with great ceremony.

CHRIS'MATIS DENARII, or crimson-pence, money formerly paid to the diocesan, or his suffragan, by the parochial clergy, for the *chrism* consecrated by them at Easter, for the uses of the year ensuing. This customary payment being made in Lent, near Easter, was in some places called *quadragesimals*, and in others *paschals* and *Easter-pence*. The bishops' exaction of it was condemned by pope Pius XI. for simony and extortion; and thereupon the custom was released by our English bishops.

CHRISOM', *s.* [from χρίσμα, chrism.] In the Romish baptism, a white vesture or garment, which, immediately after the ceremony, the priest puts upon the child, accompanied with a formula or benediction. This ceremony was retained in the English church, for some time after

after the reformation; from which custom, though long since abolished, the children who die within a month of their birth are still called *chrisoms*, in our London bills of mortality.

CHRIST, [from χριςὸς, *anointed*; whence the pre-eminent term, *the anointed of the Lord*.] A name synonymous with the MESSIAH, usually added to JESUS, (*Deliverer*;) and, together therewith, denominating or implying THAT DIVINE PERSON WHO WAS APPOINTED TO BE THE SAVIOUR OF THE WORLD; because the object of his mission upon earth was to restore mankind to the inheritance of those blessings and that favour of God which had been forfeited by Adam's transgression. Every dispensation of Providence from the fall, had been preparatory of this great event. Prophets had been raised from time to time, to preserve, in the early ages of the world, the knowledge and worship of the true God: the children of Abraham had been separated from the surrounding nations for the same purpose; and, by the dispersion of the ten tribes, the captivity of the other two in Babylon, and the translation of the Hebrew scriptures into the Greek language, much of the knowledge which had been revealed to the Israelites, and their expectation of a promised Messiah, was gradually diffused over the eastern world.

This promise of a Redeemer of Israel, transmitted through so many generations, was recognized by the Jews, and anxiously expected by them at the very time it was fulfilled; but they had grossly mistaken the spiritual mission of Christ, fondly expecting a powerful and mighty prince, who should reign over them on earth, with all the pomp of temporal greatness, trampling under foot the enemies and oppressors of Israel, and leading forth his chosen people amid the triumphs of conquest, and the splendour of dominion. Yet the same prophecies which foretold the coming, had likewise marked out with singular precision, every particular concerning the character, the office, and the person, of the Saviour. The mysterious union of the divine and human natures in the person of Christ, was repeatedly shadowed out, and might have been fairly inferred from those very prophecies, which predicted the meanness, the sufferings, and the ignominious death, of the Messiah; and which painted the victory, the grandeur, and the spiritual eternity, of his heavenly kingdom. He was, nevertheless, described as "despised, and rejected of men; a man of sorrows, and acquainted with grief; wounded for the transgressions, and bruised for the iniquities, of his people:" and, lastly, as "closing his unexampled distresses and unspotted life, like the sheep led forth in patient and submissive silence to the slaughter."

As, in the Old Testament, we find these striking facts long and early predicted; so, in the New Testament, we see them precisely and literally fulfilled. Thus between the Old and the New Testament, there is the closest connexion. The two parts taken together constitute the HOLY SCRIPTURES: which being proved the authentic writings of men, whom divine agency prevented from mistake in the relation of facts and doctrines, become to us the unerring rule of our faith. We should have to recite the whole of the gospels, if we were to enter into a minute detail of facts recorded by the evangelists. From such recapitulation we are necessarily prevented: but we should not do justice to the importance of the subject, if we did not direct the attention of the reader to some particulars. Let him observe then, "what Christ teaches concerning God the Father; concerning his own Divine Nature; and concerning the Holy Spirit: what he teaches concerning his own manifestation in the flesh; concerning good and evil spirits; concerning a state of future retribution. Let him observe also, the authority with which he spake; the force and energy, the simplicity, affection, and dignity, of his discourses; the beauty of his parables, and the correspondence of them with the subjects to be illustrated; and the appropriate method with which our Lord raised moral and religious instructions from familiar objects and common occurrences. Every reader should observe also the knowledge he possessed of men's secret thoughts; the constant and inherent power with which he was endowed, to work instantaneous and permanent miracles in the very sight of his enemies; and with which he was enabled to foretel events, which have been accomplished in a manner extraordinary as it has been punctual and literal." All these circumstances combined together, substantiated as they are by credible witnesses, who sealed the truth of their histories with their own blood, must impress on every candid mind strong conviction that CHRIST was infinitely superior to man, and that his mission was truly from God. Nor should we be inattentive to what may be styled the moral and religious conduct of CHRIST upon earth. The manner in which the sacred writers have described the actions of Christ, not only increases the efficacy of his instructions, but constitutes a new, a striking, and peculiar species of evidence, for the truth of his doctrines. Indeed, the exemplary life and exalted character of Jesus Christ, affords to human beings the most perfect model of piety, humility, and virtue, of morality and benevolence; the true pattern of every thing that is good or excellent on earth. In patience and long-suffering, he betrayed neither pusillanimity nor spleen. He was firm without obstinacy, and humble without meanness. In the general tenor of his life he was mild and gentle; the promoter of peace among men, and the strictest observer of it in his own behaviour. Yet when great and urgent occasions called for a different deportment, he displayed a nobleness of mind, a contempt of danger and death, such as the importance of his mission required from him, and such as conscious rectitude could alone inspire. These virtues of Christ, whether we consider them as too sublime to excite sentiments of presumptuous emulation, or too rational not to justify our endeavours to imitate them, will, in no age and no country, lose either their usefulness, their beauty, or their merit. They are certainly in various respects practicable under every form of government, whether free or despotic; under every modification of manners, not absolutely barbarous; and in every state of knowledge, whether it be imperfect or improved. In the lowest condition of the world, they will tend to lessen the miseries and disorders to which the unsearchable providence of God has subjected our species; they will increase the stock of our happiness, and exalt our nature to the highest perfection, when accompanied by every assistance which reason, which philosophy, which civilization, can bestow, in forming the moral or the religious character of man.

The first public appearance of Christ was in the highest degree unpopular, and opposed to all the prejudices and all the pride of his countrymen. Instead of alluring them by the prospect of temporal importance and dominion, to which their expectations had been directed, he proclaimed the commencement of a spiritual and invisible kingdom, little calculated to satisfy their worldly desires, or gratify their ambition. Instead of erecting his victorious standard as the champion of Israel, as their mighty deliverer from the oppression of every earthly foe, he offered them a redemption, more beneficial, indeed, though less attractive to the sensual mind; a redemption from the dreadful tyranny of sin, and from those effects of divine displeasure, which, after temporal death, await habitual and unrepenting sinners. Had interest or ambition been the guide of his actions, he would certainly have assumed that character, to which the warmest hopes and the most rooted prepossession of the Jews universally inclined. He would not have opposed alike the pride of princes, and the superstition of the people; he would have either courted popularity, or grasped at dominion; he, at least, would not have taken every measure that had a natural tendency to alarm the jealousy of the magistrate, and to provoke the displeasure of the multitude. As ambition had no share in his claims, as his kingdom was neither formed on the policy,

policy, nor supported by the power, of the world, he sought not its favour, nor shrunk from its displeasure. Instead of labouring to increase the number of his followers by an insinuating flexibility in his own manners, or by a corrupt compliance with their prejudices, he gave offence by the unaffected plainness of the one, and by an undisguised opposition to the other. He disdained to conciliate the affections of any class of men, however dignified by their station, or formidable for their power, by any base or dishonourable concessions. Thus did he act to those, whom self-conceit and spiritual pride made blind to their own vices: but to the meek and contrite such was his condescension, that when we compare his gentleness, mildness, and compassion, with the austerity of the teachers among whom he lived, we are struck with admiration at his amiable and adorable benevolence. The two great sects into which the Jewish church was divided, carried away the bulk of the people; and though the most implacable hatred existed between the leaders of the two sects, both of them cordially united in opposing the gospel; and each of them were reproved with equal firmness and severity, by Jesus Christ. His doctrine was in direct opposition to the tenets of both; and his example involved a constant reprehension of their practices. He resisted with equal success the haughty scepticism of the Sadducee, and the abject superstition of the Pharisee. Against the one he maintained the doctrine of a future life; and, in the presence of the other, he expatiated on the folly of preferring ceremonial observances to moral and humane duties of charity and necessity; and of attending rather to traditional and corrupted doctrines, than to the written and pure laws of God. If computed by the passovers at which he attended, the ministry of Christ was continued for three years; during the whole of which "he went about doing good." At the expiration of that period he was violently seized and unjustly accused by the Jewish rulers, who prevailed on Pilate the Roman governor to crucify him. In this procedure it is singular to observe, how by the very means in which they gratified their own resentment, they were actually instrumental in accomplishing the great end of his mission, and in establishing his veracity as a true prophet. For, he came to die in atonement for mankind, himself being innocent and free from all sin; and he had predicted the manner by which he should die, and the chief circumstances which should attend his death. The state of humiliation to which he appeared reduced, occasioned in his disciples desertion and disbelief. But an event, better attested than any recorded in history, very soon happened, which forced on their minds such strong conviction of our Lord's divinity, that neither dangers nor torments could ever afterwards weaken their faith, or prevail on them to deny a fact, which from their own senses and personal knowledge they were infallibly assured to be true. On the third day from his death, CHRIST rose from the dead: and his resurrection was made an object of evident notoriety, by his continuing with his disciples forty days. He was then taken up into heaven, in the sight of his disciples: and the effect of his ascension was made visible on the day of pentecost, i. e. about fifty days after his death. For, the apostles were then enabled to speak foreign languages, which they never did or could have learnt; and in consequence of this supernatural power, St. Peter converted no less than three thousand persons in one day. The success of the gospel, during the short life-time of Christ, under so many contentions, and the violent opposition of jarring interests, is truly astonishing; but its more rapid and extensive propagation after his death, is a circumstance that excites still higher admiration. Destitute of all human advantages, protected by no earthly authority, assisted by no human art, behold twelve men, poor, and artless, and illiterate, in the very heart of Jerusalem, triumphing over the rulers, who had been the authors of their Lord's death; and in distant provinces of heathenism surmounting the fiercest and most determined tyranny of the magistrate, and the subtleties of the philosopher; over the prejudices of the Gentile, and the bigotry of the Jew. They established a religion, which held forth high and revealed truths, such as the pride of man would induce him not readily to admit, because he could not perfectly comprehend them; which preached doctrines pure and spiritual, such as corrupt nature was prone to oppose, because it shrunk from the severity of their discipline; which required its followers to renounce almost every opinion they had embraced as sacred, and every interest they had pursued as important; which even exposed them to every species of danger and infamy; to persecution unmerited and unpitied; to the gloom of a prison, and to the pangs of death. Hopeless as this prospect might appear to the view of short-sighted man, the gospel yet emerged from the obscurity in which it was likely to be overwhelmed by the complicated distresses of its friends, and the unrelenting cruelty of its foes. It succeeded in a peculiar degree, and in a peculiar manner; it derived all its success, and all its progress, from the force of truth; and obtained it under circumstances, where falsehood must have been detected, exposed, and crushed. For a connected view of the doctrine and miracles of Christ, see the article THEOLOGY.

CHRIST's-THORN, *s.* in botany. See RHAMNUS PALIURUS.

CHRIST'BURG, a town of Prussia, in the territory of Colm; twelve miles south-east of Marienburg.

CHRIST'BURG, or ALT CHRISTBURG, a town of Prussia, in the territory of Oberland: four miles south-west of Preuschmark.

CHRIST'CHURCH, a borough town in Hampshire, situated at the conflux of the Avon and Stour; hence it was anciently called Thunambourn. It had its present name from a collegiate church built here in the time of the West-Saxons, and first called Trinity, but afterwards Christchurch. This church, though in a state of decay, still furnishes the antiquarian with many remains of Saxon architecture: and even its present appearance abundantly convinces us, that originally it must have been a very fine building. In the ascent to the altar, there is an effect produced by an elevation of many steps, which gives much grandeur. The stalling of the old chapel is still entire; and curious for its workmanship and monkish grotesque figures. It is 101 miles from London, about three miles from the sea, twelve from Poole, and twelve from Lymington. The market is on Mondays. It has two fairs, one on Thursday in Trinity week, and the other on the 17th of October. The corporation consists of a mayor, a recorder, alderman, bailiffs, and a common council. The town is pleasantly situated; and the contrast between the agitation of the sea and the stillness of this adjacent place, is striking to the contemplative traveller. There are some ruins of an ancient castle. If the Avon were cleared, the town might have considerable trade in articles of coals and timber. Attached to the church, and, without doubt, originating from the monastic institution, is a free-grammar-school, for twenty-four boys. There is in the town a manufactory which employs a number of boys and girls in making watch-chains. It is famous for a fine salmon-fishery, and is thought the first place in England for knit-silk stockings. By the liberal subscription of several gentlemen here is a Sunday-school for 500 boys and girls.

CHRIST'CHURCH, a township of the American States, in Charlestown district, South Carolina, containing 2954 inhabitants.

To CHRIS'TEN, *v. a.* [cnıſτnıan, Sax.] To baptize; to initiate into Christianity by water. To name; to denominate.—Where such evils as these reign, *christen* the thing what you will, it can be no better than a mock millennium. *Burnet.*

CHRIS'TENDOM, *s.* The collective body of Christianity; the regions of which the inhabitants profess the Christian religion.—His computation is universally received over all *christendom*. *Holder.*

CHRIS'TENING,

CHRIS'TENING, *s.* The ceremony of the first initiation into Christianity. See BAPTISM.—The day of the *christening* being come, the house was filled with gossips. *Arbuth.*

CHRIS'TIAN, *s.* [*Christianus*, Lat.] A professor of the religion of Christ.—We *Christians* have certainly the best and the holiest, the wisest and most reasonable, religion in the world. *Tillotson.*—The name of *Christian*, was first given at Antioch, in the year 42, to such as believed in Christ, as we read in the Acts: till that time they were called *disciples.*

CHRIS'TIAN, *adj.* Professing the religion of Christ:

I'll not be made a soft and dull-ey'd fool,
To shake the head, relent, and sigh, and yield
To *Christian* intercessors. *Shakespeare.*

Most Christian King, was one of the titles of the late kings of France. The French antiquaries trace the origin of this appellation up to Gregory the Great, who, writing a letter to Charles Martel, occasionally gave him that title, which his successors afterwards retained.

CHRIS'TIAN-NAME, *s.* The name given at the font, distinct from the gentilitious name, or surname.

CHRISTIA'NA, a post-town of the American States, in Newcastle county, Delaware, situated on a navigable creek of its name, twelve miles from Elkton, nine south-west of Wilmington, and thirty-seven south-west of Philadelphia. The town stands on a declivity, which commands a pleasant prospect of the country towards the Delaware. It carries on a brisk trade with Philadelphia in flour. It was built by the Swedes in 1640, and thus called after their queen Christina.

CHRISTIA'NA RA'DIX. See ASTRAGALUS.

CHRISTIA'NIA, a city and seaport of Norway, in the government of Agerhuus, situated in a bay or gulf, about twenty-five miles from the sea. It is esteemed the capital of the kingdom, because the supreme court of judicature is held here. It is divided into three parts, the city and suburbs, the fortress of Agerhuus, and the old town of Opslo, or Anslo: the city and suburbs contain 1100 houses, and Opslo 400; the number of inhabitants is estimated at 9000. Opslo was burnt in 1624, and the city, on being rebuilt, obtained the name of Christiania. It is the see of a bishop, who is metropolitan of Norway. It has an excellent harbour; the principal exports are, tar, soap, iron, copper, planks, and deals. The environs of Christiania not yielding planks sufficient for exportation, the greatest part of the timber is brought from the more inland parts. The trees are hewn in the forests, and floated down the rivers and cataracts. Saw-mills are used for the purpose of cutting the planks; but must be privileged, and can only cut a certain quantity. The proprietors are bound to declare on oath, that they have not exceeded that quantity; and if they do, the privilege is taken away, and the saw-mill destroyed. There are 136 privileged saw-mills at Christiania, of which 100 belong to the family of the Ankers. The quantity of planks permitted to be cut, amounts to 20,000,000 standard deals, twelve feet long, and one inch and a quarter thick. Lat. 59. 55. N. lon. 10. 50. E. Ferro.

CHRIS'TIANISM, *s.* [*christianismus*, Lat.] The Christian religion. The nations professing Christianity.

CHRISTIA'NITY, *s.* [from *christianitas*, Latin, of χριστιανὸς, Greek.] A true belief in, and fervent practice of, the doctrines and precepts of Christ; a dispensation calculated to raise the dignity of human nature, and promote the happiness of mankind. This happiness is the natural result of Christianity, by the exercise of love and gratitude towards God, and resignation to his providence, by humanity, integrity, and good will towards men; and by the due government of our appetites and passions. Social happiness again proceeds from the members of society entertaining a disinterested regard for the public welfare; being actively industrious each in his proper sphere of exertion, and being strictly just and faithful, and generously benevolent in their mutual intercourse. The tenor of the gospel inculcates these virtues; it seems everywhere, through the whole of the Christian code, to have been the great design of its divine Author to inspire mankind with mild, benevolent, and peaceful, dispositions, and to form them to courteous manners. Christianity again represents the Deity and his attributes in the fairest light; even so as to render our ideas of his nature, and the manner in which he exerts his power, consistent with the most correct principles of morality.

The ritual observances which Christianity enjoins, are few in number, easy to perform, decent, expressive, and edifying. This ritual inculcates no duties but what are founded on the principles of human nature, and on the relation in which men stand to God, their Creator, Redeemer, and Sanctifier; and it prescribes accurate rules for the regulation of their conduct. The assistance of the Spirit of God is promised in this sacred volume to those who assiduously labour to discharge the duties which it enjoins; and it exhibits a striking example of spotless purity, which we may safely venture to imitate. The gospel teaches that worldly afflictions are incident to both good and bad men; a doctrine highly conducive to virtue, which consoles us in distress, prevents despair, and encourages us to persist firmly in our integrity under every difficulty and trial. Christianity represents all men as children of the same God, and heirs of the same salvation, and levels all distinctions of countries and states, of rich and poor, as insignificant in the sight of Him, who, without respect of persons, rewards or punishes with impartial justice, according to the merits or demerits of his creatures. This doctrine is highly favourable to virtue, as it tends to humble the proud, and to communicate dignity of sentiment to the lowly; to render princes and inferior magistrates moderate and just, gentle and condescending, to their inferiors. The Christian dispensation, to prevent a perseverance in immorality, offers pardon for the past, provided the offender forsakes his vicious practices, with a firm resolution to act virtuously in future. The sanctions of the gospel have a natural tendency to exalt the mind above the paltry pursuits of this world, and to render the Christian incorruptible by wealth, honours, or pleasures. The true Christian not only abstains from injustice towards others, but even forgives those injuries which he himself suffers, knowing that he cannot otherwise hope for forgiveness from God. Such are the precepts, such the spirit, and such the general tendency, of the gospel. Even those who refused to give credit to its doctrines and history, have yet acknowledged the excellence of its precepts; and allowed that the gospel of Christ is one continued lesson of the strictest morality, of justice, benevolence, truth, and universal charity.

The miraculous propagation and final establishment of Christianity, the triumphs it has obtained over obstacles the most formidable, and the effects it has produced amongst mankind, are visible indications of the hand of Providence, by which it has been supported and sustained. Nor is it less deserving of our surprise and astonishment, that the enmity of the Jews, the chosen people of the covenant, should be so long and so obstinately persisted in, against the doctrines of Christ, under pretence that they abrogate the original law, and render null the word of God contained in the Old Testament. But this assertion is wholly unfounded, since it is easy to shew, even from the words of Christ, a perfect coincidence between the Old Testament and the New, in all the fundamental points of the Christian religion. It will here be sufficient to observe, that the gospel in no respect runs counter to the law, so as to render the one inconsistent with the other. Each was brought forward in its natural order, and each is interwoven with the other in the most perfect agreement. The ceremonial law, though vacated by the gospel, yet was not abolished till its own purposes were fully answered: but the moral duties of the law are enforced by the gospel with additional sanctions, and illustrated with additional evidence. Its doctrines are confirmed, and

and explained in their full latitude; what was obscure is made clear; and what was foretold has been accomplished. Hence it is plain there is no inconsistency between the two dispensations. They coalesce with each other, as parts of the same system; and, with an exact conformity to all the designs of Providence, in the natural and the moral world, the more obscure and partial are preparatory to the more perfect and illustriou . The purity of the gospel is indeed additional evidence of the word of God, and of the origin whence the holy scriptures proceeded: it is an evidence ever present, ever legible; and which no distance, whether of time or place, can efface. That purity is such, as we should naturally expect from the sentiments which uncorrupted nature leads us to form of the Divine Being. If he had not already vouchsafed to grant us a revelation of his will, with respect to our duty both to him and to one another; yet, if we had reason to expect that he would grant it, the clearest dictates of our judgment, and the noblest sentiments of our heart, would lead us to anticipate the same display of benevolence on the part of God, and the same encouragements to virtue among men, which are now displayed in the gospel of Christ. Here every declaration of sin and duty, every promise to engage us to pursue the one, and every serious threat to deter us from the other, are brought forward with a precision and simplicity, which leave no room either for the perverse to cavil, or the impartial to mistake. There is no vice which it does not detect, even within the darkest recesses of the mind. There is no duty, connected with the glory of God, the welfare of our neighbour, or the true happiness of ourselves, but what it unfolds and illustrates. Its precepts are not only clear in their mode of delivery, and beneficial in their tendency; but they are enforced by every motive that is calculated to affect the heart, and to exalt and purify its affections. The promise of forgiveness and compassion through Christ, and of help and succour through the divine spirit, are of the most soothing and comforting nature to beings encompassed with difficulties of various kinds; and exposed to moral weaknesses and transgressions, which are degrading to our nature, and destructive of our happiness. But to inspire us with the full soul of virtue and religion, it carries our aspiring minds beyond the contracted views of this mortal scene, to that exalted world of harmony and love, where peril and distress are neither felt nor known.

The blessed effects of Christianity, in humanizing and improving the intellectual faculties of man, are universally acknowledged. No event which history has recorded, or philosophy investigated, has been attended with so extensive and auspicious a change in private and public life; in the government of nations, and in the manners of individuals; in the sentiments of the higher ranks, and the habits of the lower; in the cultivation of every polite attainment which adorns the mind, and the yet greater improvement of every profound science which invigorates and enlarges it. The progression of knowledge has been constant in every country where the gospel has been received; the spirit of enquiry has, in every age, communicated itself to surrounding nations; and while our proficiency is such as to justify our claim of discoveries, to many of which former generations never reached, and to others of which they never aspired, we have the consolation to reflect, that a wide and unexplored field still lies open for the most unwearied endeavours and the brightest talents: that our own success has indeed been so rapid as to animate their emulation, and yet that our progress is hitherto so imperfect, as to facilitate, not to preclude, their most vigorous exertions. In a word, from this eventful period, the spirit of science has been hastening towards perfection. In every country where Christianity has flourished, the superior accomplishments of human nature have been encouraged and acquired. And when we review mankind as inhabitants of the same globe, and mark the revolutions by which as men, or as nations, they are distinguished, the character of Christian may be determined by the superior degree of intelligence which accompanies and adorns it.

If we consult the history of the heathen nations, we shall be astonished at the innumerable vices and abominable practices, which Christianity has been the happy means of extirpating from among them. In Parthia, where polygamy prevailed, they are not polygamists; in Persia, they do not marry their own daughters; in Bactria and Gaul, they do not violate the marriage bed; nor do they, wheresoever they reside, yield to the influence of corrupt laws and wicked customs, familiar to others. By the laws of Zoroaster, the Persians committed incest until they embraced the gospel; after which period they abstained from that crime, and observed that temperance and chastity enjoined by its precepts. This people exposed the bodies of the deceased to be devoured by birds or beasts of prey; but abstained from this custom, and decently interred them, after it was promulgated.

Eusebius has furnished a catalogue of abominable customs, some of which have been abolished by the gospel; and proves its professors to be free from several crimes, not even condemned in the pagan world. Christianity was useful not only in its positive precepts, and the genius which it inspired, but also in delivering men from detestable practices, perfectly repugnant to the feelings of Christians. This learned writer assures us, that proselytes to Christianity no longer married their own mothers in Persia; nor in Scythia did they as usual eat human flesh, and sacrifice their children, prompted by superstition. The Massagetæ used to sacrifice their relations, and eat their flesh, when worn out with age; the Tibareni were wont to fling them down precipices; the Hyrcani and Caspians exposed them to be devoured by birds and dogs. These and such like cruel and inhuman customs prevailed, not only among barbarous nations, but even among the Greeks, who were polished and refined. In Salamis a man was sacrificed to the daughter of Cecrops; and another at Chios was cruelly torn to pieces and sacrificed to Bacchus; three were daily sacrificed to Juno; and a man was dragged thrice round the altar in Diomede's temple, struck by the priest with a spear, and sacrificed to Diomede. The Greeks, in general, before they went out to war, sacrificed a human victim; Aristomenes sacrificed three hundred together to Jove on that occasion; the Celtæ and Carthaginians used human sacrifices; and Italy was said to have been visited by calamities, because the tenth part of the men were not sacrificed to the gods. In Laodicea a virgin was slain in honour of the Syrian Pallas; in Lesbos they sacrificed to Bacchus; in Phocis to Diana; and the Tauroscythæ offered up, at the shrine of the same goddess, as many as were driven on their coasts by winds or waves. It is unnecessary to multiply instances of cruelty among pagan nations, since ancient history abounds with them. It is admitted that human victims ceased in some of those places before Christ's appearance, and that animal sacrifices were substituted in their room; but these, and other abominable customs, were not exploded in many countries, until they had embraced the gospel of Christ.

The Romans, though a polished people, were cruel and blood-thirsty before the promulgation of the gospel, and its establishment in the empire. The breaking of a glass, or some such trifling offence, was sufficient to provoke Vidius Pollio to cast his slaves into fish-ponds, to be devoured by lampreys. The effusion of human blood was their frequent entertainment; some of their fellow-creatures were set to fight with beasts, others to be devoured by them, and some to fight against each other. Lipsius assures us, that no wars ever made such havock on mankind, as those games of pleasure, which sometimes deprived Europe of twenty thousand lives in one month. From the detestable practice of killing persons at the funerals of great men, arose another custom equally cruel and shocking to humanity, the fights of gladiators. The Romans,

Romans, as if ashamed of human sacifices, trained up persons to engage in voluntary combat, and to fight until they killed each other at the tombs of the deceased. This was the origin of those bloody shows afterwards so delightful to the people of Rome; these were the amusements with which the principal magistrates of Rome, and afterwards the emperors, entertained the citizens, and by which they acquired popularity among the people of that city. Julius Cæsar presented three hundred and twenty pair of gladiators; even the worthy Titus exhibited a show of gladiators; and Trajan, though not cruel in other respects, furnished another display, where one thousand pair of gladiators were exhibited on a theatre, for the entertainment of the spectators. In all those spectacles, every pair of combatants was matched and pitted against each other, and obliged to maim and murder, in cold blood, those who never had offended them. The passion for these bloody encounters rose to such a height, that senators and knights turned gladiators; and even women engaged in them under Nero and Domitian. Christian divines soon exercised their pens against these practices; Constantine the Great restrained them by edicts, and the emperor Honorius entirely abolished them.

The following instances may evince the utility of Christianity in banishing idolatry and barbarous practices from some countries, even where it did not immediately produce virtue, among converts to the gospel. The Gauls and ancient Saxons employed various absurd methods of discovering whether persons suspected of any crime were innocent or guilty. Sometimes the person accused was obliged to engage in single combat, to prove his innocence; and both priest and people prayed in silence, during the combat, that the innocent might be victorious. Sometimes he was forced to the shocking alternative of grasping red-hot iron, or of acknowledging himself guilty; sometimes to walk blind-folded and bare-footed over red-hot ploughshares, placed at certain distances; and sometimes, to thrust his arm into boiling water. In all these cases, he was judged innocent or guilty, according to the effects which these trials produced. In some instances, a person was flung into the river with a rope about his arms; if he staid at the bottom, until he was drawn up, he was looked on as innocent; but if he floated, he was considered as criminal. These four sorts of ordeal, a remain of heathen superstition, lasted for a considerable time after the introduction of Christianity, but were abolished by a decree of pope Stephen II. as impious and unjust, and frequently exposing the innocent to manifest hazard. It is generally admitted, that the Irish were extremely fierce and barbarous before the time of St. Patrick, and that their ferocity was astonishingly abated after that primitive Christian preached the gospel among them. St. Jerome tells us, that the Scots adopted Plato's community of wives, and had their appetites no better regulated than those of beasts. That the Atticotti, a people of Britain, ate human flesh. Whether the Atticotti were a people of Scotland or not, let antiquarians determine; our object is only to prove, that some nations of Britain were extremely barbarous before the Christian code, that softener of manners, was published among them. Gildas the Wise affirms, that the Britons, before they were civilized by the gospel, were rude, barbarous, and impure in their manners, sacrificed human victims, and that their idols were more numerous than the idols of Egypt. Collier is of opinion, that the inhabitants of Britain were extremely cruel before the introduction of Christianity, and he founds his opinion on the following facts. In Gaul, before that period, the druids managed the sacrifices, interpreted omens, and directed all matters relative to their superstitions. In times of public distress they offered animal sacrifices, and in case of sickness or other calamity which befel individuals, they required human victims to appease their deities. Their idol figures were hollow and capacious, being formed by wicker sticks so interwoven as to hold together, and so shaped as to represent the monstrous form of a gigantic man. In them they placed wretched victims, and burned them to death. They generally sacrificed thieves, robbers, or other criminals; but when they were not supplied with a sufficient number of these, they sacrificed the innocent. Cæsar gives this account of the Gallic druids, and acquaints us, that these borrowed their superstitions from those of Britain; whence the ecclesiastical historian fairly concludes, that the Britons were as superstitious in their worship, and as barbarous in their manners, as the Gauls; and strengthens his conclusion by the authority of Tacitus, who affirms, that in the isle of Anglesea druids used to sacrifice prisoners taken in war, and put persons of both sexes to death, for the purpose of inspecting their entrails, and prying into futurity. This rough people were softened in their manners, and human sacrifices were exploded in Great Britain, Gaul, and other places, by the promulgation of a code, whose spirit is so adverse to cruelty and bloodshed.

As a demonstrative proof that the greatest empires of the world were to have a connection with the advancement of true religion under the dispensation of Christ, we need only appeal to the testimony of the ancient predictions. Enlightened with the bright visions of futurity, the prophet Isaiah calls by name on the conqueror of Assyria, and the restorer of Israel, two centuries previous to his birth. To the eye of Daniel the successive monarchies of Persia, of Macedon, and of Rome, were represented by the most exact display of emblematical imagery. The different periods of the Jewish history, when the Almighty raised up the nations as the instruments of his vengeance or his mercy, will shew by what various modes they combined to execute the divine decrees. Sometimes the daughter of Babylon mocked the sorrows of her captives, whose neglect of Jehovah had been the cause of their chains; sometimes, when only humbled by their calamity, their conqueror permitted them to regain the seat of their fathers, and to restore the glories of the fallen temple.

From the ruins of preceding states, arose the stupendous and august fabric of the Roman empire. Though long agitated by the storm of contending factions, it survived every shock of domestic tumult, and gradually extended its dominion over the most populous and warlike regions of the world. The nations of Europe, of Asia, and of Africa, which at present compose formidable kingdoms, were enrolled in the register of her tributary provinces, and Rome became the metropolis of a vast empire. On the advancement of Augustus to the imperial throne, the violence of intestine disorders was extinguished, and the various parts of the empire enjoyed a degree of repose unknown to former ages. The love of conquest, which had for seven successive centuries prompted the Romans to carry their arms into every country which acknowledged not their power, subsided into sudden and lasting peace; and the disposition of the first emperor to mark out the boundaries of dominion, and to silence the clamour of arms, produced a strong and astonishing contrast to the fierce and ambitious temper of their ancestors. In the tendency of all these circumstances to some magnificent event, we may clearly discern the directing hand of the Creator of the universe. To his disposal alone, can properly be attributed that long and complex concatenation of affairs which led the Romans by regular steps to the summit of dominion. The conflict of their passions, the various resolutions of their government, the ingenuity of the wise, and the ambition of the valiant, co-operated for one transcendent purpose. It was ultimately for this end, that the legislators remedied the political evils which threatened the destruction of the Roman state, and laid the firm foundations of general order. For this her heroes fought with unparalleled advantage, and victory was ever ready to lead her armies to triumph. For this Scipio gloried in the fall of Carthage, Pompey returned with the spoils of Mithridates, and Cæsar bore his triumphant eagle from the plains of Egypt to the shores

shores of Britain. All their great atchievements, and all their splendid events, the boldness of their enterprises, and the frequency of their success, uniformly pointed to the fulness of time when the Son of God was to be made manifest, and were so wisely regulated as to prepare the way for the more easy progress, and more ready reception, of the Christian religion.

A late writer, however, Mr. Gibbon, whose elegance of style seems to have conferred a very alarming popularity on the licentiousness of his opinions, has assigned the reception of Christianity to five *accidental* causes; each of which he has represented, as in reality unconnected with any divine interposition. First, "the inflexible and intolerant zeal of the first Christians, derived from the Jews, but purified from that unsocial spirit, which had deterred the Gentiles from embracing the law of Moses." Now zeal, which is at once intolerant, and purified from any unsocial spirit, is a quality which we leave to the admirers of this writer to conceive and explain. But we deny the fact, that any kind or any degree of intolerance existed among the primitive Christians; and as to their zeal, we maintain that it did not bear the slightest similitude to the fierceness and bigotry of the Jews. It was derived from very different causes, and aimed at far nobler ends. It was not the narrow and temporal interests of one nation, but the general reformation, and the spiritual happiness of the whole world, which the teachers of Christianity were anxious to promote. That firmness, which may be misconstrued into intolerance, and that activity, which we are content to call by the name of zeal, had, in the usual course of human affairs, a tendency to retard, rather than to facilitate, the propagation of the gospel. The Christian, instead of falling into the fashionable and popular intercommunity of worship, disdained, amidst the terrors of impending death, to throw incense on the altar of Jupiter; he boldly pronounced the whole system of pagan mythology imposture, and charged the whole ritual of its external devotions with groveling superstition and profane idolatry.

A second cause he finds "in the doctrine of a future life." Such a doctrine, doubtless, is congenial to the nature of man, as an accountable and moral agent; it is repeatedly insisted upon in the gospel, and must ultimately, and in a favourable state of things, have increased its efficacy. But the future life taught by the apostles, had few recommendations in the sight of the heathen world. It was offensive to the Epicureans by the punishments it threatened; it was not attractive to the vulgar by the very rewards which it proposed. The pride of the philosopher was shocked by the doctrine of a resurrection, the mode of which he was unable to comprehend; the imaginations of other men were feebly impressed by the representation of a future state, which did not hold out the serene sky, the verdant garden, and the luxurious enjoyments, of an elysium.

A third cause he finds in "the miraculous powers ascribed to the primitive church;" and then proceeds, in a style of the most bitter derision, to insinuate that these powers were never possessed. Now, the hardiest adversaries of the gospel, a Porphyry, a Celsus, and a Julian, do not deny the existence of those miracles; and Christianity has little to fear from the improbable causes to which these writers impute them. It is, however, worthy of remark, that when Christianity was published, a general prejudice in the people, and a very severe spirit of suspicion in the government, prevailed against the belief of miracles. They were stigmatized by the opprobrious appellation of magic; and Augustus, it is well known, had published very rigorous edicts against the whole race of prastigiators. The peculiar difficulties which obstructed the reception of Christian miracles, have been explained, with great acuteness of reasoning, and equal depth of erudition, by a modern writer, Mr. Weston, whose remarks defeat, indeed, the fallacies, but seem to have escaped the notice, of Mr. Gibbon. The sum of his arguments are, in his own words, as follows: "The multitude of popular gods admitted amongst the heathens, did, by necessary consequence, occasion such a multitude of pretended miracles, that they insensibly lost their force, and sunk in their esteem. Though the philosophers in general, and men of reading and contemplation, could not but discover the grossness and absurdity of the civil religion; yet this could have little effect on the vulgar, or themselves; not on the vulgar, because it was the business of the wisest and most politic heads zealously to support and encourage them in their practices; not on themselves, because, if they despised their gods, they must despise their miracles too." Now, under these circumstances, miracles ascribed to the first propagators of Christianity, must have created an immediate and stubborn prejudice against their cause; and nothing could have subdued that prejudice, but miracles really and visibly performed.

A fourth cause is, "the virtues of the first Christians," which are themselves reduced to a mean and timid repentance for former sins, and to an impetuous zeal in supporting the reputation of the sect newly embraced. But, surely, in the eyes of the haughty and jealous Romans, such repentance and such zeal must have equally excited opposition to Christianity. The first would have provoked contempt among persons of their singular self-sufficiency; and the other would have awakened the jealousy of the magistrate. True it is, that the Christians had virtues of a nobler kind. It is also true, that those virtues did ultimately triumph over the scorn and malice of their foes; and it is true, that a religion producing such effects on its followers, and deriving success from such means, carries with it a presumptive proof, of which imposture never could boast.

The last secondary cause mentioned by this writer, is, "the union and discipline of the Christian church." We acknowledge the force of union in securing the order, and enlarging the interests, of every society; and we heartily wish that such union could be found among the propagators of the gospel. But the distractions and internal divisions of the different Christian sects, present a very contrary prospect. And if the gospel succeeded, not only amidst the furious assaults of its enemies, but the no less violent contentions of its friends, we must look for its success in some more efficient cause, than in such as this historian has assigned. In the mean time, it may be well to guard the young and unwary Christian against the dangerous influence of such disingenuous and insidious endeavours to undermine the best evidence of revealed religion, and the truths of the gospel; not by cogent or irresistible arguments, indeed, founded on fact and experience, but merely by the insinuating arts of sophistry, and the captivating graces of fine language.

Now, whatever allowances a philanthropic mind may make for the ignorance and superstition of the vulgar, the same indulgence can scarcely be insisted upon in behalf of educated and enlightened men, who, enamoured of the subtleties of human wisdom, and bewildered in the mazes of an absurd and unintelligible philosophy, are unwilling to believe that the plainness and simplicity of the gospel, could ever be worthy an omniscient God. Yet how many such men happily and timely, in the hour of death, have contradicted all their wild and extravagant ideas, recalled their bold and unavailing charges against the doctrines of Christianity, and have died, firm in the faith, and comforted in the belief, of a happy immortality!

Reason informs us, that the present is a probationary state of discipline; and, in conformity to such a state, religion adapts all her doctrines to faith, all her encouragements to hope, and all her regulations to practice. Christianity, holding up to us the prospect of our future existence, bids us now prepare for it by virtuous habits of thought and action; and true philosophy will inform us, that those habits, in a great scheme of moral government, are neither recommended by the Creator, nor acquired by

by the creature, in vain. We are therefore to believe, that a real, an intimate, and most important, connection, subsists between the present life and that which is to follow it; though it surpasses our abilities to explain, and perhaps to comprehend, the particular powers with which we shall be invested, and the particular agency in which we are to be employed. Christianity may then be excused for not gratifying our curiosity on subjects, to which our apprehensions are now utterly inadequate; and even were they more adequate, it would deserve our praise for informing us of what is true, that we are destined for immortality; and for instructing us in what is most important, the duties by which we are to gain it. Such is the effect of Christianity with regard to its doctrine of a judgment to come. And as to the happiness which is to succeed that judgment, as a sure reward for good and virtuous actions upon earth, it still holds out the same plain and unequivocal language. When, therefore, the actions of every day, and every hour, have this intimate connection with our eternal doom, is it not to be expected that religion should have a forcible and constant influence over our lives? That influence, it must be confessed, is often counteracted by our infirmities, our prepossessions, and our headstrong appetites. Yet Christianity far surpasses every other religion in its visible tendency to make us better men, and in its real effects upon the sentiments and the manners of mankind. Every instance of improvement resulting from Christianity, in government, in laws, and in erudition, may be considered as a presumptive argument of its efficacy in matters purely of a religious nature: the same commands and the same sanctions, which have quickened the efforts of men in securing their spiritual well-being, have been indirectly the instruments of increasing their temporal. The same expectation of a righteous judgment which makes us good men, tends at the same time to make us useful and ornamental members of society. The same elevation of mind which actuated the bosom of a being, who reveres himself as the heir of immortal life, inspires every noble sentiment, and animates to every virtuous and exemplary undertaking, which can adorn and dignify human nature in this probationary state of mortality. For a full and connected view of Christian revelation, and the various doctrines and religious tenets that are and have been propagated through the world, see the article THEOLOGY.

To CHRIS'TIANIZE, *v.a.* To make Christians; to convert into Christianity.—The principles of Platonic philosophy, as it is now *christianized. Dryden.*

CHRIS'TIANLY, *adv.* Like a Christian; as becomes one who professes the holy religion of Christ.

CHRIS'TIANSAND, a seaport town of Norway, in the government of Agerhuus, opposite the island of Fleckeren. Lat. 58. 10. N. lon. 8. 14. E. Greenwich.

CHRIS'TIANSBURG, a fortress of Africa, on the Gold Coast, belonging to Denmark. It was taken by the negroes in 1693, who pillaged it, and kept it for some time.

CHRIS'TIANSBURG, a town of the American States, in Montgomery county, Virginia. It has a court-house and jail, situated near a branch of Little River, a water of the Kanhaway.

CHRIS'TIANSOE, a fortress of Denmark, built on a rock, on the east coast of the island of Bornholm.

CHRIS'TIANSTAD, a town of the island of Santa Cruz, in the West Indies, defended by a fortress, on the north-coast. Lat. 17. 46. N. lon. 63. 23. W. Greenwich.

CHRIS'TIANSTADT, a town of Sweden, in the country of Blekingen: built by Christian IV. king of Denmark, when the country was in the power of that crown, to guard against the eruption of the Swedes; but, in 1658, it was restored to Sweden by the treaty of Roschild; the town is small, but well built, and strongly fortified; the houses are all of brick, and mostly stuccoed white. It stands in a marshy plain, close to the river Helge-a, which flows into the Baltic at Ahus, about the distance of twenty miles, and is navigable only for small craft of seven tons burden. English vessels annually resort to this port for alum, pitch, and tar. The inhabitants have manufactures of cloth and silken stuffs. Fifty-seven miles west of Carlscrona. Lat. 55. 58. N. lon. 14. 6. E. Greenwich.

CHRIS'TIANSTADT, a town of Silesia, on the west side of the Bober: thirty-two miles west of Glogau, and fifty-four north-east of Dresden.

CHRIS'TIGNETH, a river of Wales, which runs into the Dee, in Denbighshire.

CHRISTI'NA, an illustrious queen of Sweden. See SWEDEN.

CHRIS'TINESTADT, a seaport town of Sweden, in the province of East Bothnia, built in the year 1649.

CHRISTIS'CA, a town of Poland, in the palatinate of Braclaw: forty-four miles south-south-west of Braclaw.

CHRIST'MAS-BOX, *s.* A box in which it has for many ages been a custom to collect little presents at Christmas:

When time comes round, a *Christmas-box* they bear.
And one day makes them rich for all the year. *Gay.*

CHRIST'MAS-DAY, *s.* A festival of the Christian church; observed on the 25th of December, in memory of the nativity or birth of Jesus Christ. As to the antiquity of this festival, the first footsteps we find of it are in the second century, about the time of the emperor Commodus. The decretal epistles, indeed, carry it up a little higher; and say that Telesphorus, who lived in the reign of Antonius Pius, ordered divine service to be celebrated, and an angelical hymn to be sung, the night before the nativity of our Saviour. However, that it was kept before the times of Constantine, we have a melancholy proof; for, whilst the persecution raged under Dioclesian, who then kept his court at Nicomedia, that prince, among other acts of cruelty, finding multitudes of Christians assembled together to celebrate Christ's nativity, commanded the church-doors where they were met to be shut, and fire to be put to it, which, in a short time, reduced them and the church to ashes.

CHRIST'MAS-FLOWER, *s.* Hellebore.

CHRIST'MAS-HARBOUR, a good and safe bay, on the north-east coast of Kerguelen's Land. Lat. 48. 41. S. lon. 69. 4. E. Greenwich.

CHRIST'MAS-ISLAND, in the Pacific Ocean, lies entirely solitary, nearly equally distant from the Sandwich islands on the north, and the Marquesas on the south. It was so named by captain Cook, on account of his first landing there on Christmas-day. Not a drop of fresh water was found by digging. A ship touching at this desolate isle must expect nothing but turtle, fish, and a few birds. It is about fifteen or twenty leagues in circumference, and bounded by a reef of coral rocks, on the west side of which there is a bank of fine sand, extending a mile into the sea, and affording good anchorage. Lat. 1. 59. N. lon. 202. 30. E. Greenwich.

CHRIST'MAS-ROSE, or FLOWER. See HELLEBORUS.

CHRIST'MAS-SOUND, a bay on the south coast of Terra del Fuego. Lat. 55. 22. S. lon. 73. W. Greenwich.

CHRIS'TOFHER, a town of Poland, in the palatinate of Sandomirz: sixteen miles south-south- of Sandomirz.

CHRIS'TOPHER, [Χριστοφορος, of Χριστος, Christ, and φερω, to bear; Christ's carrier.] A proper name of men.

CHRISTOPHORIA'NA, or HERB CHRISTOPHER, *s.* in botany. See ACTÆA, ADONIS, and ARALIA.

CHRIS'TORF, a town of Bohemia, in the circle of Boleslau: six miles south-south-east of Krottau.

CHRO'BERG, a town of Poland, in the palatinate of Sandomirz: fifty two miles west of Sandomirz.

CHRO'MA, a river of Siberia, which runs into the Frozen Sea. Lat. 73. N. lon. 17. E. Ferro.

CHROMA'TIC, *adj.* [χρωμα, colour.] Relating to colour.—I am now come to the third part of painting, which is called the *chromatic*, or colouring. *Dryden.*—Relating to a certain species of ancient music.—It was observed, he never touched his lyre in such a truly *chromatic* and enharmonic manner. *Arbuthnot.*—See the article MUSIC.

CHROMATICS, or CHROMATOGRAPHY, *ſ.* [from χρωμα, colour, and γραφω, to deſcribe.] The ſcience which inveſtigates the natural colour of bodies; and, when applied to light, conſtitutes a principal branch of optics. Before the time of ſir Iſaac Newton, philoſophers were formerly of opinion, that the ſolar light was ſimple and uniform, without any difference or variety in its parts, and that the different colours of objects were made by refraction, reflection, or ſhadows. But Newton taught them the errors of their former opinions; he ſhewed them to diſſect a ſingle ray of light with the minuteſt preciſion, and demonſtrated that every ray was itſelf a compoſition of ſeveral rays all of different colours, each of which when ſeparate held to its own nature, ſimple and unchanged by every experiment that could be tried upon it. Or to be more particular, light is not all ſimilar and homogeneal, but compounded of heterogeneal and diſſimilar rays, ſome of which in like inſtances being more refrangible, and others leſs refrangible, and thoſe which are moſt refrangible are alſo moſt reflexible; and according as they differ in refrangibility and reflexibility, they are endowed with the power of producing or of exciting in us ſenſations of different colours.

Sir Iſaac Newton's theory of light and colours is ſtriking and beautiful in itſelf, and deduced from clear and deciſive experiments, and may be almoſt ſaid to demonſtrate clearly, 1. That lights which differ in colour, differ alſo in degrees of refrangibility. 2. That the light of the ſun, notwithſtanding its uniform appearance, conſiſts of rays differently refrangible. 3. That thoſe rays which are more refrangible than others, are alſo more reflexible. 4. That as the rays of light differ in degrees of refrangibility and reflexibility, ſo they alſo differ in their diſpoſition to exhibit this or that particular colour; and that colours are not qualifications of light derived from refractions or reflections of natural bodies, as was generally believed, but original and connate properties, which are different in different rays, ſome rays being diſpoſed to exhibit a red colour and no other, and ſome a green and no other, and ſo of the reſt of the priſmatic colours. 5. That the light of the ſun conſiſts of violet-making, indigo-making blue-making, green-making, yellow-making, orage-making, and red-making, rays; and all of theſe are different in their degrees of refrangibility and reflexibility; for the rays which produce red colours are the leaſt refrangible, and thoſe that make the violet the moſt; and the reſt are more or leſs refrangible as they approach either of theſe extremes, in the order already mentioned; that is, orange is leaſt refrangible next to red, yellow next to orange, and ſo on; ſo that, to the ſame degree of refrangibility, there ever belongs the ſame colour, and to the ſame colour the ſame degree of refrangibility. 6. Every homogeneal ray, conſidered apart, is refracted according to one and the ſame rule, ſo that its ſine of incidence is to its ſine of refraction in a given ratio; that is, every different coloured ray has a different ratio belonging to it. 7. The ſpecies of colour, and degree of refrangibility and reflexibility, proper to any particular ſort of rays, is not mutable by reflection or refraction from natural bodies, nor by any other cauſe that has been yet obſerved. When any one kind of ray has been ſeparated from thoſe of other kinds, it has obſtinately retained its colours, notwithſtanding all endeavours to bring about a change. 8. Yet ſeeming tranſmutation of colours may be made, where there is any mixture of divers ſorts of rays; for, in ſuch mixtures, the component colours appear not, but, by their mutually alloying each other, conſtitute an intermediate colour. 9. There are, therefore, two ſorts of colour, the one original and ſimple, the other compounded of theſe; and all the colours in the univerſe are either the colours of homogeneal, ſimple light, or compounded of theſe mixed together in certain proportions. The colours of ſimple light are, as we obſerved before, violet, indigo, blue, green, yellow, orange, and red, together with an indefinite variety of intermediate gradations. The colours of compounded light are differently compounded of theſe ſimple rays, mixed in various proportions: thus a mixture of yellow-making and blue-making rays exhibits a green colour, and a mixture of red and yellow makes an orange; and in any colour the ſame in ſpecie with the primary ones may be produced by the compoſition of the two colours next adjacent in the ſeries of colours generated by the priſm, whereof the one is next moſt refrangible, and the other next leaſt refrangible. But this is not the caſe with thoſe which are ſituated at too great a diſtance; orange and indigo do not produce the intermediate green, nor ſcarlet and green the intermediate yellow. 10. The moſt ſurpriſing and wonderful compoſition of light, is that of whiteneſs; there is no one ſort of rays which can alone exhibit that colour: it is ever compounded, and to its compoſition all the aforeſaid primary colours are requiſite. 11. As whiteneſs is produced by a copious reflection of rays of all ſorts of colours, when there is a due proportion in the mixture; ſo, on the contrary, blackneſs is produced by a ſuffocation and abſorption of the incident light, which being ſtopped and ſuppreſſed in the black body, is not reflected outward, but reflected and refracted within the body till it be ſtifled and loſt.

The foundation of a rational theory being thus laid, it next became natural to enquire by what peculiar mechaniſm in the ſtructure of each particular body, it was fitted to reflect one kind of rays more than another. This ſir Iſaac Newton attributes to the denſity of theſe bodies. This ſubject, however, is not ſo clear as the preceding; for the preſent theory ſuggeſts many doubts to every inquiſitive mind, and is allowed by all to be attended with difficulties. There are no optical experiments, however, in which ſir Iſaac Newton ſeems to have taken more pains, than thoſe relating to the rings of colours which appear in thin plates, and which we now propoſe to explain. In all his obſervations and inveſtigations concerning them, he diſcovers the greateſt ſagacity, both as a philoſopher and a mathematician.

The bubbles which children blow with a mixture of ſoap and water, were obſerved by Dr. Hooke to exhibit various colours according to their thinneſs, and that when they have a conſiderable degree of thickneſs they appear colourleſs; from this the preſent theory has taken its riſe. It is thus that things overlooked by the reſt of mankind, are often the moſt fertile in ſuggeſting hints to thoſe who are habituated to reflection.

Sir Iſaac Newton blew up a large bubble from a ſtrong mixture of ſoap and water, and ſet himſelf attentively to conſider the different changes of colour it underwent, from its enlargement to its diſſolution. He in general perceived that the thinner the plate of water which compoſed the ſides of the bubble, the more it reflected the violet-colour ray; and that in proportion as the ſides of the bubble were more thick and denſe, the more they reflected the red; he, therefore, was induced to believe, that the colours of all bodies proceeded from the thickneſs and denſity of the little tranſparent plates of which they are compoſed. To bring this opinion nearer to certainty, it was neceſſary to meaſure the thickneſs of the plate of water which compoſed the bubble; but this was a matter of great difficulty, as the bubble was of itſelf of too tranſient a nature to undergo the neceſſary experiments.

Our philoſopher, ever fertile in expedients, recollected having obſerved, that as two priſms were compreſſed hard together, in order to make their ſides (which happened to be a little convex) touch one another, they were both as perfectly tranſparent in the place of contact as if they had been but one piece of glaſs; but that round the point of contact, where the glaſſes were a little ſeparated from each other, rings of different colours appeared.

To obſerve more accurately the order of the colours produced in this manner, he placed a glaſs lens, whoſe convexity was very ſmall, upon a plain glaſs. Now it is evident, that thoſe would only touch at one particular point; and, therefore, at all other places between the adjacent ſurfaces, a thin plate of air was interpoſed, whoſe

thickneſs

thickneſs increaſed in a certain ratio, according to the diſtance from the point of contact.

He preſſed theſe glaſſes ſlowly together, by which means the colours very ſoon emerged, and appeared diſtinct to a conſiderable diſtance; next to the pellucid central ſpot made by the contact of the glaſſes, ſucceeded blue, yellow, white, yellow, and red. The blue was very little in quantity, nor could he diſcern any violet in it; but the yellow and red were very copious, extending about as far as the white, and four or five times as far as the blue. The next circuit immediately ſurrounding theſe conſiſted of violet, blue, green, yellow, and red; all theſe were very copious, except the green, which was very little in quantity, and ſeemed more faint and dilute than the other colours. The third circle of colours was purple, blue, green, yellow, and red; in this the purple was more reddiſh than the violet in the former circuit, and the green was more conſpicuous, being as bright and copious as any of the other colours, except the yellow; the red was alſo ſomewhat faded. The fourth circle conſiſted of green and red; the green was copious and lively, inclining on one ſide to blue, on the other to yellow, but there was neither violet, blue, nor yellow; and the red was very imperfect. Each outer circuit, or ring, was more obſcure than thoſe within, like the circular waves upon a diſturbed ſheet of water, till they at laſt ended in perfect whiteneſs.

As the colours were thus found to vary according to the different diſtances of the glaſs-plates from each other, ſir Iſaac judged that they proceeded from the different thickneſs of the plate of air, intercepted between the glaſſes; and that this plate was, by the mere circumſtance of thinneſs or thickneſs, diſpoſed to reflect or tranſmit this or that particular colour; from whence he concluded, as before obſerved, that the colours of all natural bodies depended on their component particles. He alſo conſtructed a table, wherein the thickneſs of a plate, neceſſary to reflect any particular colour, was expreſſed in parts of an inch, divided into 1,000,000 parts.

It has been already obſerved, that the thin plates, made uſe of in the different experiments, reflected ſome kinds of rays in particular parts, and tranſmitted others in the ſame parts. Hence the coloured rings appeared variouſly diſpoſed, according as they were viewed by reflected or tranſmitted light; that is, according as the plates were or were not held up between the eye and the window. That we may underſtand this better, the following table has been formed. On one ſide are mentioned the colours appearing on the plates by reflected light, and on the other thoſe which are perceptible when the glaſſes are held between the eye and the window. The centre, when the glaſſes are in full contact, is perfectly tranſparent; this ſpot, therefore, when viewed by reflected light, appears black, becauſe it tranſmits all the rays; and for the ſame reaſon it appears white, when viewed by tranſmitted light.

Colours by Reflected Light.	*Colours by Tranſmitted Light.*
Black	White
Blue	Yellowiſh-red
White	Black
Yellow	Violet
Red	Blue
Violet	White
Blue	Yellow
Green	Red
Yellow	Violet
Red	Blue
Purple	Green
Blue	Yellow
Green } Yellow } Red }	Red Blueiſh-green
Green	Red
Red	Blueiſh-green
Greeniſh-blue	Red
Red	

In comparing the rings produced by tranſmitted with thoſe produced by reflected light, the white is found oppoſed to the black, the red to the blue, the yellow to the violet, and the green to a colour compoſed of red and violet; in other words, the parts of the glaſs, which when looked at are white, appear black on looking through the glaſs; and, on the contrary, thoſe which appear black in the firſt inſtance, appear white in the ſecond; and ſo of the other colours. Newton has ſhewn, that the rays of any particular colour are diſpoſed to be reflected, when the thickneſſes of the plate of air are as the numbers 1, 3, 5, 7, 9, 11, &c. and that the ſame rays are diſpoſed to be tranſmitted at the intermediate thickneſſes, which are as the numbers 0, 2, 4, 6, 8, 10, &c.

The places of reflection or tranſmiſſion of the ſeveral colours in a ſeries, are ſo near each other, that the colours dilute each other by mixture; whence the number of ſeries, in the open day-light, ſeldom exceeds ſeven or eight. But if the ſyſtem be viewed through a priſm, by which means the rings of various colours are ſeparated, according to their refrangibility, they may be ſeen on that ſide towards which the refraction is made, ſo numerous that it is impoſſible to count them. Or, if in a dark chamber the ſun's light be ſeparated into its original rays, by a priſm, and a ray of one uncompounded colour be received upon the two glaſſes, the number of circles will become very numerous, and both the reflected and tranſmitted light will remain of the ſame colour as the original incident ray. This experiment ſhews, that in any ſeries, the circles formed by the leſs refrangible rays exceed, in magnitude, thoſe which are formed by the more refrangible; and, conſequently, that, in any ſeries, the more refrangible rays are reflected at leſs thickneſſes than thoſe which are leſs refrangible.

If we apply water to the edges of the glaſs, it will be attracted between them; and, filling all the intercedent ſpace, it will become a thin plate of the ſame dimenſions as that which before was conſtituted of air; in this caſe, the circular rings grow leſs, and the colours fainter, but not varied in ſpecies. They become contracted in diameter, nearly in proportion of 7 to 8, and conſequently, the intervals of the glaſſes, at ſimilar circles, as cauſed by theſe two mediums, are as about 3 to 4; that is, as the ſines of refraction out of water into air.

We have already ſpoken of the variety of colours produced by bubbles blown in ſoap-water; but, as theſe colours are commonly too much agitated by the external air to admit of any certain obſervation, it is neceſſary to cover the bubble with a clear glaſs, in which ſituation the following appearances take place: the colours emerge from the top of the bubble, and as it grows thinner, by the ſubſidence of the water, they dilate into rings parallel to the horizon, which deſcend ſlowly, and vaniſh ſucceſſively, at the bottom. This emergence continues till the water at the upper end of the bubble becomes too thin to reflect the light, at which time a circle of an intenſe blackneſs appears at the top, which ſlowly dilates, ſometimes to three quarters of an inch in breadth, before the bubble breaks. Reckoning from the black central ſpot, the reflected colours are the ſame, in ſucceſſion and quality, as thoſe produced by the afore-mentioned plate of air; and the appearance of the bubble, if viewed by tranſmitted light, is ſimilar to that of the plate of air, in like circumſtances.

If we take very thin plates of talc, or Muſcovy glaſs, that exhibit theſe colours; then, by wetting the plates, the colours remain as before, but become more faint and languid, eſpecially when wetted on the under ſide. So that the thickneſs of any plate, requiſite to produce any colour, ſeems to depend only on the denſity of the plate, and not on the denſity of the incloſing medium. But the colours are more vivid, as their denſities are different.

If two pieces of plate-glaſs, or even common glaſs, be previouſly wiped, and then rubbed together, they will ſoon adhere, with a conſiderable degree of force, and exhibit various ranges of colours, much broader than thoſe obtained

obtained by lenses. One of the most remarkable circumstances attending this method of making the experiment, is the facility with which the colours may be removed, or even made to disappear, by heats too low to separate the glasses. A touch of the finger immediately causes the irregular rings of colours to contract towards their center, in the part touched.

These experiments render it evident, that the colours of bodies depend, in some degree, upon the thickness and density of the particles that compose them. Hence, if the density, or size of the particles, in the surface of a body, be changed, the colour is likewise changed. When the thickness of the particles of a body is such, that one sort of light, or one sort of colour, is reflected; another light, or other colours, will be transmitted; and therefore the body will appear of the first colour.

There is a certain determinate thickness which seems to be necessary in a plate of water, for example, in order to reflect a particular colour, and a different thickness to make it reflect any other colour; and in general, that a less thickness is necessary, to reflect the most refrangible rays, as violet and indigo, than those which are least refrangible, as the red and orange-coloured rays. The particles of bodies reflect rays of one colour, and transmit those of another; and this is the ground of all their colours.

Sir Isaac Newton, in order to account for the intervals of the coloured rings in these thin plates, and also all other cases of the reflection or transmission of light, advances an hypothesis; but, like a wise and cautious philosopher, he professes not to lay much stress upon it, though he seems not to entertain any suspicion of its being fallacious. Indeed, it seems to be a kind of fair inference from the experiments we have been describing. The hypothesis is this: that every ray of light is, at its first emission from the luminous body, put into a transient state or constitution, which, in its progress, returns at equal intervals, disposing it, at every return, to be easily transmitted into any refracting surface it may meet with; whereas in the intervals between these returns, it is disposed to be easily reflected; so that, upon the arrival of a number of rays of light at the surface of every medium, those of them in which they were disposed to be transmitted easily, would pass the interval between the two mediums; and those which were in a contrary state, would be reflected; on which account, some light is generally reflected, and some transmitted, at every different surface on which it falls. Those states, into which the rays of light are put, he calls fits of easy reflection and transmission. This hypothesis, however, is not without difficulties, and must, therefore, be received with caution, as it was proposed, till it shall be either confirmed or confuted by experiment, and a new theory substituted in its stead. When we are brought, as it were, to the confines of material nature, we must expect to meet with some confusion and darkness in our explanations. There are barriers to our knowledge, which cannot be passed by any force of human faculties. Sir Isaac Newton, the legislator of philosophers, expressed, under the form of conjectures or questions, those things which he was unable satisfactorily to resolve; avoiding rash assertions, which are so fondly taken up by those who wish to gain a momentary reputation.

Newton conjectured, that these fits of easy reflection and transmission may be occasioned by the vibrations of a subtil fluid, in which the ray passes; any ray being disposed to be transmitted when the vibration coincides with it, and to be reflected when it is thereby counteracted. He also thought that these vibrations might be excited by the mutual action and re-action of the light in bodies, and of this medium, at the instant of refraction and reflection. He therefore supposed two causes of this disposition to be reflected or transmitted, when rays of light arrive at any new surface. One of them is the regular vibration of the etherial medium, affecting them through the whole of their progress from the luminous body; and the other the tremulous motion, or irregular vibration of the same medium, at the surfaces of bodies, occasioned by the action and re-action between those bodies and light. Thus, as stones, by falling into water, put the water into an undulating motion; and all bodies, by percussion, excite vibrations in the air; so the rays of light, by impinging on any refracting or reflecting surface, excite vibrations in the refracting or reflecting medium, and, by exciting these, agitate the solid parts of the refracting or reflecting body; and that the vibrations thus excited in this subtil refracting or reflecting medium are propagated much after the manner that vibrations are propagated in the air, causing sound, and moving faster than the rays, so as to overtake them; and that when any ray is in that part of the vibration which conspires with its motion, it easily breaks through a refracting surface; but when it is in the contrary part of the vibration which impedes its motion, it is easily reflected; and, by consequence, that every ray is successively disposed to be easily reflected, or easily transmitted by every vibration by which it is overtaken.

It has already been stated, that the colours of natural bodies consist in a disposition to reflect one sort of rays more copiously than another; and that other bodies are of a different colour, because they reflect rays of a different kind. So that if light consisted only of one kind of rays, there could be only one colour in the world; nor would it be possible, by refractions and reflections, to produce a new one. Thus, in some bodies, all the rays are extinguished but the red-making; and when they are reflected to our eyes, they excite in us the idea of red; and thence we say, that such a piece of cloth, &c. is red; attributing that only to the cloth or wood, which more particularly arises from the light which dresses them in their various beauty. Thus the ruby absorbs the green, the blue, and the violet; but reflects the red-making rays to our eye, with all their prismatic lustre. The amethyst imbibes the stronger rays, and gives back the violet with milder brightness. The jonquil gives us only yellow, and the hyacinth its vivid blue. Every coloured object may be thus regarded as a partial divider of the rays, separating one or more colours, and confounding all the others. Those surfaces of transparent bodies, which have the greatest refracting power, reflect the greatest quantity of light. In other words, bodies, by which the light is more refracted, do likewise more strongly reflect it. Diamonds, which refract the light very strongly, give it, in proportion, a stronger reflection: and hence proceed the vivacity of their colours, and their sparkling effect.

We shall perceive the analogy between refraction and reflection, by considering that the most refractive medium totally reflects the rays of light, at certain degrees of incidence. But the truth of the proposition further appears, by observing the transparent bodies, such as air, water, oil, glass. Island crystal, white transparent arsenic, and diamond, have a stronger or weaker reflection, according to the greater or less refractive powers of the mediums that are contiguous to them. Thus at the confine of air and sal gem, it is stronger than at the confine of air and water; and still stronger between common air and glass; still more so between air and a diamond. If any of these be immersed in water, its reflection becomes weaker than before; and it is weaker still, if it be immersed in liquors of a greater refractive power. If water be divided into two parts, by any imaginary surface, there is no reflection at the confine of those two parts; and for the same reason, there can be no sensible reflection in the confine of the two glasses of equal density. The reason, therefore, why all pellucid mediums have no sensible reflection but at their external surfaces, where they are contiguous to mediums of different densities, is, that their contiguous parts have precisely the same degree of density.

The least parts of all bodies, though seemingly void of transparency, when viewed in the gross, will be found, if taken

taken separately, to be, in some measure, transparent; and the opacity arises from the multitude of reflections caused in their internal parts. This observation will be easily granted by those who have been conversant with microscopes; for there they are found to be, for the most part, transparent. Nothing seems more opake, and free from transparency, than the clothes we wear. Yet let us only examine one of the woollen hairs that enter into its composition, with a microscope, and we shall find it to be nearly transparent. Gold in the mass lets no light pass through it; but if beaten out extremely thin, we shall then see that its parts are transparent, like other bodies. If held over a hole, in a darkened window, it will appear of a greenish hue. If gold be composed of transparent parts, we may surely conclude the same of other bodies; and, indeed, very few are to be found, in which, if reduced to sufficient thinness, and applied to a hole through which the sun's rays pass, a degree of transparency is not manifest.

It now becomes necessary, since light finds a free passage through the least particles, to inquire what renders them opake; and this, by sir Isaac Newton, is attributed to the multitude of reflections and refractions which take place in its interior parts; there being, between the parts of opake or coloured bodies, a number of spaces, filled with mediums of a different density from that of the body, as water between the tinging corpuscles with which any liquor is impregnated; air between the aqueous globules that constitute clouds and mists, &c. These spaces cannot be traversed by light, without refracting or reflecting it in various ways, by which it is prevented from passing on in a straight line, which it would do if the parts were continuous, without any such interstices between them; for we have already learned, that reflections are only made at the superficies of mediums of different densities. The opacity of a body arises, therefore, from the discontinuity of its particles, and the different density of the intervening mediums and the particles which compose them. This idea of opacity is greatly confirmed, by considering that opake bodies become transparent by filling up the pores with any substance of nearly the same density with their parts. Thus when paper is wet with oil or water, or when linen cloth is dipped in water, oiled, or varnished, or the oculus mundi steeped in water, &c. they become more transparent than they were before; as filling the pores of an opake body makes it transparent, so, on the other hand, evacuating the pores of a transparent body, or separating its parts, renders it opake; as salts, or wet paper, by being dried; horn, by being scraped; glass, by being reduced to powder, or otherwise flawed; turpentine, by being stirred about with water, till they mix imperfectly; and water, by being formed into many small bubbles, either in the form of froth, or, by shaking it together with oil of turpentine, or some other convenient liquor, with which it will not combine. It is plain, therefore, that it is in homogeneity we are to seek for the cause of transparency. If there be many pores in a body, and these be filled with a matter differing much in density from the body itself, the light will meet with a thousand refractions and reflections in the internal parts, and will thus be utterly extinguished. But the parts of bodies, and their interstices, must not be less than some definite size, to become opake and coloured. For the most opake bodies, if their parts be sufficiently divided, as metals, by being dissolved in acid menstrua, become perfectly transparent. The black spot, near the point of contact of the two plates of glass, it has been observed, transmitted the whole light where the glasses did not absolutely touch; and the reflection at the thinnest part of the soap-bubble was so insensible as to make that part appear intensely black, by the want of reflected light. It is on these grounds that water, salt, glass, stones, &c. are transparent; for, from many considerations, they seem to be as full of pores as other bodies are, yet their particles and pores are too small to cause reflection in their common surfaces.

The transparent parts of bodies, according to their several sizes, must reflect rays of one colour, and transmit those of others, on the same principles that thin plates or bubbles do reflect or transmit these rays; and this seems to be the ground of all their colours. That they do so is plain from various observations; and it is on these principles that we explain the variety of colours seen in some silks, on pigeons' necks, peacocks' tails, and the feathers of other finely-coloured birds. If the eye be fixed on a pigeon's neck, and both be kept at rest, only one colour is observable; but if either moves, especially the latter, a different colour may be seen. Shady silks are woven with threads of different colours; one arranged longitudinally, the other transversely; and as the greater or less proportion of either of these appears, so one or the other of the colours will prevail. Wet these double-coloured objects, dip the variegated feather in water, or the changeable silk in oil, their reflections will be less vivid, and they will return but one uniform shade of colouring. The skin of the camelion is transparent, its ground being between a pale red and yellow, coloured with a number of small smooth protuberances of a cold blueish colour. It is endowed with a faculty of blowing up or contracting its skin at will. This causes the different colours, in appearance, to vary; it therefore sometimes appears reddish, at others blue: the yellow rays of the skin, occasionally mixing with the blue of the protuberances, produce the idea of green; and when placed on a red or yellow substance, its natural colours are unavoidably heightened.

From various phenomena it is evident, that a great proportion of the fainter coloured rays are stopped in their passage through the atmosphere, and are thence reflected upon other bodies; while the red and orange rays are transmitted to greater distances. This circumstance explains the blue shadows of bodies, the blue colour of the sky, and the red colour of the clouds, when the sun is near the horizon. At particular times, when the sky is clear and serene, in the morning and the evening, the shadows cast from opake bodies have been observed to be tinged with blue and green. This circumstance naturally results from the minute particles of the atmosphere reflecting the delicate and most refrangible rays, the blue and violet, for instance, which occasions a predominance of these hues.

The blueness of the sky is accounted for on the same principles; namely, the copious reflection of the blue rays by the atmosphere, which produces the effect of an arch of that colour all around us. This is occasionally diversified by the greater density of the vapours, which reflect the stronger rays. The coloured clouds, in particular, which appear towards the morning and evening, when the sun is in or near the horizon, are to be attributed to the same cause. The rays of light traversing a vast extent of atmosphere; the fainter and more delicate rays, as the blue and violet, are detached by repeated reflections of the atmospheric particles; and the stronger rays, as the red, the orange, &c. are permitted to proceed, and reach the clouds, from whence they are reflected. Agreeable to this theory, we may observe, that the sun's horizontal light is sometimes so deeply tinctured with the red, that objects illuminated by it frequently appear of a bright orange, and even red. It is observable, that the clouds do not, in common, assume their brighter dyes till the sun is some minutes set, and that they pass from yellow to a flaming gold colour; and thence, by degrees, to red, which becomes deeper and deeper, till at length the disappearance of the sun leaves them of a leaden hue, by the reflection of the blue light from the air. A similar change of colour is observed on the snowy tops of the Alps; and the same may be seen, though less strongly, on the eastern and western fronts of white buildings. St. Paul's church, in London, is a good object of this kind, and is often, at sun-set, tinged with a considerable degree of redness. What makes the same colours more rich and copious in the clouds, is their semi-transparency, joined with the obliquity

obliquity of their position. It is highly probable that it is the same coloured light, which being thrown, by the refraction of the atmosphere, into the shadow of the earth, sometimes gives the moon, in a total eclipse, the obscure reddish colour of brick. For the same reason, the colour of the moon will vary in eclipses, according to the extent of atmosphere through which the rays have to traverse.

The doctrine of colours has been lately much improved by Mr. Delaval, as stated in a paper communicated by him to the Literary and Philosophical Society of Manchester, and published in their second volume of memoirs. He was led to this subject, from a persuasion of its utility to those interesting and elegant arts, whose object is the preparation and use of colouring substances: justly observing, that our views of experimental philosophy should not be confined to theory alone, but directed also to its practical application. For, in proportion as the principles of any science are unknown or misconceived, the advancement of the arts, and manufactures which depend on them, must, of course, be impeded; for, without those guides, neither much addition, nor any improvement, is to be expected. But when scientific principles are disclosed to the artist, he is enabled to draw from those original sources an ample store of useful inventions, by which his art is enriched; and thus, the speculative sciences, by their extension to practical purposes, become objects of great public importance.

The arts of colour-making and dying were, in remote ages, carried to the height of perfection, in the countries of Phœnicia, Egypt, Palestine, India, &c. The inhabitants of those countries excelled also in the art of imitating gems, and tinging glass and enamel of various colours. The colours used in very ancient paintings, were as various as those now in use, and greatly superior both in beauty and durability. The paints used by Apelles were so bright, that he was obliged to glaze his pictures with a dark-coloured varnish, lest the eye should be offended by their brightness; and even these were inferior to what had been used among the ancient Egyptians. Notwithstanding this perfection in dying and colouring, we find the Grecians and Romans continually degrading the useful arts. We may consider this as one of the most striking characters that distinguish the philosophy of the ancients from that of the moderns. The ancients being chiefly engaged in speculations that might procure them respect, and attract applause, thought the useful arts unworthy their attention; whereas the moderns have cultivated and promoted the useful arts; and hence the Academy of Sciences at Paris attempted to shed the light of science upon the arts, by publishing a description of them, grounded on the elevated idea, that the industry of a nation cannot fail to be enlightened and increased by a free communication of all the processes it uses; and that the sacrifices it makes by this publicity, will ever be amply compensated by the advantages it procures.

The changes of colour in permanently coloured bodies, are produced by the same laws which take place in transparent colourless substances; and the experiments by which they can be investigated, consist of various methods of uniting the colouring particles into larger, or dividing them into smaller, masses. The great Newton, as we have seen, made his experiments chiefly on transparent substances; but, where he treats of others, he acknowledges his deficiency of experiments. He makes the following remark on those bodies which reflect one kind of light, and transmit another; viz. "that if these glasses or liquors were so thick and massy, that no light could get through them, he questions whether they would not, like other opake bodies, appear of one and the same colour, in all positions of the eye, though he could not yet affirm it from experience." It was an opinion of this great philosopher, that all coloured matter reflects the rays of light; some reflecting copiously the more, others the less, refrangible rays. He was likewise of opinion, that opake bodies reflect the light from their anterior surface, by some power of the body, evenly diffused over, and external to it. With respect to transparent coloured liquors, he says, that a transparent body, which looks of any colour by transmitted light, may also look of the same colour by reflected light, the light of that colour being reflected by the farther surface of that body, or by the air beyond it; and then the reflected colour will be diminished, and perhaps cease, by making the body very thick, and pitching it on the back side, to diminish the reflections of its farther surface, so that the light reflected from the tinging particles may predominate. In such case the reflected light will be apt to vary from that which was transmitted.

In order to investigate the truth of these opinions, Mr. Delaval entered upon a course of experiments with transparent coloured liquors and glasses, as well as with opake and semi-transparent substances. From these he found, that in transparent coloured substances, the colouring matter does not reflect any light, and when, by intercepting the light which was transmitted, it is hindered from passing through such substances, they do not vary from their former colour to any other, but become entirely black. This incapacity of the colouring particles of transparent bodies to reflect light, being deduced from very numerous experiments, it may be considered as a general law. It appears the more extensive, if we consider that, for the most part, the tinging particles of transparent substances are extracted from opake bodies; that the opake bodies owe their colour to these particles, as well as the transparent; and that by the loss of them they are deprived of their colours.

For his experiments Mr. Delaval used small phials of flint-glass, calculated for the purpose; the form, that of a parallelopiped; the height, exclusive of the neck, about two inches; the base about an inch square, the neck two inches long. The bottom and three sides of each of these phials was covered with a black varnish; the cylindrical neck, and the anterior side, except at the edges, being left uncovered. He was careful to avoid any crevices in the varnish, that no light might be admitted, except through the neck or anterior side of the phials. The phials should be perfectly clean, and those liquors that deposit a sediment should not be put into them, but at the time when the experiments are to be made. The uncovered side likewise should not be placed opposite to the window where the light is admitted, because in that situation the light would be reflected from the farthest side of the phial; smooth black substances, reflecting light powerfully, are best situated when the uncovered side forms a right angle with the window. Having taken these precautions, he viewed a great number of solutions, both of coloured metallic salt, and of the tinging matter of vegetables, observing that the colour by reflection was black, whatever it might be when viewed by transmitted light. If these colours are, however, spread thin upon a white ground, they appear of the same colour as when viewed by transmitted light; but on a black ground they afford no colour, unless the black body be polished, in which case the reflection of light through it produces the same effect as transmission.

The experiments made with coloured glasses were, in many respects, analogous to those with transparent coloured liquors. For these he made several parcels of colourless glass, composed of borax and white sand. The glass was reduced to powder, and afterwards ground together with the ingredients, by which the colour was to be imparted; a method he found preferable to the usual mode of tinging glasses, as they became little inferior in lustre to real gems. The result of all his experiments was, that when matter is of such thinness, and the tinge so dilute, that light can be transmitted through it, the glasses then appear vividly coloured; but when they are in large masses, and the tinging matter is more densely diffused through them, they appear black; for these, as well as the transparent liquors, shew their colour only by transmission. Having in this manner formed pieces of such glass,

glass, two inches thick, he inclosed them in black cloth on all sides, except their anterior and farther surfaces. In this situation each of them shewed a vivid colour when light was transmitted through them; but when the posterior surface was likewise covered with the cloth to prevent the transmission, no other colour but black was exhibited. From these phenomena he drew the following inferences: 1. That the colouring particles do not reflect any light. 2. That a medium, such as is described by sir Isaac Newton, is diffused over both the anterior and posterior surfaces of the plates, whereby objects are equally and regularly reflected, as by a mirror.

Mr. Delaval next considers the colouring particles themselves, pure and unmixed with other media. To procure masses made up of such particles, several transparent coloured liquors were reduced to a solid consistence by evaporation; by employing a gentle heat the colouring matter will not be injured, and may have its particles again separated by water or other fluids, and tinging them as before. In this state also the colouring particles reflect no light, and therefore appear uniformly black, whatever be the substance from which they may have been extracted. He endeavours to prove by experiments on the colouring particles of opake bodies, that these colours are produced on the above-mentioned principles; that they seem black when very dense, but shew their proper tinge when spread thin upon a white ground. The green of grass and leaves of plants being obtained by digesting them in rectified spirits of wine, and placed in one of the above-mentioned phials, the part in the neck transmitted the vivid green, but that contiguous to the uncovered side of the phial was black. After the colour had been totally extracted, the leaves remained apparently unaltered as to figure or texture, but were entirely white, or of a white tinged with brown. Red, blue, and purple, flowers were also digested with spirits of wine, all of which yielded their colouring matter to the spirit, and became white when deprived of it. From most of these flowers the spirit, however, either acquired no tinge at all, or only a very faint one; but when acidulated it became red, and by the addition of an alkali became blue, purple, or green, according to the quantity of the alkali, and the nature of the infusion. In these states all of them, when viewed by transmitted light, or poured upon a white paper, shewed their colours, but universally appeared black by reflection. Other experiments were tried with other flowers, but the final result was the same, no colour by reflection. Linen, cotton, white paper, &c. may be tinged of any of these colours, by dipping them in the infusions; and the consideration of the manner in which the colours are imparted to linen, affords much insight into the manner in which natural colours are produced. See the article Chemistry, p. 343, &c. of this volume.

It has been already observed, that when the colouring matter of plants is extracted from them, the solid fibrous parts, thus divested of their covering, display their natural whiteness. White linen, paper, &c. are formed of such fibrous vegetable matter, which is bleached by dissolving and detaching the heterogeneous colouring particles; when these therefore are dyed or painted with vegetable colours, it is evident that they do not differ in their manner of acting on the rays of light from natural vegetable bodies; both yield their colours by transmitting through the transparent coloured matter the light which is reflected from the white ground. This white matter ever exists without any considerable mixture in plants while they are in a state of vegetation, as cotton, white flowers, the pith, wood, seeds, roots, and other parts of several kinds of vegetables. When decayed leaves of trees have been long exposed to the atmosphere, their coloured juices are sometimes so perfectly extracted, that their fibres appear white. Mr. Delaval has even rendered ashes intensely white, by carefully calcining them, and afterwards grinding with a small proportion of nitre, and exposing them to such a degree of heat as would cause the nitre to deflagrate. The ashes were then digested with the marine acid, in order to dissolve the ferruginous matter diffused through them, and the remainder repeatedly washed in water. Hence it would appear, that the earth which forms the substance of plants is white, and separable from that substance which gives to each its peculiar colour; that whenever it is pure and unmixed, or diffused through colourless media, it shews its native whiteness, and is the only vegetable matter endowed with a native whiteness. This white matter may be discovered by other means besides combustion: thus roses may be whitened by exposing them to burning sulphur, and the colour may be again restored by the addition of an acid either mineral or vegetable.

Dyed substances have their colour destroyed by the rays of the sun.—Thus dyed silk, and other substances of that kind, when exposed to the sun's light, are deprived of their colour in every part on which the rays are allowed to act; whilst those preserve their colours which are defended from the light. The colours, thus impaired, may be restored, if acids are employed while the injury is recent. All Mr. Delaval's experiments shew, that the colouring matter of plants does not exhibit any colour by reflection, but by transmission only; that their solid earthy substance is a white matter, and that it is this part that has the property of reflection; that the colours of vegetables are produced by the light reflected from this white, and transmitted from thence through the coloured coat or covering which is formed on its surface by the colouring particles; that whenever the colouring matter is either discharged or divided by solution into particles too minute to exhibit any colour, the solid substance itself displays that whiteness which is its distinguishing characteristic. Having settled this point, he proceeded to examine the coloured parts of animal substances, and found them exactly similar with regard to the manner in which the colour is produced, to the vegetable substances already treated of. The tinctures and infusions of cochineal and kermes yield their colours when light is transmitted through them, but shew none by reflection. On diluting fresh ox-gall with water, and examining it in the above-mentioned phials, the part of it viewed by transmitted light was yellow; but the anterior surface in the lower part of the phial was black, and reflected no colour. Flesh derives its colour entirely from the blood, and when deprived of it the fibres and vessels are perfectly white; as are likewise the membranes, tendons, and bones, when freed from their aqueous and volatile parts. The florid red colour of the flesh arises from the light which is reflected from the white fibrous substance, and transmitted back through the red transparent covering formed by the blood on every part of the surface of the body.

In like manner the red colour of the shells of lobsters after boiling, is no more than a mere superficial covering spread over the white calcareous earth of which the shells are composed, and may be removed from the surface by scraping or filing. Before the application of heat this superficial colouring is much denser, insomuch that in some parts of the shell it appears quite black, being too thick to admit the passage of the light to the shell and back again; but where this transparent blue colour of the unboiled lobster is thinner, it constantly appears like a blue film. In like manner the colours of the eggs of certain birds are entirely superficial, and may be scraped off, leaving the white calcareous earth exposed. It is the same with feathers, which owe their colours entirely to a very thin layer of some transparent matter upon a white ground; this was ascertained by scraping off the superficial colours from certain feathers, which were strong enough to bear the operation, and which separated the coloured layers from the white ground on which they had been naturally spread. The lateral fibres cannot have their colours separated in this manner; but their texture, when viewed by a microscope, seems to indicate that their colours are produced on them by no other means than those already related. In a word, he found that in all the animal

animal subjects he examined, the colours were produced by the transmission of light from a white ground through a transparent coloured medium.

The mineral kingdom abounds with coloured substances, belonging principally to two classes, earths and metals. The former, when pure, are all white, and their colour arises from metallic mixtures. Calcareous earths, when indurated, constitute marble, and may be tinged with various colours by means of metallic solutions, all of which are similar in their nature to the dyes put upon silk, cotton, or linen, and invariably proceed from the same cause, the transmission of light through a very thin transparent medium. Flints are formed from siliceous earths, and owe their colour to the state of fire within them; when sufficiently heated, they are rendered white by the loss of the inflammable matter which produced their colour; when impregnated with metals, they form agates, cornelians, jasper, and coloured crystals. The coloured gems also receive their different hues from metals, and may be imitated by glasses tinged with such inflammable or metallic matter as entered into the original substances, all exhibiting their various tints in the same manner, by the transmission of light from a reflected white ground.

Mr. Delaval observes, that even the colours of metals are produced in the same manner. Gold exhibits a white light tinged with yellow; this is grounded on an experiment of sir Isaac Newton, who says, that gold in a white light appears of the same colour as in the day-light, but that on intercepting a due quantity of the yellow-making rays, it will appear white like silver, which shews that its yellowness arises from an excess of the intercepted rays, tinging that whiteness with their colour when they are let pass through. A solution of silver is pellucid and colourless; a solution of gold transmits yellow, but reflects no colour. This metal, when united to glass, yields no colour by reflection, but only by transmission. All these circumstances seem to indicate, that the yellow colour of gold arises from a yellow transparent matter, which is a constituent part of that metal, and that is equally mixed with the white particles of the gold, and transmits the light reflected by them; in like manner as when silver is gilt, or foils are made by covering white metals with transparent colours. But these factitious coverings are only superficial, whereas the yellow matter of gold is diffused throughout the whole substance of the metal, and appears to envelop and cover each of the white particles; the yellow matter bears to the white about the same proportion that the yellow-making rays, which were intercepted, bear to all the other rays comprised in the white light of the sun.

It has been shewn by sir Isaac Newton, that when the spaces or interstices of bodies are replenished with media of different densities, the bodies are opake; that those superficies of transparent bodies reflect the greatest quantity of light, which intercede media that differ most in their refractive densities; and that the reflections of thin transparent substances are considerably stronger than those made by the same substances of a greater thickness. Hence the minute portion of air, or of the rarer medium, which occupies the pores or interstices of dense bodies, is a minute white substance. This is manifest in the whiteness of froth, and of all pellucid colourless substances, such as glass, crystal, or salts reduced to powder, or otherwise flawed; for in all these instances a white light is reflected from the air or rarer medium, which intercede the particles of the denser substance, whose interstices they possess. Hence also we see why white opake substances are rendered pellucid by being reduced to uniform masses, whose component parts are every where nearly of the same density; for as all pellucid substances are rendered opake and white by the admixture of pellucid colourless media, of considerably different densities, they are again deprived of their opacity, by extracting these media, which keep their particles at a distance from each other: thus froth and snow, when resolved into water, lose their whiteness, and assume their former pellucid appearance. In like manner the opake white earths are by proper fluxes reduced to pellucid colourless glass; because all reflections are made at the surfaces of bodies differing in density from the ambient medium, and in the confines of equally dense media there is no reflection.

As the calces of metals are capable of reflecting their colours by the intervention of air, so, when mixed with oil in making paints, they always assume a darker colour, because the excess of the density of oil over air forms a sensible difference, when comparatively considered with respect to the specific gravity of the rarer metals. From this cause perceptibly less light is reflected from the moleculæ of oil than those of air, and consequently the mass appears darker. The case is however different with such paints as are formed of the denser metals, as vermilion, minium, &c. for though oil differs very considerably from air in its specific density, yet it also differs very much in this respect from the denser metallic powders; and the moleculæ of oil, which divide their particles, act upon the light so strongly, that the reflection of light occasioned by them cannot be distinguished from those which are caused by rarer media. Hence, when we mix vermilion or minium with oil, the colour is not sensibly changed.

All those earths, which in their natural state are of a pure white, constitute transparent colourless media when vitrified with proper fluxes, or when dissolved in colourless menstrua; and the saline masses, obtainable from their solutions, are transparent and colourless, while they retain the water which is necessary to their crystallization, and are not flawed or reduced to powder; but after their pores and interstices are opened in such a manner as to admit the air, they become white and opake by the admittance of that rare medium. The earthy particles, which form the solid parts of bodies, generally exceed each other in density; consequently these particles, when contiguous to the rare media already mentioned, must reflect the rays of light with a force proportionate to their density. The reflective power of bodies does not depend merely upon their excess of density, but upon their difference of density with respect to the surrounding media. Transparent colourless particles, whose density is greatly inferior to that of the media they come between, also powerfully reflect all sorts of rays, and thereby become white; of this kind are the air, or other rare fluids, which occupy the interstices of liquors, and in general of all denser media, where such rare particles find access. Hence we may conclude, that white opake bodies are constituted by the union or contiguity of two or more transparent colourless media, differing considerably from each other in their reflective powers. Of these substances we have examples in frothy emulsions, or other imperfect combinations of pellucid liquors, as milk, snow, calcined or pulverized salts, glass or crystal reduced to powder, white earths, paper, linen, and even those metals which are called white by mineralogists; for those metals do not appear white unless their surfaces be rough; as in that case only there are interstices on their surface sufficient to admit the air, and thus make a reflection of a white and vivid light. The polished surfaces of metallic mirrors reflect the incident rays equally and regularly according to their several angles of incidence, so that the reflected rays do not interfere with each other, but remain separate and unmixed, and therefore distinctly exhibit their several colours. Hence it is evident, that white surfaces cannot act upon the light as mirrors, because all the rays which are reflected from them are blended in a disorderly and promiscuous manner.

The foregoing phenomena give us some insight into the nature and cause of opacity, as they clearly shew, that even the rarest transparent colourless substances, when their surfaces are adjacent to media differing greatly from them in refractive power, may thereby acquire a perfect opacity, and may assume a hue and resplendence similar to that of white metals; that the rarer pellucid substances

 cannot

cannot by the fight be diftinguifhed from the denfe opake metals; and this fimilarity to the furface of metals not only occurs, when from the roughnefs of their furfaces they refemble polifhed metals in whitenefs, but alfo when from their fmoothnefs they refemble the polifhed furface of metals.

It fhould feem, that metals confift entirely of tranfparent matter, and derive their apparent opacity and luftre folely from the copious reflection of light from their furfaces. The analogy between metals and tranfparent media, as far as concerns their optical properties, will appear plain from the following confiderations: 1. All metals diffolved in their proper menftrua are tranfparent. 2. By the union of two or more tranfparent media, fubftances are conftituted which are fimilar to metals in their opacity and luftre, as plumbago and marcafites. 3. The tranfparent fubftances of metals, as well as thofe of minerals, by their union with inflammable matter, acquire the ftrong reflective powers from which their luftre and opacity arife. 4. The furfaces of pellucid media, fuch as glafs or water, affume a metallic appearance, when by their fmoothnefs, difference of denfity with refpect to the contiguous media, or any other, they are difpofed copioufly to reflect the light.

It is plain from the foregoing confiderations, that opake fubftances are conftituted by the union or contiguity of tranfparent colourlefs media, differing from one another in their reflective powers; and that when the common furface, which comes between fuch media, is plane, equal, and fmooth, it reflects the incident rays equally and regularly as a mirror; but when their furface is rough and unequal, or divided into minute particles, it reflects the incident rays irregularly and promifcuoufly in different directions, and confequently appears white. When the interftitial vacuities of bodies are fo difpofed that the light can preferve its rectilinear courfe through them, fuch bodies appear luminous throughout, and are vifible in their internal fubftance; but when their conftitution is fuch as will not allow a free paffage to the light, they are then vifible only by thofe rays which are reflected from their furface, and their internal furface is cold and dark.

Sir Ifaac Newton found, on comparing the refractive power of different bodies, that inflammable fubftances poffefs it in a much greater degree than fuch as are not inflammable. From his obfervations on this fubject, he drew the wonderful conclufion, that the diamond contained a large quantity of inflammable matter; that water was an intermediate fubftance between inflammable and uninflammable bodies, and that it fupplied vegetables with the inflammable principle; which truths have been feen and demonftrated only in our own time. Subftances that are not tranfparent in their ordinary ftate, may be rendered fo either by relaxing their parts with heat, fo that the light may pafs through them more eafily, or by giving fome new direction, together with an additional force, to the matter of light. Mr. Hawkfbee was very much furprifed to find, that the fealing-wax, and the pitch, within fide a glafs globe, became fo tranfparent when the glafs was whirled about and rubbed with the hand, that the fingers might be plainly feen on the other fide through the coating. Oil is condenfed, when cold, into a fort of globules impervious to the light; but when thefe globules are diffolved, and opened by the action of caloric, the oil not only becomes tranfparent, but appears as bright and fhining as if the light were a natural part of its compofition. We know, that many heterogeneous fluids grow dark and muddy with cold, but that they may be foon clarified again by the application of a moderate heat: red port wine is fometimes as foul as if brick-duft was mixed with it, but will become bright and clear by the application of warmth.

Tranfparency is a quality given, by a wife ordination of Providence, to the fluid fubftance of water, which is fo neceffary to the life of all animals. Tranfparency renders glafs moft valuable; the value of gold is arbitrary, but the worth of glafs is intrinfic; its cleanlinefs and tranfparency recommend it to our ufe in the common arts of life; and render vifible the moft curious and fubtil proceffes of chemiftry and philofophy: in optics, it affifts the aged, and gives to man an infight into the wonders of the creation.—For the lateft *mathematical* inveftigation of the doctrine of light and colours; the method of producing the artificial rainbow; and many other entertaining and curious experiments, fee the article OPTICS.

CHRO'MATISM, *f.* [χρωματισμὸς, Gr.] The natural colour or tincture of any fubftance. With phyficians, it is the morbid difcolouration of the blood and animal juices.

CHRONHYO'METER, *f.* The time-rain gauge, invented by Landrianus.

CHRO'NIC, or CHRO'NICAL, *adj.* [from χρονος, time.] A term implying duration or continuance. In medicine, chronic diftempers are oppofed to acute.—Of difeafes fome are *chronical*, and of long duration; as dropfies, quartan agues, fcurvy, wherein we defer the cure unto more advantageous feafons. *Brown.*—See the article MEDICINE.

CHRO'NICLE, *f.* [*chronique*, Fr. from χρονος, Gr. time.] A regifter or account of events in the order of time:

No more of this;
For 'tis a *chronicle* of day by day. *Shakefpeare.*

A hiftory.—I give up to hiftorians the generals and heroes which crowd their annals, together with thofe which you are to produce for the Britifh *chronicle*. *Dryden.*

To CHRO'NICLE, *v. a.* To record in chronicle, or hiftory.—This to rehearfe, fhould rather be to *chronicle* times, than to fearch into reformation of abufes in Ireland. *Spenfer.*—To regifter; to record:

Love is your mafter, for he mafters you;
And he that is fo yoked by a fool,
Methinks fhould not be *chronicled* for wife. *Shakefpeare.*

CHRO'NICLER, *f.* A writer of chronicles; a recorder of events in order of time:

Here gathering *chroniclers*, and by them ftand
Giddy fantaftic poets of each land. *Donne.*

An hiftorian; one that keeps up the memory of things paft.—This cuftom was held by the druids and bards of our ancient Britons, and of latter times by the Irifh *chroniclers*, called rimers. *Raleigh.*

CHRO'NOGRAM, *f.* [χρονος, time, and γραφω, to write.] An infcription bearing the date of any action. Of this kind the following is an example:

Gloria laufque Deo fæCLorVM in fæcVla funto.

A *chronogrammatical* verfe, which includes not only this year, but numerical letters enough to reach above a thoufand years further. *Howell.*

CHRONOGRAMMA'TICAL, *adj.* Belonging to a chronogram.

CHRONOGRAM'MATIST, *f.* A writer of chronograms.—There are foreign univerfities, where, as you praife a man in England for being an excellent philofopher or poet, it is an ordinary character to be a great *chronogrammatift*. *Addifon.*

CHRONO'LOGER, *f.* [χρονος, time, and λογος, doctrine.] He that ftudies or explains the fcience of computing paft time, or of ranging paft events according to their proper years.—*Chronologers* differ among themfelves about moft great epochas. *Holder.*

CHRONOLO'GICAL, *adj.* Relating to the doctrine of time.—Thus much touching the *chronological* account of fome times and things paft, without confining myfelf to the exactnefs of years. *Hale.*

CHRONOLO'GICALLY, *adv.* In a chronological manner; according to the laws or rules of chronology; according to the exact feries of time.

CHRONO'LOGIST, *f.* One that ftudies or explains time; one that ranges paft events according to the order of

of time; a chronologer.—According to these *chronologists*, the prophecy of the Rabin, that the world should last but six thousand years, has been long disproved. *Brown.*

CHRONO'LOGY, *s.* [*chronologie*, Fr. *chronologia*, Lat. from χρονος, time, and λογος, doctrine, or discourse.] A scientific method of ascertaining or computing time, from the commencement of some given event, to the completion or fulfilment of another; with the doctrine of dates, eras, epochs, &c. coincident therewith. Like HISTORY, it opens through a great avenue to an expanded view of all human affairs, and connects and illumines the most dark and distant revolutions of the world. Yet it is to be lamented, that many and insuperable difficulties arise, in ascertaining the dates and periods of antiquity; concerning which much controversy and difference of opinion has arisen. "All nations," says sir Isaac Newton, "before they began to keep exact records of time, seem to have been led away by the false pride of heightening their antiquity, and of ascribing their origin to some divinity, or renowned prince, often known only in fable, and handed down by legendary tradition." On this account, sir Isaac found himself constrained to deviate widely from the beaten path of former writers, in fixing the dates of facts preceding the war between the Greeks and Persians: "yet so affixing them," says he, "as to make chronology suit with the course of nature, with astronomy, with SACRED history, and with itself."

Where, and about what time, chronology first assumed the form of a regular science, may be easily pointed out. Polybius is of opinion, that Ephorus of Cumæ, the historian, was the first who attempted it, under the form of an universal history; and he flourished in the days of Philip of Macedon, about 350 years before Christ; but nothing satisfactory upon this subject seems to have appeared till after the days of his son Alexander; and so late, indeed, as towards the close of the reign of Ptolemy Philadelphus, about the middle of the third century before Christ: and the true reason of it seems to be, that before the conquests of Alexander, the Greeks had very scanty materials for such a work; as their knowledge was confined to the transactions of a narrow tract of country, and to the annals of a short period of time. For their travellers could not easily import the historical memoirs of the countries through which they passed; because such an undertaking would have required many advantages of which they were seldom masters: such as, a thorough knowledge of the language of the country, a free access to all their principal records, and a perseverance in such application for a long series of years. Even cruel and relentless wars, among their fatal calamities, have to such a work as this produced some accidental good consequences, by the opportunities they afford of observing the situation, nature, and improvements, of other nations; by which the progress of learning, and of many useful arts, has been the more easily propagated into different countries.

Strabo tells us, "that the Greeks received great advantages in their knowledge of geography, from the conquests of Alexander; for by his means they became more perfectly acquainted with the larger tracts of Asia, and all the northern parts of Europe, to the river Ister;" and he might have mentioned too the whole extent of Egypt; so that, at one and the same time, they came to the full possession of Babylon and Egypt, the two great fountains of ancient learning. "The Romans," says he, "in like manner, opened the same light over the western parts of Europe, up to the river Elbe, which divided Germany into two parts; and they went beyond the Ister even to the Tyra; and as for the countries round the lake Mœotis, and the sea-coast to Colchis, they were undiscovered, till the days of Mithridates, surnamed Eupator, king of Pontus; and the Parthian empire made Hyrcania, Bactria, and the Scythians that lived beyond them, to be better known." We may therefore take for granted, that no general history could be properly composed, till the geography of these countries was sufficiently known, in order to describe the strength of each particular kingdom, the number of its inhabitants, the progress of its armies, or the provinces that might be lost or acquired, in its quarrels with other kingdoms. But whenever the access to all these countries was laid open by the conquests of Alexander; when so many new kingdoms were established under the Macedonian government, into which the citizens of all the Greek states were freely admitted; when it extended the Greek tongue, as an universal language, over Asia and Egypt; it gave the most favourable opportunity to several eminent men to write the histories of different nations. Berosus compiled the history of Chaldea, from the records of Babylon; and Manetho that of Egypt, from the records of Memphis and of Thebes; and the Arundelian Marbles gave a complete series of the annals of Greece, from their earliest times; all of which were composed in that age, by cotemporary writers. And when we add to this, that the great library of Alexandria was first formed under Ptolemy Philadelphus, into which the writings of all nations were collected, we may safely conclude from so many united particulars, that it was then, and not before, that universal chronology became a science.

The more attentively we consider the situation of the world at this time, the more we shall be convinced of the truth of this assertion. For till there was a collection of proper materials brought together, such as the manuscripts of all nations must contain, it was impossible to separate the truth of history from the rubbish of fable; because facts are only to be canvassed from a multitude of circumstances, which combine together to give light to each other, while the cotemporary history of one country corresponds to the cotemporary state of another. And as a library was necessary to furnish the materials for this purpose, so we find, that the first great father of chronology was Eratosthenes, the librarian of Alexandria, who had the command of all that treasury of learning. For the possession of such a multitude of historical memoirs both prompted and enabled him to determine the dates of many distant facts. And we are informed by Dionysius of Halicarnassus, that, in the execution of this work, he had laid down to himself certain chronological canons, which that great critic declares, he found to be accurate and uncorrupted, having examined them, in a treatise written purposely upon that subject, though, to the great misfortune of the learned world, it is now lost.

The most ancient data for the measurement of time, appear to have been the returns of the seasons, and the generations of families. The succession of Juno's priestesses at Argos served Hellanicus for the regulation of his narrative; while Ephorus reckoned time by generations. In Herodotus and Thucydides, there are no regular dates for the events recorded; but Eratosthenes and Apollodorus digested the events related by them, according to the succession of the Olympiads, and of the Spartan kings. The chronology of the Latins is more uncertain: the records of the Romans were destroyed by the Gauls; and Fabius Pictor, the most ancient of their historians, was obliged to borrow the chief part of his information from the Greeks. In other European nations the chronology is still more imperfect, though of a later date: and even in modern times a considerable degree of confusion and inaccuracy has arisen, from the want of attention among historians to ascertain the dates and epochs with precision. Hence is seen how necessary a proper system of chronology must be for the right understanding of history, and also how difficult it is to establish such a system. For this purpose, however, several learned men have spent much time, particularly Julius Africanus, Eusebius of Cæsarea, George Cyncelle, John of Antioch, Dennis, Petau, Clavius, Calvisius, Scaliger, Vieta, Newton, Usher, Simson, Brown, Marsham, Helvicus, Vossius, Strauchius, Blair, Playfair, and Walker. Their researches for the accomplishment of so valuable a system, have been founded, 1st. On astronomical observations, especially of the eclipses of

of the sun and moon, combined with calculations of the years and eras of different nations. 2d. The testimonies of credible, authentic, and unimpeached, authors. 3d. Such epochs in history as are so well attested and determined, that they have never been controverted. 4th. Ancient medals, coins, monuments, and inscriptions; which serve in general as so many land-marks to regulate further enquiries.

The most obvious division of time, in all ages and countries, is to be referred to the apparent or real revolutions of the sun and moon. Thus, the apparent revolution of the sun, or the real rotation of the earth on her axis causing the sun to appear to rise and set, constitutes the vicissitudes of day and night, which must be evident to the most barbarous and ignorant nations. The moon, by her revolution about the earth, and her changes, as naturally and obviously forms months; while the great annual course of the sun through the several constellations of the zodiac, points out the larger division of the year.

Of the COMMON DIVISIONS of TIME.

Time itself is only a succession of phenomena in the universe; or a mode of duration marked by certain periods. "Our idea of time in general," says Mr. Locke, "is formed by considering any part of infinite duration, as set out by periodical measures: the idea of any particular time, or length of duration, we acquire first by observing certain appearances at regular and seemingly equidistant periods. Thus, by being able to repeat these lengths or measures of time as often as we will, we can imagine duration, where nothing really endures or exists; and hence we imagine to-morrow, or next year," &c. Some philosophers define time to be, the duration of a thing whose existence is neither without beginning nor end; and by this, *time* is distinguished from *eternity*. The most familiar portions or measures of time, are its subdivisions into hours, days, weeks, months, and years; but as these have varied considerably in different ages and countries, it becomes the business of chronology to investigate and explain them.

An *hour*, is the aliquot part of a natural day, usually the twenty-fourth, but sometimes a twelfth part. With us, it is the twenty-fourth part of the earth's diurnal rotation, or the time from noon to noon, and therefore it answers to fifteen degrees of the whole circle of longitude, or of 360 degrees. The hour is divided by sixtieths, viz. first into sixty minutes, then each minute into sixty seconds, &c. The division of time into hours is very ancient; as is shewn by Kircher, Œdip. Ægypt. tom. 2. part. 2. The most ancient hour is that of the twelfth part of the day. Herodotus observes, that the Greeks learnt from the Egyptians, among other things, the method of dividing the day into twelve parts; and the astronomers of Cathaya still retain this method. The division of the day into twenty-four hours, was not known to the Romans before the Punic war. Till that time they only regulated their days by the rising and setting of the sun. They divided the twelve hours of their day into four; viz. prime, which commenced at six o'clock; third at nine; sixth at twelve, and none at three. They also divided the night into four watches, each containing three hours.

Sometimes hours are divided into *equal* and *unequal*. *Equal hours*, are the twenty-fourth parts of a day and night precisely; that is, the time in which the fifteen degrees of the equator pass the meridian. These are also called equinoctial hours, because measured on the equinoctial; and astronomical, because used by astronomers.—*Astronomical hours*, are equal hours, reckoned from noon to noon, in a continued series of twenty-four.—*Babylonish hours*, are equal hours, reckoned from sun-rise in a continued series of twenty-four.—*European hours*, used in civil computation, are equal hours, reckoned from midnight; twelve from thence till noon, and twelve more from noon till midnight.—*Jewish*, or *planetary*, or *ancient hours*, are twelfth parts of the artificial day and night. They are called ancient or Jewish hours, because used by the ancients, and still among the Jews. They are called planetary hours, because the astrologers pretend, that a new planet comes to predominate every hour; and that the day takes its denomination from that which predominates the first hour of it; as Monday from the moon, &c.—*Italian hours*, are equal hours, reckoned from sun-set, in a continued series of twenty-four.—*Unequal* or *temporary hours*, are twelfth parts of the artificial day and night. The obliquity of the sphere renders these more or less unequal at different times; so that they only agree with the equal hours at the times of the equinoxes.

The next measure of time above or superior to the hour, is that of the *day*; which is either *natural*, or *artificial*. The *artificial day* is that which is primarily meant by the word *day*, and is the time of its being light, or the time while the sun is above the horizon. Though sometimes the twilight is included in the term day-light; in opposition to night or darkness, being the time from the end of twilight to the beginning of day-light. The *natural day* is the portion of time in which the earth makes a rotation on its axis. And this is either astronomical, or civil. *Astronomical day* begins at noon, or when the sun's center is on the meridian, and is counted twenty-four hours to the following noon. *Civil day* is the time allotted for day in civil purposes, and begins differently in different nations, but still including one whole rotation of the earth on its axis; beginning either at sun-rise, sun-set, noon, or midnight. 1st. At sun-rising, among the ancient Babylonians, Persians, Syrians, and most other eastern nations, with the present inhabitants of the Balearic islands, the Greeks, &c. 2dly. At sun-setting, among the ancient Athenians and Jews, with the Austrians, Bohemians, Marcomanni, Silesians, and modern Italians. 3dly. At noon, with astronomers, and the ancient Umbri and Arabians. And, 4thly, at midnight, among the Egyptians, Chinese, and Romans, with the modern English, French, Dutch, Germans, Spaniards, and Portuguese. The different length of the natural day in different climates, has been matter of controversy, viz. whether the natural days be all equally long throughout the year; and if not, what their difference is? A professor of mathematics at Seville, in the Philos. Trans. vol. x. p. 425. asserts, from a continued series of observations for three years, that they are all equal. But Mr. Flamsteed, in the same Trans. p. 429. refutes the opinion; and shews that one day, when the sun is in the equinoctial, is shorter than when he is in the tropics, by forty seconds; and that fourteen tropical days are longer than so many equinoctial ones, by ten minutes. This inequality of the days flows from two distinct principles: the one, the eccentricity of the earth's orbit; the other, the obliquity of the ecliptic with regard to the equator, which is the true measure of time: but as these two causes happen to be differently combined, the length of the day is varied.

The next division of time beyond the day, is that of *weeks*, which comprises seven days. The origin of this division, or of computing time by sevenths, is much controverted. It has often been thought to have taken its rise from the four quarters or intervals of the moon, between her changes of phases, which, being about seven days distant, gave occasion to the division: but others more probably, from the seven planets. Be this as it may, the division is certainly very ancient. The Syrians, Egyptians, and most of the oriental nations, appear to have used it from the earliest ages: though it did not get footing in the west till brought in by Christianity. The Romans reckoned their days not by sevenths, but by ninths; and the ancient Greeks by decads, or tenths; in imitation of which the new French calendar seems to have been framed. The Jews divided their time by weeks, of seven days each, as prescribed by the law of Moses; in which they were appointed to work six days, and to rest the seventh, in commemoration of the creation. This method was in use in the days of Hesiod; but it was not until

until several ages had elapsed, that the use of weeks was received into Greece. We are told by sir George Staunton, that the Chinese are still unacquainted with the week of seven days, but divide the year into six parts, of sixty days each. The week was likewise unknown to the ancient Persians and to the Mexicans; the former having a different name for every day of the month, and the latter making use of a cycle of thirteen days. It is remarkable, that one day in the week has been accounted sacred by almost every nation. Thus Saturday was consecrated to pious purposes among the Jews, Friday by the Turks, Tuesday by the Africans of Guinea, and Sunday by the Christians. Hence also the origin of *feriæ*, or holidays, frequently made use of in systems of chronology. The Chinese, however, being unacquainted with the week of seven days, have no idea of a sabbath, or day of rest.

The next division of time superior to weeks, is that of *months*. This appears to have been, if not coeval with the creation, at least in use before the flood. As this division is naturally pointed out by the revolution of the moon, the months of all nations were originally lunar; until after some considerable advances had been made in science, the revolutions of that luminary were compared with the sun, and thus the limits of the month fixed with greater accuracy. The division of the year into twelve months, as being founded on the number of full revolutions of the moon in that time, has also been very general; though sir John Chardin informs us, that the Persians divided the year into twenty-four months; and the Mexicans into eighteen months of twenty days each. The months generally contained thirty days, or twenty-nine and thirty days alternately; though this rule was far from being without exception. The months of the Latins consisted of sixteen, eighteen, twenty-two, or thirty-six, days; and Romulus gave his people a year of ten months and 304 days. The Kamtschatkadales divide the year into ten months; reckoning the time proper for labour to be nine months, and the winter season, when they are obliged to remain inactive, only as one month.

The *lunar* month is either illuminative, periodical, or synodical. *Illuminative month*, is the interval between the first appearance of one new moon and that of the next following. As the moon appears sometimes sooner after one change than after another, the quantity of the illuminative month is not always the same. The Turks and Arabs reckon by this month. *Lunar periodical month*, is the time in which the moon runs through the zodiac, or returns to the same point again; the quantity of which is 27 d. 7 h. 43 m. 8 s. *Lunar synodical month*, called also a *lunation*, is the time between two conjunctions of the moon with the sun, or between two new moons; the quantity of which is 29 d. 12 h. 44 m. 3 s. 11 thirds. The ancient Romans used lunar months, and made them alternately of twenty-nine and thirty days: they marked the days of each month by three terms, viz. Calends, Nones, and Ides; which see under their respective names. *Solar month*, is the time in which the sun runs through one entire sign of the ecliptic, the mean quantity of which is 30 d. 10 h. 29 m. 5 s. being the twelfth part of 365 d. 5 h. 49 m. our mean solar year. *Astronomical* or *natural month*, is that measured by some exact interval corresponding to the motion of the sun or moon. Such are the lunar and solar months above-mentioned. *Civil* or *common month*, is an interval of a certain number of whole days, approaching nearly to the quantity of some astronomical month. These may be either lunar or solar. The *civil lunar month*, consists alternately of twenty-nine and thirty days. Thus will two civil months be equal to two astronomical ones, abating for the odd minutes; and so the new moon will be kept to the first day of such civil months for a long time together. This was the month in civil or common use among the Jews, Greeks, and Romans, till the time of Julius Cæsar. The *civil solar month*, consisted alternately of thirty and thirty-one days, excepting one month of the twelve, which consisted only of twenty-nine days, but every fourth year of thirty days. And this form of civil months was introduced by Julius Cæsar. Under the emperor Augustus, the sixth month, till then from its place called Sextilis, received the name Augustus, now August, in honour of that prince; and, to make the compliment still the greater, a day was added to it, which made it consist of thirty-one days, though till then it had only contained thirty days; to compensate for which, a day was taken from February, making it consist of twenty-eight days, and twenty-nine every fourth year: and such are the civil or calendar months now used throughout Europe.

The highest or ultimate familiar division of time, is into *years*; and of these there are divers measurements or denominations. The *solar year*, properly, and by way of eminence, so called, is the space of time in which the sun moves through the twelve signs of the ecliptic. This, by the observations of the best modern astronomers, contains 365 d. 5 h. 48 m. 48 s. the quantity assumed by the authors of the Gregorian calendar is 365 d. 5 h. 49 m. But, in the civil or popular account, this year only contains 365 days; except every fourth year, which contains 366. The vicissitude of seasons seems to have given occasion to the first notice or institution of the solar year. Man, naturally curious to know the cause of that diversity, soon found it was the proximity and distance of the sun; and therefore gave the name *year* to the space of time in which that luminary performed his whole course, by returning to the same point of his orbit. According to the accuracy in their observations, the year of some nations was more perfect than that of others, but none of them quite exact, nor whose parts did not shift with regard to the parts of the sun's course. According to Herodotus, it was the Egyptians who first formed the year, making it to contain 360 days, which they subdivided into twelve months, of thirty days each. Mercury Trismegistus added five days more to the account. And on this footing it is said that Thales instituted the year among the Greeks; though that form of the year did not hold throughout all Greece. Also the Jewish, Syrian, Roman, Persian, Ethiopic, Arabic, &c. years, were all different. In fact, considering the imperfect state of astronomy in those ages, it is no wonder that different people should disagree in the calculation of the sun's course.

The solar year is either *astronomical* or *civil*. The *astronomical solar year*, is that which is determined precisely by astronomical observations; and is of two kinds, *tropical*, and *sidereal* or *astral*. *Tropical* or *natural year*, is the time the sun takes in passing through the zodiac; which, as before observed, is 365 d. 5 h. 48 m. 48 s. or 365 d. 5 h. 49 m. This is the only true or natural year, because it always keeps the same seasons to the same months. *Sidereal* or *astral year*, is the space of time the sun takes in passing from any fixed star, till his return to it again: this consists of 365 d. 6 h. 9 m. 17 s. being 20 m. 29 s. longer than the true solar year.

The *lunar year* is the space of twelve lunar months. Hence, from the two kinds of synodical lunar months, there arise two kinds of lunar years; the one *astronomical*, the other *civil*. *Lunar astronomical year* consists of twelve lunar synodical months; and therefore contains 354 d. 8 h. 48 m. 38 s. and is therefore 10 d. 21 h. 0 m. 10 s. shorter than the solar year; a difference which is the foundation of the epact. *Lunar civil year*, is either common or embolismic. The *common lunar year* consists of twelve lunar civil months, and therefore contains 354 days; and the *embolismic*, or *intercalary lunar year*, consists of thirteen lunar civil months, and therefore contains 384 days. Thus far we have considered years and months, with regard to astronomical principles, upon which the division is founded. By this the various forms of civil years that have formerly obtained, or that do still obtain, in divers nations, are to be examined.

The *civil year*, is that form of year which every nation has contrived or adopted, for computing their time by. Or

Or the civil is the tropical year, considered as only consisting of a certain number of whole days; the odd hours and minutes being set aside, to render the computation of time, in the common occasions of life, more easy. As the tropical year is 365d. 5h. 49m. or almost 365d. 6h. which is 365 days and a quarter; therefore if the civil year be made 365 days, every fourth year it must be 366 days, to keep nearly to the course of the sun. And hence the civil year is either *common*, or *bissextile*. The *common civil year*, is that consisting of 365 days; having seven months of thirty-one days each, four of thirty days, and one of twenty-eight days. *Bissextile*, or *leap year*, consists of 366 days; having one day extraordinary, called the intercalary or bissextile day, and takes place every fourth year. This additional day to every fourth year, was first introduced by Julius Cæsar, who, to make the civil years keep pace with the tropical ones, contrived that the six hours which the latter exceeded the former, should make one day in four years, and be added between the 24th and 23d of February, which was their sixth of the calends of March; and as they then counted this day twice over, or had *bis sexto calendas*, hence the year itself came to be called *bis sextus*, and *bissextile*. However, among us, the intercalary day is not introduced by counting the 23d of February twice over, but by adding a day at the end of that month, which therefore in that year contains twenty-nine days.

The *civil* or *legal year*, in England, formerly commenced on the day of the Annunciation, or 25th of March; though the historical year began on the day of the Circumcision, or 1st of January, on which day the German and Italian year also begins. The part of the year between these two terms was then usually expressed both ways: as 1745-6, or 174$\frac{5}{6}$. But by the act for altering the stile, the civil year now commences with the 1st of January.

The *ancient Roman year*, was the lunar year, which, as first settled by Romulus, contained only ten months, of unequal numbers of days, in the following order, viz. March thirty-one, April thirty, May thirty-one, June thirty, Quintilis thirty-one, Sextilis thirty, September thirty, October thirty-one, November thirty, December thirty, in all 304 days; which came short of the true lunar year by fifty days, and of the solar by sixty-one days. Hence, the beginning of Romulus's year was vague, and unfixed to any precise season; to remove which inconvenience, that prince ordered so many days to be added yearly as would make the state of the heavens correspond to the first month, without calling them by the name of any month. Numa Pompilius corrected this irregular constitution of the year, by composing two new months, January and February, of the days that were used to be added to the former year. Thus Numa's year consisted of twelve months, of different days, as follow, viz. January twenty-nine, February twenty-eight, March thirty-one, April twenty-nine, May thirty-one, June twenty-nine, Quintilis thirty-one, Sextilis twenty-nine, September twenty-nine, October thirty-one, November twenty-nine, December twenty-nine, in all 355 days; therefore exceeding the quantity of a lunar civil year by one day; that of a lunar astronomical year by 15h. 11m. 22s. but falling short of the true solar year by ten days; so that its beginning was still vague and unfixed. Numa, however, desiring to have it begin at the winter solstice, ordered twenty-two days to be intercalated in February every second year, twenty-three every fourth, twenty-two every sixth, and twenty-three every eighth, year. But this rule failing to keep time even, recourse was had to a new way of intercalating; and instead of twenty-three days every eighth year, only fifteen were to be added. The care of the whole was committed to the pontifex maximus; who however, neglecting the trust, let things run to great confusion. And thus the Roman year stood till Julius Cæsar reformed it; which see under CALENDAR. And for the manner of reckoning the days of the Roman months, see CALENDS, NONES, and IDES:—The *Julian year* is in effect a solar year, commonly containing 365 days; though every fourth year, called *bissextile*, contains 366. The months of the Julian year, with the number of their days, stood thus: January thirty-one, February twenty-eight, March thirty-one, April thirty, May thirty-one, June thirty, July thirty-one, August thirty-one, September thirty, October thirty-one, November thirty, December thirty-one. But every bissextile year had a day added in February, making it then to contain twenty-nine days. The mean quantity therefore of the Julian year is 365$\frac{1}{4}$ days, or 365d. 6h. exceeding the true solar year by somewhat more than eleven minutes; an excess which amounts to a whole day in almost 131 years. Hence the times of the equinoxes go backward, and fall earlier by one day in about 130 or 131 years. And thus the Roman year stood, till it was farther corrected by pope Gregory. For settling this year, Julius Cæsar brought over from Egypt Sosigenes, a celebrated mathematician; who, to supply the defect of sixty-seven days, which had been lost through the neglect of the priests, and to bring the beginning of the year to the winter solstice, made one year to consist of fifteen months, or 445 days; on which account that year was used to be called *annus confusionis*, the year of confusion.

The *Gregorian year* is the Julian year corrected by this rule, viz. that instead of every secular or hundredth year being a bissextile, as it would be in the former way, in the new way three of them are common years, and only the fourth is bissextile. The error of eleven minutes in the Julian year, by continual repetition, had accumulated to an error of thirteen days from the time when Cæsar made his correction; by which means the equinoxes were greatly disturbed. In the year 1582, the equinoxes were fallen back ten days, and the full moons four days, more backward than they were in the time of the Nicene council, which was in the year 325; viz. the former from the 20th of March to the 10th, and the latter from the 5th to the 1st of April. To remedy this increasing irregularity, pope Gregory XIII. in the year 1582, called together the chief astronomers of his time, and concerted this correction, throwing out the ten days above-mentioned. He exchanged the lunar cycle for that of the epacts, and made the 4th of October of that year to be the 15th; by that means restoring the vernal equinox to the 21st of March. It was also provided, by the omission of three intercalary days in 400 years, to make the civil year keep pace nearly with the solar year, for the time to come. See CALENDAR.

In the year 1700, the error of ten days was grown to eleven; upon which, the protestant states of Germany, to prevent farther confusion, adopted the Gregorian correction. And the same was accepted also in England in the year 1752, when eleven days were thrown out after the 2d of September that year, by accounting the 3d to be the 14th day of the month; calling this the *new stile*, and the former the *old stile*. And the Gregorian, or new stile, is now in like manner used in most countries of Europe. Yet this last correction is still not quite perfect; for as it has been shewn that in four centuries the Julian year gains 3d. 2h. 40m. and as it is only the three days that are kept out of the Gregorian year, there is still an excess of 2h. 40m. in four centuries, which amounts to a whole day in thirty-six centuries, or in 3600 years. The year 1800, which in its order would have been leap-year, was made a common year.

The *Egyptian year*, called also the *year of Nabonassar*, on account of the era of Nabonassar, is the solar year of 365 days, divided into twelve months, of thirty days each, beside five intercalary days, added at the end. The order and names of these months are as follow: 1. Thoth; 2. Paophi; 3. Athyr; 4. Chojac; 5. Tybi; 6. Mechir; 7. Phamenoth; 8. Pharmuthi; 9. Pachon; 10. Pauni; 11. Epiphi; 12. Mesori. As the Egyptian year, by neglecting the six hours, in every four years loses a whole day

day of the Julian year, its beginning runs through every part of the Julian year in the space of 1460 years; after which, they meet again; for which reason it is called the *erratic year*. And because this return to the same day of the Julian year is performed in the space of 1460 Julian years, this cycle is called the Sothic period. This year was applied by the Egyptians to civil uses, till Anthony and Cleopatra were defeated; but the mathematicians and astronomers used it till the time of Ptolomy, who made use of it in his Almagest; so that the knowledge of it is of great use in astronomy, for comparing the ancient observations with the modern. The ancient Egyptians, we are told by Diodorus Siculus, (Plutarch, lib. 1. in the life of Numa; and Pliny, lib. 7. cap. 48.) measured their years by the course of the moon. At first they were only one month, then three, then four, like that of the Arcadians; and then six, like that of the people of Acarnania. Those authors add, that it is on this account that they reckon such a vast number of years from the beginning of the world; and that in the history of their kings, we meet with some who lived 1000 years, or 1200 years. The same thing is maintained by Kircher, (Œdip. Egypt. tom. 2. p. 252.) And a late author observes, that Varro has affirmed the same of all nations, that has been quoted of the Egyptians. By this means many account for the great ages of the ancient patriarchs; expounding the gradual decrease in their ages, by the successive increase of the number of months in their years. Upon the Egyptians being subdued by the Romans, they received the Julian year, though with some alteration; for they still retained their ancient months, with the five additional days, and every fourth year they intercalated another day, for the six hours, at the end of the year, or between the 28th and 29th of August. Also, the beginning of their year, or the first day of the month Thoth, answered to the 29th of August of the Julian year, or to the 30th if it happened to be leap-year.

The *ancient Greek year* was a lunar year, consisting of twelve months, which at first had each thirty days, then alternately twenty-nine and thirty days, computed from the first appearance of the new moon; with the addition of an embolismic month of thirty days, every third, fifth, eighth, eleventh, fourteenth, sixteenth, and nineteenth, year of a cycle of nineteen years; in order to keep the new and full moons to the same terms or seasons of the year. Their year commenced with that new moon which was nearest to the summer solstice. And the order of the months, with the number of their days, were as follow: 1. Εκατομβαιων, of twenty-nine days; 2. Μηταγειτνιων, thirty; 3. Βοηδρομιων, twenty-nine; 4. Μαιμακτηριων, thirty; 5. Πυανεψιων, twenty-nine; 6. Ποσειδεων, thirty; 7. Γαμηλιων, twenty-nine; 8. Ανθεστηριων, thirty; 9. Ελαφηβολιων, twenty-nine; 10. Μουνυχιων, thirty; 11. Θαργηλιων, twenty-nine; 12. Σκιροφοριων, thirty. But many of the Greek nations had other names for their months.

The *ancient Jewish year* is a lunar year, usually consisting of eleven months, containing alternately thirty and twenty-nine days; and it was made to agree with the solar year, by adding eleven, and sometimes twelve, days, at the end of the year, or by an embolismic month. The order and quantities of the months were as follow: 1. Nisan, or Abib, thirty days; 2. Jiar, or Zius, twenty-nine; 3. Siban, or Sievan, thirty; 4. Thamuz, or Tamuz, twenty-nine; 5. Ab, thirty; 6. Elul, twenty-nine; 7. Tisri, or Ethanim, thirty; 8. Marchesvam, or Bul, twenty-nine; 9. Cisleu, thirty; 10. Tebeth, twenty-nine; 11. Sabat, or Schebeth, thirty; 12. Adar, thirty in the embolismic year, but twenty-nine in the common year. In the defective year, Cisleu was only twenty-nine days; and in the redundant year, Marchesvam was thirty. The *modern Jewish year* is likewise lunar, consisting of twelve months in common years, but of thirteen in embolismic years; which, in a cycle of nineteen years, are the third, sixth, eighth, eleventh, fourteenth, seventeenth, and nineteenth. Its beginning is fixed to the new moon next after the autumnal equinox. The names and order of the months, with the number of the days, are as follow: 1. Tisri, thirty days; 2. Marchesvan, twenty-nine; 3. Cisleu, thirty; 4. Tebeth, twenty-nine; 5. Schebeth, thirty; 6. Adar, twenty-nine; 7. Veadar, in the embolismic year, thirty; 8. Nisan, thirty; 9. Ilar, twenty-nine; 10. Sivan, thirty; 11. Thamuz, twenty-nine; 12. Ab, thirty; 13. Elul, twenty-nine.

The *Syrian year* is a solar one, having its beginning fixed to the beginning of October in the Julian year; from which it only differs in the names of the months, the quantities being the same, as follow: 1. Tishrin, answering to our October, and containing thirty-one days; 2. Latter Tishrin, containing, like November, thirty days; 3. Canun, thirty-one; 4. Latter Canun, thirty-one; 5. Shabat, twenty-eight, or twenty-nine in a leap-year; 6. Adar, thirty-one; 7. Nisan, thirty; 8. Aiyar, thirty-one; 9. Haziram, thirty; 10. Thamuz, thirty-one; 11. Ab, thirty-one; 12. Elul, thirty. The *Persian year* is also a solar one of 365 days, consisting of twelve months of thirty days each, with five intercalary days added at the end. The months are as follow: 1. Afrudia meh; 2. Ardihascht meh; 3. Cardi meh; 4. Thir meh; 5. Merded meh; 6. Schabarir meh; 7. Mehar meh; 8. Aben meh; 9. Adar meh; 10. Di meh; 11. Behen meh; 12. Asfirer meh. This year is the same as the Egyptian Nabonassarean, and is called the *yezdegerdic year*, to distinguish it from the fixed solar year, called the *Gelalean year*, which the Persians began to use in the year 1079, and which was formed by an intercalation, made six or seven times in four years, and then once in every fifth year.

The *Arabic*, *Mahometan*, and *Turkish*, *year*, called also the *year of the Hegira*, is a lunar year, equal to 354 d. 8 h. 48 m. and consists of twelve months, containing alternately thirty and twenty-nine days; though sometimes it contains thirteen months, the names, &c. being as follow: 1. Muharram, of thirty days; 2. Saphar, twenty-nine; 3. Rabia, thirty; 4. Latter Rabia, twenty-nine; 5. Jomada, thirty; 6. Latter Jomada, twenty-nine; 7. Rajab, thirty; 8. Shaaban, twenty-nine; 9. Ramadan, thirty; 10. Shawal, twenty-nine; 11. Dulkaadah, thirty; 12. Dulheggia, twenty-nine, but in the embolismic year thirty. An intercalary day is added every second, fifth, seventh, tenth, thirteenth, fifteenth, eighteenth, twenty-first, twenty-fourth, twenty-sixth, twenty-ninth, in a cycle of twenty-nine years. The months commence with the first appearance of the new moons after the conjunctions. The *Ethiopic year* is a solar year perfectly agreeing with the Actiac, except in the names of the months, which are, 1. Mascaram; 2. Tykympt; 3. Hydar; 4. Tysbas; 5. Tyr; 6. Jacatil; 7. Magabit; 8. Mijazia; 9. Ginbat; 10. Syne; 11. Hamel; 12. Hahase. Intercalary days, five. It commences with the Egyptian year, on the 29th of August of the Julian year.

The *epact* is the excess of the solar month above the lunar synodical month; or of the solar year above the lunar year of twelve synodical months; or of several solar months above as many synodical months; or of several solar years above as many dozen of synodical months. The epacts then are either annual or menstrual. *Menstrual epacts*, are the excesses of the civil calendar month above the lunar month. Suppose, for example, it were new moon on the first day of January; then, since the month of January contains thirty-one days, and the lunar month 29 d. 12 h. 44 m. 3 s. the menstrual epact is 1 d. 11 h. 15 m. 57 s. *Annual epacts*, are the excesses of the solar year above the lunar. Hence, as the Julian solar year is 365 d. 6 h. 0 m. 0 s. and the Julian lunar year 354 d. 8 h. 48 m. 38 s. the annual epact will be 10 d. 21 h. 11 m. 22 s. that is, almost 11 days. Consequently the epact of two years is 22 days; of three years, 33 days; or rather 3, since 30 days make an embolismic or intercalary month. Then, adding still 11, the epact of four years is 14 days; and so of the rest, as in the following table, where they do not become 30, or 0 again, till the nineteenth

nineteenth year; so that at the twentieth year the epact is 11 again; and hence the cycle of epacts expires with the golden number, or lunar cycle of nineteen years, and begins with the same again.

TABLE OF JULIAN EPACTS.					
Golden Numb.	Epacts.	Golden Numb.	Epacts	Golden Numb.	Epacts.
I	11	VIII	28	XV	15
II	22	IX	9	XVI	26
III	3	X	20	XVII	8
IV	14	XI	1	XVIII	19
V	25	XII	12	XIX	30
VI	6	XIII	23		or 0
VII	17	XIV	4		

Again, as the new moons are the same, or fall on the same day, every nineteen years, so the difference between the solar and lunar years is the same every nineteen years. And because the said difference is always to be added to the lunar year, to adjust or make it equal to the solar year; hence the said difference respectively belonging to each year of the moon's cycle, is called the *epact of the said year*, that is, the number to be added to the said year, to make it equal to the solar year. Upon this mutual respect between the cycle of the moon and the cycle of the epacts, is founded the following *Rule for finding the Julian epact, belonging to any year of the moon's cycle*:— Multiply the golden number, or the given year of the moon's cycle, by 11, and the product will be the epact if it be less than 30; but if it exceed 30, then throw out as many 30's as the product contains, and the remainder will be the epact.

Rule to find the Gregorian epact.—1st, The difference between the Julian and Gregorian years being equal to the difference between the solar and lunar year, or 11 days, therefore the Gregorian epact for any year is the same with the Julian epact for the preceding year; and hence the Gregorian epact will be found, by subtracting 1 from the golden number, multiplying the remainder by 11, and rejecting the 30's. This rule will serve till the year 1900; but after that year, the Gregorian epact will be found by this rule: Divide the centuries of the given year by 4; multiply the remainder by 17; then to this product add 43 times the quotient, and also the number 86, and divide the whole sum by 25, reserving the quotient: next multiply the golden number by 11, and from the product subtract the reserved quotient, so shall the remainder, after rejecting all the 30's contained in it, be the epact sought. The following table contains the golden numbers, with their corresponding epacts, till the year 1900.

TABLE OF GREGORIAN EPACTS.					
Golden Numb.	Epacts.	Golden Numb.	Epacts.	Golden Numb.	Epacts.
I	0	VIII	17	XV	4
II	11	IX	28	XVI	15
III	22	X	9	XVII	26
IV	3	XI	20	XVIII	7
V	14	XII	1	XIX	18
VI	25	XIII	12	I	0
VII	6	XIV	23		

On the subject of *Epacts*, see Wolfius's Elementa Chronologiæ, apud Opera, tom. iv. p. 133; also Philos. Trans. vol. xlvi. p. 417.

OF THE DIVISION OF TIME BY CYCLES, EPOCHS, &c.

Besides the common divisions of time, arising immediately from the above described revolutions of the heavenly bodies, there are others, which are formed from some of the less obvious consequences of those revolutions, and are called *cycles*, or *circles*, because they consist of a certain series of movements or measures of time, proceeding invariably from first to last, then returning again into the first, and thus circulating in a perpetual round.

Cycles have chiefly arisen from the incommensurability of the revolutions of the earth and celestial bodies to one another. The apparent revolution of the sun about the earth, having been divided into twenty-four hours, is the basis or foundation of all our mensurations of time, whether by days, years, &c. But neither the annual motion of the sun, nor that of the other heavenly bodies, can be measured exactly, and without any remainder, by hours, or their multiples. That of the sun, for example, is 365d. 5h. 49m. *nearly*; that of the moon, 29d. 12h. 44m. *nearly*.

Hence, to swallow up these fractions in whole numbers, and yet in numbers which only express days and years, cycles have been invented; which, comprehending several revolutions of the same body, replace it, after a certain number of years, exactly in the same point of the heavens from whence it first departed; or, which is the same thing, in the same place of the civil calendar. These cycles are various; as, the cycle of indiction, the cycle of the moon, the cycle of the sun, &c.

The *cycle of indiction*, commonly called the Roman indiction, is a series of fifteen years, returning constantly round like the other cycles; and commenced from the third year before Christ; whence it happens that if 3 be added to any given year of Christ, and the sum be divided by fifteen, what remains is the year of the indiction. The popes have dated their acts by the year of the Indiction, which was fixed to the 1st of January anno Domini 313, ever since Charlemagne made them sovereign; before that time, they dated them by the years of the Emperors. At the time of reforming the calendar, the year 1582 was reckoned the tenth year of the Indiction; so that beginning to reckon from hence, and dividing the number of years elapsed between that time and this, by 15, the remainder, with the addition of 10, rejecting 15 if the sum be more, will be the year of the Indiction. But the Indiction will be easier found as above hinted, thus: Add 3 to the given year of Christ; divide the sum by 15, and the remainder after the division, will be the year of the indiction: if there be no remainder, the indiction is 15. In either of these ways, the indiction for the year 1801 is 4.

The *cycle of the moon*, or the *lunar cycle*, is a period of nineteen years: in which time the new and full moons return to the same day of the Julian year. This cycle is also called the *Metonic period* or *cycle*, from its inventor Meton, the Athenian; and also the *Golden Number*, from its excellent use in the calendar: though, properly speaking, the golden number is rather the particular number which shews the year of the lunar cycle, which any given year is in. This cycle of the moon only holds true for $310\frac{7}{10}$ years: for, though the new moons do return to the same day after nineteen years; yet not to the same time of the day, but near an hour and a half sooner; an error which in $310\frac{7}{10}$ years amounts to an entire day. Yet those employed in reforming the calendar went on a supposition that the lunations return precisely from nineteen years to nineteen years, for ever. The use of this cycle, in the ancient calendar, is to shew the new moon of each year, and the time of Easter. See EASTER. In the new one, it only serves to find the epacts; which shew, in either calendar, that the new moons falls eleven days too late. As the Orientals began the use of this cycle at the time of the council of Nice in 325, they assumed, that the first year of the cycle the pascal new moon fell on the 13th of March: on which account the lunar cycle 3 fell on the first of January in the third year. The Occidentals, on the contrary, placed the number 1 to the 1st of January, which occasioned a considerable difference in the time of Easter. Hence, Dionysius Exiguus, on framing

framing a new calendar, persuaded the Christians of the west to come into the practice of the church of Alexdria. *To determine the year of the lunar cycle,* is the same as to find the golden number.

To find the golden number; add 1 to the given year, and divide the sum by 19, and what remains will be the golden number; unless 0 remains, for then 19 is the number

Thus, the golden number for the year 1801 is 16; as by the operation in the margin.

1801
1
19)1802(94
171
92
76
Gol. No. 16

The cycle of the sun, or *solar cycle,* is a period or revolution of twenty-eight years; beginning with 1, and ending with 28; which elapsed, the dominical or sunday-letters, and those that express the other feasts, &c. return again into their former place, and proceed in the same order as before. The days of the month likewise return again to the same days of the week; the sun's place to the same signs and degrees of the ecliptic on the same months and days, so as not to differ one degree in a hundred years; and the leap years begin the same course with respect to the days of the week on which the days of the month fall. This is called the cycle of the sun, or the solar cycle, not from any regard to the sun's course, which has no concern in it; but from *Sunday,* anciently called *dies solis,* the *sun's day*; as the dominical or sunday letter is chiefly sought for from this revolution. The reformation of the calendar under pope Gregory XIII. occasioned a considerable alteration of this cycle: in the Gregorian calendar, the solar cycle is not constant and perpetual; because every 4th secular year is common; whereas, in the Julian, it is bissextile. The epoch, or beginning of the solar cycle, both Julian and Gregorian, is the 9th year before Christ. And therefore, *to find the cycle of the sun for any given year:* add 9 to the number given, and divide the sum by 28; the remainder will be the number of the cycle, and the quotient the number of revolutions since Christ. If there be no remainder, it will be the 28th or last year of the cycle.

The *Chinese cycle* is a lunar cycle of sixty years, calculated to bring, in that period, a perfect coincidence of the relative positions of the sun and moon. This has been lately exhibited by Sir George Staunton, in whose opinion it tends to shew, by an analytical review of its series, that the Chinese empire existed at least 2277 years before the Christian era.—See this explained under the article CHINA, p. 438 of this volume.

But the principal regulator of chronological events is the *Julian period,* so called as being adapted to the Julian year, and is a series of 7980 Julian years; arising from the multiplications of the cycles of the sun, moon, and indiction, together, or the numbers 28, 19, 15; commencing on the 1st day of January in the 764th Julian year before the creation, and therefore is not yet completed. This comprehends all other cycles, periods, and epochs, with the times of all memorable actions and histories; and therefore it is not only the most general, but the most useful, of all periods in chronology. As every year of the Julian period has its particular solar, lunar, and indiction, cycles, and no two years in it can have all these three cycles the same, every year of this period becomes accurately distinguished from another. This period was invented by Joseph Scaliger, as containing all the other epochs, to facilitate the reduction of the years of one given epoch to those of another. It agrees with the Constantinopolitan period, used by the Greeks, except in this, that the cycles of the sun, moon, and indiction, are reckoned differently; and also in that the first year of the Constantinopolitan period differs from that of the Julian period.

The *Constantinopolitan period,* is that used by the Greeks, and is the same as the Julian period above described.

The *Callippic period* is a series of seventy-six years, at every repetition of which, it was supposed, by its inventor Calippus, an Athenian astronomer, that the mean new and full moons would always return to the same day and hour. About a century before, the golden number, or cycle of 19 years, had been invented by Meton, which Callippus finding to contain 19 of Nabonassar's years, 4 days and $\frac{3}{4}\frac{1}{4}$, to avoid fractions he quadrupled it, and thus produced his period of 76 years, or 4 times 19; after which he supposed all the lunations, &c. would regularly return to the same hour. But neither is this exact, as it brings them too late by a whole day in 225 years.

Hipparchus's period, is a series or cycle of 304 solar years, returning in a constant round, and restoring the new and full moons to the same day of the solar year; as Hipparchus thought. This period arises by multiplying the Calippic period by 4. Hipparchus assumed the quantity of the solar year to be 365d. 5h. 55m. 12s. and hence he concluded, that in 304 years Calippus's period would err a whole day. He therefore multiplied the period by 4, and from the product cast away an entire day. But even this does not restore the new and full moons to the same day throughout the whole period: but they are sometimes anticipated 1 d. 8 h. 23m. 29s. 20 thirds.

The *Victorian period,* is an interval of 532 Julian years; at the end of which, the new and full moons return again on the same day of the Julian year, according to the opinion of the inventor, Victorinus, or Victorius, who lived in the time of pope Hilary. Some ascribe this period to Dionysius Exiguus, and hence they call it the Dionysian period: others again call it the great paschal cycle, because it was invented for computing the time of Easter. The Victorian period is produced by multiplying the solar cycle 28 by the lunar cycle 19, the product being 532. But neither does this restore the new and full moons to the same day throughout its whole duration, by 1d. 16h. 58m. 59s. 40 thirds.

OF THE DATES OR ERAS OF TIME.

Independent of the preceding cycles or periods for the measurement of time, chronologers have certain points or data from which they begin to reckon, which points or roots of time are called *eras.* The most remarkable of them are, those of the creation, the Greek Olympiads, the building of Rome, the era of Nabonnassar, the death of Alexander, the birth of Christ, the Arabian Hegira, or flight of Mahomet, the Persian Jesdegird, and the Spanish era, all which, with a few others of less note, have their beginnings fixed by chronologers to the years of the Julian period, to the age of the world, and to the years before and after Christ.

The *Olympiad* is a revolution or period of four years, by which the Greeks reckoned their time: so called from the Olympic games, which were celebrated every fourth year, during five days, near the summer solstice, upon the banks of the river Alpheus, near Olympia, a town of Elis. As each Olympiad consisted of four years, these were called the first, second, third, and fourth, year of each Olympiad; the first year commencing with the nearest new moon to the summer solstice. The first Olympiad began the 3938 year of the Julian period, the 3208 of the creation, 776 years before the birth of Christ, and 24 years before the foundation of Rome. And the computation by these, ended with the 404th Olympiad.

The *era of Nabonassar* is a Jewish era, which began on Wednesday February 26th, in the 3267th year of the Julian period, or 747 years before Christ: in this reckoning the years are Egyptian ones, of 365 days each. This is a remarkable era in chronology, because Ptolomy assures us there were astronomical observations made by the Chaldeans, from the reign of Nabonassar to his time; also Ptolomy, and other astronomers, account their years from that epoch.

The *era of Christ,* is the common era throughout Europe, commencing at the supposed time of our Saviour's nativity, December 25; or rather, according to the usual account, from his circumcision, or the 1st of January. The author of this epoch was an abbot of Rome, one Dionysius

Dionysius Exiguus, a Scythian, about the year 507 or 527. Dionysius began his account from the conception or incarnation, usually called the Annunciation or Lady Day; which method obtained in the dominions of Great Britain till the year 1752, before which time the Dionysian was the same as the English epoch: but in that year the Gregorian calendar having been admitted by act of parliament, they began to reckon from the first of January, as in the other parts of Europe, except in the court of Rome, where the epoch of the incarnation still obtains for the date of their bulls.

The *Hegira* is an account of time, used by the Mahometans, who begin their computation from the day that Mahomet was forced to make his escape from the city of Mecca, which happened on Friday the 16th of July 622. The years of the Hegira are lunar ones, consisting only of 354 days. Hence, to reduce these years to the Julian calendar, that is, to find what Julian year a given year of the Hegira answers to: reduce the year of the hegira into days, by multiplying by 354, divide the product by 365¼, and to the quotient add 622, the year the hegira commenced. The *Persian* Jesdegird, or *yezdegerdic* year, is described above.

The *Spanish era*, otherwise called the year of Cæsar, was introduced after the second division of the Roman provinces, between Augustus, Antony, and Lepidus, in the 716th year of Rome, the 4676th of the Julian period, and the 38th before Christ. In the 447th year of this era, the Alani, the Vandals, Suevi, &c. entered Spain. It is frequently mentioned in the Spanish affairs; their councils, and other public acts, being all dated according to it. Some say it was abolished under Peter IV. king of Arragon, in the year of Christ 1358, and the Christian era introduced instead of it. But Mariana observes that it ceased in the year of Christ 1383, under John I. king of Castile. The like was afterwards done in Portugal.

The year of Christ's birth was never settled till the year 527, by Dionysius Exiguus above-mentioned, who fixed it to the end of the 4713th year of the Julian period, which was four years too late; for our Saviour was born before the death of Herod, who sought to kill him as soon as he heard of his birth. And according to the testimony of Josephus, there was an eclipse of the moon in the time of Herod's last illness; which eclipse appears by our astronomical tables to have been in the year of the Julian period 4710, March 13, at 2h. 45m. past midnight, at Jerusalem. Now, as our Saviour must have been born some months before Herod's death, since in the interval he was carried into Egypt, the latest time in which we can fix the true era of his birth is about the end of the 4709th year of the Julian period.

It is with great reason that the eclipses of the sun and moon, and the aspects of the other planets, have been called public registers of the times; as their calculations afford chronologers infallible proofs of the precise epochs in which a great number of the most signal events in history have occurred. So that in chronological research we cannot make any great progress, if we are ignorant of the use of astronomic tables, and the calculation of eclipses. The ancients regarded the latter as prognostics of the fall of empires, of the loss of battles, of the death of monarchs, &c. And it is to this superstition that we are indebted for the vast labour historians have taken to record so great a number of them. The most able chronologers have collected them with still greater labour. Calvisius, for example, founds his chronology on 144 eclipses of the sun, and 127 of the moon, that, he says, he had calculated. The grand conjunction of the two superior planets, Saturn and Jupiter, which, according to Kepler, occurs once in 800 years in the same point of the zodiac, and which has happened only eight times since the creation, (the last time in the month of December, 1603,) may also furnish chronology with incontestible proofs. The same may be said of the transit of Venus over the sun, which has been observed in our own days; and of many other rare and striking positions of the planets.

As to the records or registers of men, we must confess that these guides are not always infallible, nor do they afford mathematical demonstrations. In fact, with regard to history in general, and ancient history in particular, something must be always left to conjecture and historic faith. It would be an offence against common probity, were we to pass over in silence those objections which authors of the greatest reputation have made against the absolute certainty of chronology. Indeed, the prodigious difference between the Septuagint Bible and the Vulgate, in point of chronology, occasions an embarrassment, which is the more difficult to avoid, as we cannot positively say on which side the error lies. The Greek Bible counts, for example, from the creation of the world to the birth of Abraham, 1500 years more than the Hebrew and Latin Bibles, &c. How difficult is it, likewise, to ascertain the years of the Judges of the Jewish nation, in the Bible? What darkness is spread over the succession of the kings of Judah and Israel? The calculation of time is there so inaccurate, that the scripture never marks if they are current or complete years: for we cannot suppose that a patriarch, judge, or king, lived exactly 60, 90, 100, or 969, years, without any odd months or days. The different names also that the Assyrians, Egyptians, Persians, and Greeks, have given to the same prince, have contributed not a little to embarrass ancient chronology. If we did not know that Nabucodonosor, Nabucodrosor, and Nabucolassar, were the same name, or the name of the same man, we should scarcely believe it. Sargon is Sennacherib; Ozias is Azarias; Sedecias is Mathanias; Joachas is also called Sellum; Asaraddon, which is pronounced indifferently Esarhaddon and Asarhaddon, is called Asenaphar by the Cuthæans; and by an oddity, of which we do not know the origin, Sardanapalus is called by the Greeks, Tenos Concoleros. In truth, there remain but few monuments of the first monarchs of the world. Numberless books have been lost, and those which have come down to us are mutilated or altered by transcribers. The Greeks began to write very late; and Herodotus, their first historian, was credulous. The Greeks were in general vain and partial; and the Romans were still more infatuated with notions of their own merit and grandeur. The eras, the years, the periods, the epochs, were not the same in each nation; and they, moreover, began at different seasons of the year. All this contributed to throw still more obscurity over chronology. Christianity itself had subsisted near 1200 years, before it was known precisely how many years had passed since the birth of our Saviour. They saw clearly that the vulgar era was defective, but it was a long time before they could comprehend that it required four whole years to make up the true period. They count 132 contrary opinions of different authors concerning the year in which the Messiah appeared on the earth. M. Vallemont names sixty-four of them, all celebrated writers. As for our own part, we profess to have followed the ingenious Dr. Blair, who copies archbishop Usher and the Hebrew text, in making the birth of our Saviour to fall in the fifth year before the vulgar era; in the 749th year of Rome, according to Varro, the fourth year of the 193d Olympiad, the 744th year of Nabonassar, and the year 4709 of the Julian period; it was likewise in the twenty-seventh year of the reign of Augustus the Roman emperor, counting it from his victory over Antony at Actium, September 3d, 31; and it was also in the thirty-third year of Herod king of the Jews, from which year of his reign the birth of Christ is fixed, as happening four years before the common era. This computation appears to be well established in the above-mentioned Chronology of Dr. Blair, published in 1790; from whose correct and valuable Tables the following chronological events are precisely copied. But, tho' the year of Christ's birth, with respect to posterior time, is almost absolutely certain, it is far otherwise with respect to

to prior time; for in what precise year, from the creation, Jesus was born, no man has been able to demonstrate; nor is the subject, in our opinion, capable of demonstration. From some intermediate epochs, the year may be nearly guessed; but, from the era of the creation, all is mere conjecture and uncertainty. How should it be otherwise? We have no other chronological memoirs for almost half the period, than such as are found in the Hebrew writings; and in these we have three different computations, neither of which perhaps is exactly true.

A Chronological TABLE *of* REMARKABLE EVENTS *from the* CREATION *to the* BIRTH *of* CHRIST.

4004 *The Creation of the World* began, according to archbishop Usher, on Sunday, October 23, and in the year before the vulgar era of the birth of Christ, as given in the Hebrew text, 4004; in the LXX, 5872; in the Samaritan, 4700; of the Julian period, 710. Adam and Eve were created on Friday, October 28; they are placed in Paradise, but are soon tempted and fall; sentence is passed upon them by God, who encourages them at the same time with the promise of the seed of the woman; they are banished Paradise.

4003 The birth of Cain, the first who was born of a woman. Abel is born soon after.

3875 Abel is murdered by Cain, because his sacrifice was more acceptable to God.

3874 Seth born, whose offspring were called the children of God, by way of distinction from those of Cain, who were named the children of men.

3017 Enoch, for his piety, is translated to heaven.

2469 The term of 120 years is allowed by God for the repentance of the world before the deluge; this is communicated to Noah, who is sent to them as a preacher of righteousness.

2349 On the tenth day of the second month, which was on Sunday, November 30, God commanded Noah to enter into the ark with his family, &c. and, on Sunday, December 7, it began to rain, and rained forty days; and the deluge continued one hundred and fifty days.

2348 The ark rested on Mount Ararat, on Wednesday, May 6; the tops of the mountains became visible on Sunday, July 19; and, on Friday, December 18, Noah came out of the ark with all that were with him; he built an altar, and sacrificed to God for his deliverance.

2247 *The Tower of Babel* is built about this time, by Noah's posterity, in the valley of Shinar, upon which God miraculously confounds their language, and thus disperses them into different nations.

2234 The celestial observations are begun at Babylon, as Callisthenes sent to Aristotle a register of them for 1903 years, down to the taking of that city by Alexander, in the year 331 before Christ.

2188 *The Kingdom of Egypt* begins under Misraim the son of Ham, which lasted for 1663 years, according to Constantin Manasses, which is down to the conquest of Cambyses, in 525 before Christ.

2100 Of the Julian period 2614.

2089 *The Kingdom of Sicyon* established, according to Eusebius, 1313 years before the first Olympiad. Little is known of this kingdom but the names of their kings; they end about the beginning of the eleventh century, viz. 1089, and fifteen years after the return of the Heraclidæ into Peloponnesus.

2059 *The Kingdom of Assyria* begins under Ninus, son of Belus

2017 The sixteenth dynasty of five Theban kings in Egypt, begins and continues 190 years.

2007 Semiramis queen of Assyria, died in 1965.

2000 Of the Julian period 2714.

1996 Abram, the patriarch, born at Ur, in Chaldæa; died 1821, aged 175.

1927 Sarah wife to Abraham: died 1859, aged 127.

1925 Chedorlaomer, king of Elam, subdues the five kings of Sodom, Gomorrha, Adama, Seboim, and Zoar.

1921 The covenant of God made with Abram when he leaves Haran to go into Canaan, on the 15th of Abib, or Wednesday, May 4, which begins the 430 *years of sojourning*. Abram and Lot go into Egypt for famine, and return the next year, when they separate, the one to Sodom, and the other to Hebron.

1912 The five kings rebelling against Chedorlaomer are defeated by him; he plunders Sodom, and carries off Lot captive; Abram pursues and defeats Chedorlaomer and rescues Lot; on his return he receives the benediction of Melchizedek king of Salem, the priest of the Most High God.

1910 Ishmael is born to Abram by Hagar; died 1773, aged 137.

1900 Of the Julian period 2814.

1897 The covenant is renewed by God with Abram, in memorial of which circumcision is instituted, and his name changed to Abraham; the cities of Sodom, &c. are destroyed for their wickedness by fire from Heaven; Lot, with his wife and two daughters, leave Sodom beforehand, being warned; his wife looking back is turned into a pillar of salt.

1896 Isaac born to Abraham by Sarah ninety years old; dies in 1716, aged 180.

1871 The faith of Abraham is proved in offering to sacrifice his son Isaac, who was then twenty five years old.

1856 *The Kingdom of Argos* begins under Inachus, 1080 years before the first Olympiad; Isaac being forty years old marries Rebecca the daughter of Bethuel the Syrian.

1836 Esau and Jacob are born to Isaac by Rebecca after above nineteen years barrenness.

1827 The seventeenth dynasty of the six shepherd kings in Egypt, begins, and continues 103 years.

1822 Memnon, the Egyptian, invents the letters fifteen years before the reign of Phoroneus, according to Anticlides in Pliny.

1821 Abraham dies, being 175 years old.

1800 Of the Julian period 2914.

1796 The reign of Ogyges begins 1020 years before the first Olympiad. Esau marries two daughters of Heth, which gives great uneasiness to Isaac and Rebecca.

1764 *The Deluge of Ogyges*, from which Attica lay waste for above 200 years, till the coming of Cecrops.

1759 Jacob, having received his father's blessing, goes to Haran to his uncle Laban, and marries his two daughters.

1739 Jacob returns into Canaan after a twenty years servitude under Laban.

1731 Dinah, Jacob's daughter, is ravished by Shechem; he and all his people are treacherously put to death on the third day after circumcision, by Simeon and Levi.

1728 Joseph is sold into Egypt by his brethren.

1724 The eighteenth Egyptian dynasty of seventeen Diospolitan kings begins, and continues 348 years.

1715 Joseph interprets Pharaoh's dreams, and is promoted. The seven years of plenty begin.

1708 The seven years of famine begin; and, the year after, Joseph's ten brethren come into Egypt for corn.

1706 Joseph discovers himself to his brethren; and, at Pharaoh's desire, sends for Jacob and his family into Egypt.

1704 All the money in Egypt and Canaan is collected by Joseph into Pharaoh's treasury; and, the year following, they sell him their herds and flocks.

1702 The property of all the lands in Egypt is sold to Joseph, who let them out with a perpetual tax of the fifth part of their produce.

1700 Of the Julian period 3014.

1689 Jacob on his death-bed adopts Manasseh and Ephraim, the two sons of Joseph; and, collecting all his children, blesses them, and foretels many things, particularly

particularly the coming of the Messiah; he died aged 147, having resided seventeen years in Egypt.

1635 Joseph fortels the egress of the Israelites from Egypt; and dies, aged 110, having been prefect of Egypt for eighty years. His death concludes the Book of Genesis, which contains a period of 2369 years.

1615 The Ethiopians, coming from the river Indus, settle in the neighbourhood of Egypt.

1600 Of the Julian period 3114. Prometheus flourished.

1582 The chronology of the Arundelian marbles begins here, when they suppose Cecrops came into Attica, which is twenty-six years earlier than the date given by Castor, in Eusebius.

1574 Aaron born; and the year after, Pharaoh publishes an edict for drowning all the children of the Israelites.

1571 Moses born, and three months after exposed among the flags on the banks of the river, where he is found by Thermutis, Pharaoh's daughter, who adopts and educates him in all the learning of the Egyptians.

1556 Cecrops brings a colony of Saites from Egypt into Attica, and begins the kingdom of Athens 780 years before the first Olympiad.

1546 Scamander comes from Crete into Phrygia, and begins the kingdom of Troy.

1531 Moses being forty years of age, visits the Israelites his brethren; and, observing their oppression, kills an Egyptian, whom he found smiting a Hebrew, and then flies into Midian, where he continued forty years, and married Zippora the daughter of Jethro.

1503 The deluge of Deucalion in Thessaly.

1500 Of the Julian period 3214.

1495 The games called Panathenæa are first celebrated at Athens.

1493 Cadmus carried the Phœnician letters into Greece, and built the citadel of Thebes.

1491 God appears to Moses in a burning bush, and sends him into Egypt, where he performs a number of miracles, and afflicts Pharaoh with ten successive plagues, till the Israelites were allowed to depart, to the number of 600,000, besides children, on Tuesday the 5th of May, which completed the 430 *years of sojourning*; and, on Monday, May 11, Moses opened miraculously a passage for the Israelites through the Red Sea into the desert of Etham, when Pharaoh with all his host, following them, were drowned. They come about the 22d of June to the desert of Sinai, near Mount Horeb, where they continue near a year, during which time Moses receives from God, and delivers to the people, the *Ten Commandments* and the other laws, and sets up the tabernacle, and in it the ark of the covenant.

1485 The first ship that appeared in Greece, and was brought from Egypt by Danaus, surnamed Armais, who was then expelled by his brother Ægyptus. The ship arrived at Lindus, in Rhodes; he brought with him his fifty daughters; introduced the invention of pumps into Greece; and, ten years after, viz. in 1475, got possession of the kingdom of Argos.

1453 The first Olympic games celebrated in Elis by the Idæi Dactyli, fifty years after the deluge of Deucalion.

1452 The five books of Moses are written in the land of Moab, where he dies the year following, aged 110.

1451 The Israelites under Joshua pass the river Jordan, and enter Canaan, on Friday, April 30. Jericho is taken by Joshua, and after that the city of Ai; he makes a treaty with Gibeon, and defeats the five kings of the Amorites, while the sun and moon stood still. The Israelites began to till the lands they had conquered, so that the period of the sabbatical years commences from this autumn.

1445 Joshua makes a division of the land of Canaan, among the tribes of Israel, and rests from his conquests, upon the sabbatical year, which begins from the autumnal equinox.

1426 Joshua dies in his retirement at Timnath-serah, aged 110.

1413 The Israelites, having sunk into idolatry after the death of Joshua, are now in servitude under Cushan, king of Mesopotamia, and continue so for eight years.

1406 Minos gives laws to the Cretans, and acquires a great maritime power.—Iron is found by the Idæi Dactyli, from the accidental burning of the woods of Mount Ida, in Crete.

1405 Othniel, the first of their judges, defeats Cushan, and gives rest to Israel in the fortieth year after the rest given by Joshua.

1400 Of the Julian period 3314.

1390 The tribe of Benjamin almost totally destroyed by the other eleven tribes for their cruel usage of the wife of a Levite; it happened while Phineas was high priest.

1383 Ceres came to Athens and taught them to sow corn; she sent her son Triptolemus through the rest of Greece.

1376 The nineteenth Egyptian dynasty begins, being the second Diospolitan; it continues 194 years.

1356 The Eleusinian mysteries first introduced at Athens by Eumolpus the son of Musæus.

1344 The kingdom of Argos is divided, and the most considerable part of it is called Mycenæ.

1343 The Israelites relapsing into idolatry, are again in servitude under Eglon king of Moab, for eighteen years.

1341 The rape of Ganymede sixty-five years after the burning of Mount Ida.

1326 The Isthmian games first instituted by Sisyphus king of Corinth, fifteen years after the rape of Ganymede.

1325 Ehud the Benjamite, being the second judge in an embassy, kills Eglon, and so relieves them from their second bondage in the eightieth year from their rest under Othniel. A little after this, Shamgar killed 600 Philistines with an ox goad.—The great Egyptian canicular year began on Saturday, July 20, and consisted of 1460 years, the Dog-star, or Sirius, having risen heliacè that morning at Heliopolis precisely at four o'clock.

1305 The Israelites returning to their former wickedness upon Ehud's death, are delivered by God into the hands of Jabin king of Canaan. This third servitude continued forty years.

1300 Of the Julian period 3414.

1285 Deborah the prophetess, and third judge of Israel, with Barak general of the Israelites, defeats the Cannaanites under Sisera at the waters of Megiddo; Sisera is killed by Jael the wife of Heber; upon this battle was composed the beautiful song of victory, in Judges, chap. v. The land of Israel had rest in the fortieth year after the rest given by Ehud.

1284 The Siculi pass out of Italy into Sicily about three generations before the Trojan war. Orpheus the poet flourished.

1266 Œdipus king of Thebes; died about 1228.

1263 *The Argonautic Expedition* under Jason and his companions through the Euxine Sea to Colchis for the Golden Fleece, being seventy-nine years before the taking of Troy.—The first Pythian games celebrated by Adrastus king of Argos.

1252 The fourth servitude of the Israelites under the Midianites, which continues seven years.

1245 Gideon, the fourth judge of Israel, routs the Midianites with only 300 men, and slew their two kings kings Zebah and Zalmunna; he is offered the kingdom of Israel, which he refuses. The land had rest in the fortieth year after the rest given by Deborah, and 200 years after that of Joshua.

1236 Upon Gideon's death, Abimilech, his natural son, murders his seventy brothers upon one stone, and makes himself king of Israel for three years.

1234 Theſeus collects the twelve villages of Attica into one city, ſettles a democracy, and renews the Iſthmian games.
1233 Tola the fifth judge of Iſrael for twenty-three years.
1225 The Theban war of the ſeven heroes againſt Eteocles king of Thebes.
1222 The celebration of the Olympic games by Hercules.
1213 The rape of Helen by Theſeus.
1210 Jair the ſixth judge of Iſrael for twenty-two years.
1206 The Iſraelites being given to idolatry, are delivered by God into the hands of the Philiſtines and Ammonites. This is their fifth ſervitude, and continues eighteen years.
1200 Of the Julian period 3514.
1198 The rape of Helen by Paris.
1193 The Trojan war begins, and continues ten years.
1188 Jephtha, the ſeventh judge of Iſrael for ſix years; he defeats the Ammonites, and raſhly makes a vow, which deprives him of his daughter. He chaſtiſes the inſolence of the Ephraimites, having killed 42,000 of them in a battle.
1184 *Troy is taken* and burnt by the Greeks on the night betwixt the 11th and 12th of June, being the 23d and 24th of Thargelion, according to the marbles, and 408 years before the firſt Olympiad. According to Apollodorus, Æneas ſet ſail in the beginning of autumn for Thrace, where he wintered.
1182 Ibzan, the eighth judge of Iſrael, for ſeven years.—The twentieth Egyptian dynaſty begins, being the third Dioſpolitan; it continues 178 years. The kingdom of the Latins begins the year under Æneas, who builds Lavinium.
1179 The Lydians are the firſt after Minos who acquire the maritime power of the Mediterranean, according to Caſtor, in Euſebius.
1175 Elon, the ninth judge of Iſrael, for ten years.
1165 Abdon, the tenth judge of Iſrael, for eight years.
1157 Eli the high prieſt, the eleventh judge of Iſrael, for forty years.
1156 The ſixth ſervitude of the Iſraelites under the Philiſtines, which continues forty years.
1152 The city of Alba-longa is built by Aſcanius king of the Latins.
1136 Samſon kills a thouſand Philiſtines with the jawbone of an aſs.
1124 The migration of the Æolian colonies eighty years before that of the Ionians.
1117 Samſon is betrayed to the Philiſtines, being deprived of his ſtrength. Upon its return he pulled down the temple of Dagon on their heads, and with himſelf there periſhed more than he had ever killed before. The Iſraelites being encouraged by the diſaſter attack the Philiſtines, but are defeated with the loſs of 4000 men. They ſend then for the ark from Shiloh, renew the battle, but are again defeated with the loſs of 30,000 men and of the ark. Eli hearing this, fell down, broke his neck, and died.
1116 Samuel, the twelfth and laſt judge of Iſrael, for twenty-one years. The Philiſtines, having placed the ark in the temple of Dagon, are ſmitten with emerods, and ſend it back after ſeven months poſſeſſion.
1104 *The Return of the Heraclidæ* into Peloponneſus eighty years after the taking of Troy, and 328 before the firſt Olympiad.
1102 The Heraclidæ divide Peloponneſus, upon which the kingdom of Lacedemon begins under Euryſthenes and Procles, the two ſons of Ariſtodemus.
1100 Of the Julian period 3614.
1096 The Philiſtines are defeated by Samuel at Eben-ezer.
1095 The Iſraelites aſk for a king, which is granted them, though with God's diſpleaſure; and Saul is anointed by Samuel to be their king.
1093 Saul defeats the Philiſtines; before this they [illegible] allow him a ſmith in all his kingdom.—Sa[illegible]jected of God for diſobedience with regard to the

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Amalekites; and David, when twenty-two years old, is anointed by Samuel to be king after Saul.
1088 Here ends the kingdom of Sicyon; Charidemus the laſt king.
1070 The kingdom of Athens ends in Codrus, upon which they are governed by Archons.
1062 David, finding that Saul ſought his life, retires into the deſerts of Judah.
1058 The Pelaſgi are the ſecond who acquire the maritime power of the Mediterranean.
1056 David retires among the Philiſtines, who give him Ziklak, where he is one year and ſix months.
1055 Saul conſults the witch of Endor; and is totally defeated by the Philiſtines next day upon Mount Gilboa. Three of his ſons are ſlain, upon which he kills himſelf.
1048 Jeruſalem taken by David from the Jebuſites, and made the ſeat of his kingdom.
1044 The migration of the Ionian colonies from Greece ſixty years after the return of the Heraclidæ; they are properly ſettled in this year, as they were moving for near thirty years before.
1034 David is reproved by Nathan for his adultery, &c. and repents.
1023 Abſalom rebels againſt David, and takes Jeruſalem; but is defeated and killed by Joab.
1012 Solomon begins the building of the temple 480 years after the going out out from Egypt.
1004 The temple is ſolemnly dedicated on Friday, October 30, 1000 years before Chriſt.—The twenty-firſt Egyptian dynaſty of the Tanites begins, and continues 130 years.
1000 Of the Julian period 3714.
1000 The Thracians are the third who acquire the maritime power of the Mediterranean about this time, and hold it for nineteen years.
992 Solomon finiſhes the building of his palace, which, with that of the temple, employed him twenty years.
986 The city of Samos is built in the iſland of that name.
975 The diviſion of the kingdom of Judah and Iſrael. Jeroboam ſets up two golden calves, one at Dan, and the other at Bethel, to prevent his ſubjects going to worſhip at Jeruſalem.
971 Seſac king of Egypt takes Jeruſalem, and carries off the treaſures of the temple and of the palace.
941 Zerah the Ethiopian, with a million of men, totally defeated by king Aſa, in the valley of Zephathah.
940 Benhadad king of Syria, attacks Baaſa king of Iſrael, and takes ſeveral of his cities.
926 Lycurgus, the Spartan law-giver, is born 150 years before the firſt Olympiad.
924 Omri transferred the ſeat of the kingdom of Iſrael from Tirza to Samaria.
916 The Rhodians are the fourth who acquire the maritime power of the Mediterranean, and hold it for twenty-three years. Heſiod the poet flouriſhed.
907 Homer wrote his poems and flouriſhed about this time, according to the marbles.
900 Of the Julian period 3814.
900 The end of the kingdom of Aſſyria by the conqueſt and death of Sardanapalus, is placed here by Juſtin and others, though we have followed Euſebius.
896 Elias the prophet is taken up into heaven.
893 The Phrygians are the fourth who acquire the maritime power of the Mediterranean, and hold it twenty-five years.
884 Lycurgus, after ten years travelling, eſtabliſhes his body of laws in Lacedemon.—Iphitus, Lycurgus, and Cleoſthenes, reſtore th[illegible]nes at E[illegible] which was 108 years befo[illegible] firſt Olympiad.
878 Athalia queen of Judah is put [illegible] order of the high prieſt Je[illegible]ada, ſurnam[illegible]anan.
874 The twenty-ſecond Egyptian dynaſty of the Bubaſtes begins, and continues forty-nine years.
[illegible] Phidon [illegible]

869 Phidon, king of Argos invented scales and measures, and coined silver, at Ægina.—The city of Carthage is built by queen Dido about this time.
868 The Cyprians are the sixth who acquire the maritime power of the Mediterranean.
855 Alladius king of the Latins, endeavouring to imitate thunder, is destroyed by lightning.
839 The army of Hazael king of Syria desolates great part of the kingdom of Judah.
826 The Phœnicians are the seventh who acquire the maritime power of the Mediterranean.
825 The twenty-third Egyptian dynasty of the Tanites begins, and continues forty-four years.
820 Niniveh is taken, after three years siege, by Arbaces and Belesis, which finishes the kingdom of Assyria; Sardanapalus burns himself to death; the kingdom is subdivided.
814 The kingdom of Macedon begins, and continues 646 years, till the battle of Pydna.
807 Ahab is killed by the Syrians in the battle of Ramoth Gilead, according to the prophecy of Micaiah; upon this the Moabites revolt, having been tributary from the days of king David.
800 Of the Julian period 3914. Jonah the prophet flourished.
797 The kingdom of Lydia begins, and continues 249 years.
795 Amulius usurps the kingdom of the Latins, setting aside his elder brother Numitor.
787 Amos prophecies against Jeroboam second king of Israel.—The Egyptians are the eighth who acquire the maritime power of the Mediterranean.
786 The Corinthians first invent the ships called Triremes.
785 Hosea the prophet lived; died in 721.
781 The twenty-fourth Egyptian dynasty of the Saites begins, and continues forty-four years.
779 The race of kings end at Corinth, and are succeeded by annual magistrates called Prytanes.
776 Coræbus conquers in the twenty-eighth Olympiad, from their institution by Iphitus, though vulgarly called the *first Olympiad*; which was celebrated on July 23, according to Scaliger.
771 Azariah king of Judah, presuming to burn incense, is struck with leprosy, which continues till his death.
770 Phul king of Assyria invades the kingdom of Israel, but departs soon, being bribed by Menahem with 1000 talents.
760 Theopompus king of Lacedemon introduces five ephori into their government.
758 Nahum the prophet lived.
757 Isaiah the prophet begins to prophesy, and continues it for above sixty years.
754 Micah the prophet lived.—The decennial archons begin at Athens, Charops being the first. Numitor the sixteenth king of the Latins.
753 The æra of the *Building of Rome* begins, according to Varro, April 20th or 12th of the calends of May.—The Milesians are the ninth who acquire the maritime power of the Mediterranean.
752 Daicles is crowned at the Olympic games, being the first who had that honour.
750 The rape of the Sabine virgins. Tatius king of the Sabines; died 742.
748 This is called by the Eleans the first Anolympiad, because the Pisans presided in it, though it was rather in the eighth Olympiad from Iphitus.
747 The Romans and Sabines make peace, and unite their states. The *era of Nabonassar* begins, February 26.
743 The first Messenian war betwixt them and the Lacedemonians begins, and continues nineteen years.
738 Romulus triumphs over the Camerini.
737 The twentieth Egyptian dynasty of the Ethiopians, begins, and continues forty-four years.
736 Eumelus the Corinthian poet.—Midas king of Phrygia; died 697.
734 The Carians, about this time, have the command of the Mediterranean.
732 Romulus triumphs over the Veientes. Syracuse built by a colony of Corinthians under Archias.
731 Habakkuk the prophet flourished about this time.
726 The Lacedemonians being defeated by Aristodemus, allow their wives to prostitute themselves in their absence.
724 The first Messenian war ended by the taking of Ithome, by which they become vassals to the Lacedemonians.
723 A colony of the Messenians under Alcidamidas settle at Regium.
721 Samaria taken after three years siege, and the kingdom of Israel finished by Salmanasar king of Assyria. The first eclipse of the moon on record, according to Ptolemy, March 19, three hours twenty minutes before midnight.
720 The second and third eclipses of the moon on record; the second on March 8, fifty minutes before midnight; and the third on September 1, four hours twenty minutes before midnight, according to the meridian of Alexandria.—The δολιχος was added to the Olympic games; and they first run naked in the stadium.
717 Tyre is besieged in vain for about five years by Salmanasar king of Assyria.
710 Senacherib's army destroyed by an angel in one night, to the amount of 185,000 men.
709 An order of 12 priests called Salii, instituted by Numa.
708 The πενταθλον and the παλη added to the Olympic games. Ecbatuna built by Dejoces.
707 The Lacedemonian bastards, called Parthenians, being expelled Sparta, build Tarentum.
703 Corcyra built by the Corinthians.
700 Of the Julian period 4014. Of the era of Nabonassar 48. First year of the 20th Olympiad. Of Rome 34.
696 Isaiah the prophet is put to death by Manasses, being cut asunder by a saw.
693 The twenty-sixth Egyptian dynasty of the Saites begins.
686 Archilochus the poet, and inventor of the Iambic verse, flourished.
685 The second Messenian war begins, they rebelling against the Lacedemonians, and continues fourteen years.
684 The government of Athens under annual archons begins, Creon being the first.
683 Aristomenes defeats the Lacedemonians near Caprus's monument.
682 The Lacedemonians defeat the Messenians by the treachery of Aristocrates king of the Arcadians, whom they bribed.
680 Assaradinus, or Essarhadon, king of Assyria, takes possession of the kingdom of Babylon. The chariot race introduced at the Olympic games.
678 Dejoces extends the Median empire to the river Halys.
677 Manasses king of Judah is taken prisoner, and carried in chains to Babylon.
676 The Lesbians acquire, about this time, the command of the Mediterranean, which they retain about sixty-nine years.
675 The festival games of the Carnia instituted in Sparta about this time; they were annual in August, and continued nine days.
673 Terpander added, about this time, three strings to the lyre, giving it seven when it formerly had but four strings.
671 Ira taken by the Lacedemonians after a siege of eleven years, which finishes the second Messenian war, when the Messenians are expelled Peloponnesus.
667 The combat between the three Horatii and the three Curiatii.
665 The city of Alba destroyed. War between the Romans and Fidenates.
664 A sea-fight between the Corinthians and the inhabitants of Corcyra, 260 years before the end of the Peloponnesian war.

659 Cypselus

659 Cypselus usurped the government of Corinth, and continued in it for thirty years.
658 Byzantium built by a colony of the Argives, or, according to some, the Athenians and others.
651 A five years war between the Romans and Sabines begins.
648 The παγκρατιον and the ιππος κελης are both added to the Olympic games. The Thoth of this year of Nabonassar was on February 1, having shifted twenty-five days in 100 years.
644 Pantaleon with his Pisans prevailed in the Olympiad, having excluded the Eleans, who therefore expunged it afterwards from their fasti, and called it the *second Anolympiad.*
641 Amon king of Judah is treacherously put to death by his domestic servants.
639 Politorium, a city of the Latins, taken and destroyed by the Romans.
632 The σταδιον παιδων and the παλη παιδων are both added to the Olympic games.
631 The Fidenates and Sabines rebel against the Romans, which war continues by intervals for about fifty years.
630 Cyrene is built by Battus, who begins that kingdom.
629 The government of Corinth is usurped by Periander, who holds it for forty-four years. Prusias in Bythynia built.
628 The πενταθλον παιδων is added to the Olympic games; but it was afterwards discontinued.
627 Jeremiah the prophet; died, 577.
626 Zephaniah the prophet flourished.
625 Phraortes king of the Medes is killed in battle by the Assyrians.
624 The Scythians invade Media, Lydia, &c. and keep possession of several provinces for twenty-eight years.
623 Draco establishes his laws at Athens.
621 A war between the Lydians and Milesians, which continues eleven years. The fourth eclipse on record, which was of the moon, on Saturday, April 22, five hours after midnight, according to the meridian of Alexandria.
616 The Apiolani conquered by the Romans. The πυγμη παιδων is added to the Olympic games.
610 Necho began about this time the famous canal betwixt the Nile and the Red Sea.
608 Josiah king of Judah is slain in battle at Megiddo, in the spring, by Pharaoh Necho king of Egypt.
607 Alcæus the poet lived about this time.
606 Nineveh taken and destroyed by the joint armies of Cyaxares and Nabopolassar.
605 The beginning of the captivity.
604 By Necho's order, some Phenicians, about this time, sailed from the Red Sea round Africa, and returned by the Mediterranean.
600 Julian period 4114. Olympiad the 45th. Year of Nabonassar, 148; of Rome, 154.
600 Sappho the Lyric poetess flourished.
597 Jehoiachin king of Judah is carried away captive by Nebuchadnezzar to Babylon.
596 The Scythians expelled from the Upper Asia by Cyaxares, after twenty-eight years possession.
594 Thales of Miletus, Solon archon and lawgiver of Athens, Ezekiel the prophet, and Anacharsis the Scythian, all flourished about this time.
591 The Pythian games first celebrated at Delphi, and continued on the second year of every Olympiad.
590 The Lydian war begins betwixt Cyaxares and Halyattes, and continues six years.
587 The city of Jerusalem taken by Nebuchadnezzar, after a siege of eighteen months, June 9.
586 The temple of Jerusalem is burnt on the seventh day of the fifth month.
585 A battle upon the river Halys, betwixt Cyaxares and Halyattes, interrupted by a total eclipse of the sun, May 28, which was predicted by Thales: this occasioned the finishing of the Lydian war. Æsop the mythologist flourished.
582 The Isthmian games restored, being celebrated the first and third year of every Olympiad.
572 Tyre taken by Nebuchadnezzar, after a siege of thirteen years.
571 Apries king of Egypt dethroned by Nebuchadnezzar.
568 Nemean games restored, being celebrated the first and third year of every Olympiad.
565 Bias of Priene, one of the seven wise men.
562 The first comedy at Athens acted upon a moveable scaffold by Susarion and Dolon.
560 Pisistratus first usurped the tyranny of Athens, and held it two years.
558 Daniel the prophet lived at this time.
557 Pisistratus, after an expulsion, recovers the tyranny of Athens a second time.
556 Pisistratus expelled again, and continues so for eleven years.
552 Camarina in Sicily taken and destroyed by the Syracusans.
549 Theogenes the poet flourished.
548 Crœsus, after crossing the Halys by an artificial bridge contrived by Thales, is defeated by Cyrus.
539 The Phoceans desert their native country and settle in Gaul, where they build Marseilles.
538 The kingdom of Babylon finished; that city being taken by Cyrus. Darius is made viceroy.
537 Simonides of Cea the poet, and Pythagoras, lived about this time.
536 Cyrus gives an edict for the return of the Jews, and the rebuilding the temple, whose foundations were begun on the second month of the second year after their return. Jeshua the son of Josedek the first high priest, and Zorobabel the Jewish leader.
535 The first tragedy was acted about this time at Athens on a waggon, by Thespis.
532 Anacreon the poet lived.
528 Haggai and Zachariah the prophets flourished at this time.
526 Learning is greatly encouraged about this time at Athens, and a public library first founded by Hippias and Hipparchus, tyrants of Athens.
525 Cambyses conquers Egypt, being assisted by Polycrates with forty triremes.
523 The fifth lunar eclipse on record, observed at Babylon, on Wednesday July 16, one hour before midnight, and above six digits eclipsed on the north part of her disk.
522 Polycrates tyrant of Samos is put to death by Orætes.
521 This year is counted the 227th and 228th year of Nabonassar, as one began January 1, the other December 31.
520 Confucius the Chinese philosopher flourished.
515 Temple of Jerusalem finished March 10, and the passover celebrated April 18.
513 Hipparchus the son of Pisistratus, and one of the tyrants of Athens, is put to death by Harmodius and Aristogiton.
512 Babylon revolts from Darius, but is recovered two years after by a stratagem of Zopyrus.
510 The tyranny of the Pisistratidæ finally abolished at Athens by the assistance of the Lacedemonians.
509 The consular government begins at Rome, Tarquin being expelled, with his whole family, on the 6th of the calends of March, or February 24, being the regifugium of their calendar.
508 Sybaris destroyed by those of Crotona, who routed their army of 300,000 by one of 100,000 under Milo the Wrestler.
506 Heraclitus of Ephesus, and Parmenides of Elea, philosophers, flourished about this time.
504 Sardis taken and burnt by the Athenians, which gave occasion to the Persian invasion of Greece.
503 The triumph called *ovation* is begun at Rome by Posthumius, who entered the city with a myrtle crown.
502 The sixth lunar eclipse on record, observed at Babylon on Monday November 19, twenty-four minutes before

before midnight, having three digits eclipsed on the south part of her disk.

500 Of the Julian period 4214; of Nabonassar 249; 70th Olympiad; of Rome 254.

498 The first dictator created at Rome, who was Lartius.

495 Tarquin, surnamed the Proud, dies at Cumæ, (with Aristodemus the tyrant,) to which place he retired upon the close of the Latin war.

493 The populace of Rome being discontented retire to the Mons Sacer, but return December 10, by Menenius Agrippa's persuasion. Tribunes of the people first created.

491 The kingdom of Syracuse usurped by Gelo. Coriolanus is banished Rome. The seventh lunar eclipse on record, observed at Babylon on Wednesday April 25, having two digits eclipsed to the south.

490 The Persians defeated by Miltiades in the battle of Marathon, September 28. Spurius Cassius flourished.

488 Coriolanus, by his mother's intreaty, &c. withdraws the Volscian army from Rome.

487 Egypt rebels, and revolts from the Persians.

486 Æschylus first gains the prize of tragedy, being thirty-nine years old. Aristides the Athenian, surnamed the Just, banished by ostracism in 484, and recalled in 479.

484 Xerxes recovers Egypt, and gives the government of it to his brother Achæmenes.

481 Xerxes begins his expedition against Greece, and winters at Sardis.

480 The affair at Thermopylæ finished August 7. The Persians defeated in the sea-fight at Salamis, October 20. Themistocles the Athenian general.

479 The Persians under Mardonius defeated at Platæa, September 22, by Pausanias; on the same day was fought the battle of Mycale.

478 Pindar the poet, and Charon of Lampsacus the historian, flourished. Hiero king of Syracuse.

477 The 300 Romans of the name of Fabius killed by the Veientes near Cremera, July 17.

471 Themistocles, being accused of conspiring with Pausanias against the liberty of Greece, retires into Asia to Xerxes.

470 Cimon defeats the Persian fleet at Cyprus, and again the land army near the river Eurymedon in Pamphylia; he is banished by ostracism in 460, recalled in 455, and dies, aged 51. Anaxagoras of Clazomene the philosopher, died 428, aged 72.

469 The first solemn contest between the tragic poets, instituted when Sophocles was twenty-eight years old; from his first piece was declared victor over Æschylus, then in high reputation.

468 Pericles the Athenian general flourished.

466 The Syracusans banish their king Thrasybulus, and recover their liberty, which continues sixty-one years, till the usurpation of Dionysius.

465 The third Messenian war with the Lacedemonians begins, and continues ten years.

463 Egypt revolts from the Persians, under Inarus, who procures them the assistance of the Athenians.

462 The Persians are defeated by the Athenians in a naval engagement in Egypt.

459 The Athenians begin to tyrannize over the other Grecian states.

458 Ezra is sent from Babylon to Jerusalem with the captive Jews, and the vessels of gold and silver, &c. by Artaxerxes, in the seventh year of his reign, being seventy weeks of years, or 490 years, before the crucifixion of our Saviour.

456 The Athenians, being deserted by the Egyptians, retire out of Egypt, by capitulation with the Persians. Nehemiah the prophet, and Plato the comic poet, lived.

454 The Romans send to Athens for Solon's laws.

453 Aristarchus, the tragic poet, lived at this time.

451 The decemvirs created at Rome, and the laws of the twelve tables compiled and ratified.

450 A war between the Persians and Athenians at sea, which continues two years. The Persians, under Osiris, are often defeated by Cimon. Zaleucus, the lawgiver of Locri, flourished.

448 The first sacred war about the temple of Delphi, in which the Lacedemonians and Athenians were auxiliaries, but on opposite sides. Hellanicus, the historian, lived.

447 The Athenians are defeated by the Bœotians at Chæronea, and their general, Tolmides, killed.

446 A thirty years truce agreed on between the Athenians and Lacedemonians. Thucidides, the Athenian general, banished by ostracism.

445 Herodotus reads his history in the council at Athens, and receives public marks of honour, being thirty-nine years old.

444 The Athenians send a colony to Thurium in Italy: Herodotus, Thucydides, and Lysias, were of the number. Military tribunes, with a consular power, are created at Rome. Empedocles of Agrigentum, the Pythagorean philosopher.

443 Censors first created at Rome.

442 Euripides first gained the prize of tragedy at Athens, being forty-three years old.

441 Pericles subdues Samos, which had revolted from the Athenians. Artemones invented the battering-ram, the testudo, and other military instruments, in this war.

440 Comedies are prohibited at Athens, which continued for three years. Phidias the statuary.

439 A war begins between Corinth and Corcyra.

437 Cornelius Cossus gained the second Spolia Opima over Tolumnius king of Fidenæ. Cratinus, the comic poet.

436 Malachi, the last of the prophets.

435 Fidenæ taken by the Romans. The Corinthians defeated at sea by the Corcyræns, assisted by the Athenians.

432 Meton begins his nineteen years cycle of the moon, from the new moon of July 15, being eighteen days after the summer solstice.

431 The *Peloponnesian War* begins May 7, by an attempt of the Bœotians to surprise Platæa. It continues near twenty-seven years.

430 The *History of the Old Testament finishes about this time.* A plague at Athens for five years. The Lacedemonian ambassadors are arrested by Sitacles king of Thrace, and afterwards put to death by the Athenians.

429 Pericles dies about the beginning of November, after governing Athens forty years; twenty-five of which was with others, but fifteen years by his sole power.

428 Democritus of Abdera, the philosopher, and Cleomenes the Lacedemonian general and regent.

427 The Leontines send an embassy to Athens for assistance against the Syracusans, which is granted them.

426 The plague having broke out at Athens a second time, they permitted each man to marry two wives; Socrates was one of the first who took advantage of this privilege. Thucydides the historian.

425 Hippocrates of Cos, the physician, and Cleon, the Athenian general, lived at this time.

424 Aristophanes's comedy of the Clouds first acted against Socrates. The Sicilians make peace, and the Athenians return. The engagement at Pelium, about the beginning of November.

423 The Lacedemonians and Athenians make a truce about the 3d of October.

422 The truce finishes about the 12th of April, soon after the celebration of the Pythian games.

421 A peace of fifty years, concluded April 10, between the Athenians and Lacedemonians, which is kept for six years and ten months, though each continued at war with the other's allies.

420 The Athenians, by the instigation of Alcibiades, renew the treaty with the Eleans, Argives, and Mantineans,

tineans, about June 13, being twenty days before the Olympic games, and ten days before the Panathenæa.

419 Protagoras of Abdera the sophist, and Appius Claudius, lived at this time.

418 The Lacedemonians gain a signal victory over the Argives and Mantineans, about August the 1st; and soon after both parties withdrew home to celebrate, August 6, their festival, called Carnia.

416 The scene of the Peloponnesian war is changed to Sicily. The agrarian law first moved in Rome.

415 The statues of Mercury at Athens thrown down May 9th; and about the middle of June the Athenian fleet set sail for Sicily. Alcibiades, being accused, is soon recalled from thence, and retires to Sparta. Parrhasius of Ephesus, the painter.

414 Egypt revolts from the Persians. The second part of the Peloponnesian war, called the *Decelean*, begins. The Lacedemonians send an army into Sicily about the beginning of May.

413 An eclipse of the moon, on August 27th, which so frightened Nicias, that he lost the Athenian army in Sicily.

412 The Athenians, from their misconduct in Sicily, are deserted by their allies of Chios, Samos, and Byzantium. Lysias the orator.

410 The Lacedemonians, under Mindarus, assisted by Pharnabazus, are defeated at Cyzicum by the Athenians.

409 The Carthaginians enter Sicily, destroy Selinus and Himera, but are repulsed by Hermocrates.

407 Alcibiades returns to Athens, June the 10th; and rejoins the army about the 28th of September.

406 Agathon the comic poet, and Cebes the philosopher, flourished about this time.

405 The Athenian fleet, consisting of 180 ships, are totally defeated at Ægospotamos by Lysander, December the 13th. Syracuse usurped by Dionysius.

404 Athens taken by Lysander, on the 24th of April, which finished the Peloponnesian war. Athens is governed by thirty tyrants.

401 Cyrus is killed in an expedition against his brother Artaxerxes. Retreat of the 10,000 Greeks. The thirty tyrants are expelled Athens by Thrasybulus.

400 Of the Julian period, 1314; of Nabonassar, 349; 95th Olympiad; of Rome, 354.

400 Socrates is put to death by the Athenians. Xenophon the philosopher, surnamed the Attic Muse.

398 Military catapultæ invented about this time, by Dionysius of Syracuse. Pisander, the Lacedemonian general; died 394.

397 Dionysius of Syracuse makes war against the Carthaginians, which continues about five years. Zeuxis, of Heraclea, the painter.

396 Agesilaus, king of Lacedemonia, makes an expedition into Asia, against the Persians. Antisthenes the first cynic philosopher.

395 An alliance of the Athenians, Thebans, Corinthians, and Argives, against the Lacedemonians, which began the Corinthian war.

394 Sea fight at Cnidus a few days before the solar eclipse, August 14; when the Lacedemonians, under Pisander, were defeated by Conon. The allies were defeated a few days after at Coronea, by Agesilaus. Archytas of Tarentum the Pythagorean philosopher and mathematician.

392 Aristippus senior, of Cyrene, the philosopher, lived at this time; also Mago the Carthaginian general.

390 Battle of Allia, July 17th, in which the Romans are defeated by the Gauls, and the city of Rome taken and burnt. Camillus, Roman dictator.

389 Plato made his first voyage into Sicily.

388 Dionysius begins the siege of Rhegium, which is taken after a defence of eleven months.

387 Peace of Antalcidas, between the Persians and Lacedemonians, by which the Greek cities in Asia were made tributary to the Persians. Damon and Pythias the Pythagorean philosophers and friends.

385 War of Cyprus finished by treaty, after it had lasted two years.

384 M. Manlius Capitolinus died. Mithridates king of Pontus; died 363.

377 Sea-fight at Naxus, September 20th, where the Lacedemonians under Pollis are defeated by Chabrias. Mausolus prince of Caria; died 353. Arete of Cyrene, the female philosopher.

374 Artaxerxes sends an army into Egypt, under Pharnabazus, assisted with 20,000 Greeks, under Iphicrates.

372 Diogenes, the cynic philosopher, lived in the time of Dion of Syracuse.

371 Battle of Leuctra, July 8, in which the Lacedemonians are defeated by the Thebans under Epaminondas.

370 The Messenians return into Peloponnesus, after a banishment of about 300 years.

368 Eudoxus went into Egypt about this time, whence he brought the celestial sphere and the regular astronomy into Greece.

367 The populace of Rome obtain the privilege of having one of the consuls a plebeian.

366 Eudoxus of Cnidus the astronomer flourished.

365 The Romans renew the custom of fixing the chronological nail in the temple of Jupiter, on the Ides, or 13th of September, about this time.

364 The Pisæans preside in the Olympiad, having excluded the Eleans. Pelopidas is killed in a battle he gained over Alexander of Pheræa.

363 Battle of Mantinea, gained over the Lacedemonians by Epaminondas, who dies of a wound received in it. Aristippus junior, the Cyrenaic philosopher.

362 Agesilaus carries an army into Egypt, to assist Tachos against the Persians. Several of the Persian governments in the Lesser Asia revolt against Artaxerxes.

360 The first battle gained by Philip was at Methon over the Athenians. Plato's second voyage into Sicily, about this time.

359 The second battle gained by Philip was over the Illyrians, after an obstinate engagement with Bardyles their king.

357 Dionysius junior the Tyrant is expelled Syracuse by Dion. The second sacred war begins from the Delphic temples being attacked by the Phoceans.

356 Lycurgus, surnamed Ibis, the Athenian orator, lived at this time; also C. M. Rutilius, the first plebeian dictator.

355 Dion put to death by the Zacynthian mercenaries, and Syracuse is governed by a succession of short-lived tyrants for seven years.

353 The Phoceans under Onomarchus, assisted by Lycophron tyrant of Pheræa, are defeated in Thessaly, by Philip.

351 The Sidonians, being besieged by the Persian army, burn their city and themselves to death.

350 Egypt is conquered by Ochus, who compels Nectanebus to retire into Ethiopia.

348 The sacred war finished by Philip king of Macedon, he having taken all the cities of the Phoceans.

347 Dionysius recovers the tyranny of Syracuse, after ten years banishment, and keeps it four years.

345 Aristotle the philosopher flourished; he died in 322, aged sixty-three.

343 The war between the Romans and Samnites begins, and continues seventy-one years. Timoleon recovers Syracuse to its liberty, banishes Dionysius to Corinth, and settles a democracy. Protogenes of Rhodes, the painter.

342 Æschines the orator banished 330.

340 The Carthagenians are defeated by Timoleon in a great battle near Agrigentum in Sicily, fought June 13.

339 Xenocrates the academic philosopher; died 314, aged eighty-two. Parmenio the Macedonian general.

338 The battle of Chæronea, August second, in which the

the Athenians and Thebans were defeated by Philip. Demosthenes, the orator, banished Athens in 325, recalled in 323, and died in 322, aged sixty.

336 Philip king of Macedon is killed by Pausanias about the end of August.

335 Alexander enters Greece about September 9, obliges the Athenians to submit, and destroys the city of Thebes, leaving only Pindar the poet's house; almost all the inhabitants were either killed or enslaved.

334 The battle on the river Granicus in Phrygia, gained by Alexander over Darius on the 22d of May. Apelles of Cos, the painter.

333 The second battle gained by Alexander, at Issus in the month of October. Callisthenes the philosopher.

332 Tyre taken by Alexander, August 20th, after a siege of seven months. He takes possession of Egypt, and builds Alexandria.

331 The third and last battle of Arbela, gained October 2, being eleven days after a total eclipse of the moon, on September 21st.

330 The seventy-six years cycle of Callippus, begins from Darius's death, upon the 1st of July: it consisted of 27,759 days, equal to 940 lunations. Agis, king of Lacedemonia, defeated and killed.

329 Thalestris queen of the Amazons visits Alexander.

327 Alexander's expedition into India against Porus. Lysippus the statuary.

324 Crates of Thebes, the cynic philosopher, died after 287.

323 Alexander dies April 21st. His empire is divided into four kingdoms, two of which were unsettled for the first twelve years. The Lamian war between the Athenians and Antipater.

322 The principal Athenian orators viz.—Demosthenes, Hyperides, and Demades, are put to death by Antipater. Theophrastus the peripatetic philosopher.

321 The Romans, defeated by the Samnites, pass under the yoke at Furcæ Caudinæ near Beneventum.

320 Polysperchon publishes a general liberty to all the Greek cities. Menander the inventor of the new comedy.

318 Phocion unjustly put to death by the Athenians.

317 Syracuse, and soon after all Sicily, usurped by Agathocles. Demetrius Phalerus governs Athens for ten years. Demetrius Phalereus the peripatetic philosopher banished Athens in 307, and died 284.

315 Eumenes, after having gained two battles over Antigonus, is deserted by his army, and delivered by them as a prisoner to Antigonus.

312 The Romans begin the Hetruscan war. Seleucus takes Babylon, from which begins the era of the Seleucidæ, or what the Jews call Dhilcarnaim, and the era of contracts, on Tuesday March 13. Zeno of Cittium in Cyprus, the first of the stoic philosophers.

310 Agathocles defeated by the Carthagenians, on the river Himera, about July 22d, carries the war into Africa; in his passage the sun was almost totally eclipsed, August 15, being eleven digits $\frac{1}{2}\frac{5}{2}$.

309 Agathocles from his entering Africa continues conquering the Carthagenians for four years.

308 The Samnites, Marsi, and Peligni, defeated by Fabius, to whom the Umbri likewise surrender. Philemon the comic poet and rival of Menander.

307 Demetrius Poliorcetes changes the government of Athens, from an oligarchy to a democracy, banishing Demetrius Phalereus and others.

306 The title of king is first assumed by the successors of Alexander.

304 Pyrrho the first of the sceptic philosophers.

301 The battle of Ipsus in Phrygia, where Antigonus is defeated and killed by Ptolomy, Seleucus, Lysimachus, and Cassander.

300 Of the Julian period, 4414; of Nabonassar, 449; 120th Olympiad; of Rome, 454.

300 Euclid of Alexandria, the mathematician, and author of the elements of geometry.

299 Agathocles passes with his army into Italy, and takes Crotona. Arcesilaus the philosopher and author of the second, or middle academy.

296 Athens taken by Demetrius Poliorcetes, after a year's siege. Epicurus flourished.

295 Timocharis of Alexandria, the astronomer, flourished; and Pyrrhus king of Epirus.

294 Timocharis observed, March the 9th, and four hours before midnight, a conjunction of the moon with the Spica of Virgo; that star being then, according to him, eight degrees west from the equinoctial point.

293 The first sun dial erected at Rome, by Papirius Cursor, on the temple of Quirinus; their time was then first divided into hours.

291 Seleucus had built about forty new cities in Asia, which he now peopled with different nations.

287 The Athenians revolt from Demetrius Poliorcetes; his great army being corrupted and disbanded by Pyrrhus, who then took possession of Macedonia.

286 Lysimachus takes possession of Macedon, having expelled Pyrrhus.

285 Dionysius began his astronomical era on Monday, June 26, being the first who found the exact solar year to consist of 365 days 5 hours and 49 minutes.

284 The septuagint translation of the Old Testament is thought to have been made about this time. The pharos of Alexandria built.

283 Dolabella defeats the Senones and afterwards the Boii and Hetruscans at the lake Vadimonis in Hetruria. Sostratus of Cnidus the architect.

282 Timocharis observed, November the 9th, three hours and a half after midnight, a second conjunction of the moon with the spica of Virgo, covering that star with the north part of her disk. Theocritus of Syracuse the pastoral poet.

281 Lysimachus defeated and killed in Phrygia by Seleucus. The republic or league of the Achæans begins. The Tarentine war begins, and continues ten years.

280 Pyrrhus, king of Epirus, comes into Italy to assist the Tarentines, and continues there and in Sicily about six years. Aristarchus of Samos the astronomer.

278 A large army of Gauls, under Brennus, are cut to pieces near the temple of Delphos.

276 The first regular body of grammarians, or critics, began about this time.

274 Pyrrhus, being defeated by Curius at Maleventum, retires to Epirus.

272 The Samnites and Tarentines defeated by the Romans, which concludes the two wars; the first having lasted seventy-one years, the second ten years.

269 The first coining of silver at Rome, under the consulship of Fabius Pictor and Gulo, five years before the first Punic war.

268 Athens taken by Antigonus Gonatas, who retains the government twelve years. Berosus the Chaldean historian. Hermachus of Mitylenè the Epicurean.

264 The first Punic war begins, and continues twenty-three years. The chronology of the Arundelian marbles composed. Cleanthes the stoic philosopher.

262 Battle of Sardis, in which Antiochus Soter is defeated by Eumenes king of Pergamus.

261 The Romans first concern themselves in naval affairs. Annibal senior, Carthagenian general, dies.

260 The Carthagenians defeated at sea by the Romans, under Duilius, who had the first naval triumph, in November. Callimachus, of Cyrene, the poet.

259 Zoilus, the critic, surnamed Homero-Mastix.

258 Three hundred Romans, under Calpurnius Flamma, preserve the Roman army in Sicily, by engaging the Carthagenians till they were all cut to pieces.

256 Regulus is defeated and taken prisoner by the Carthagenians under Xanthippus. Athens is restored to its liberty by Antigonus.

251 Aratus of Sicyon, after the expulsion of their tyrants, prevails

prevails on his fellow citizens to join the Achæan League. The Romans begin the siege of Lilybæum, which continues ten years. Regulus put to death.

250 The Parthians under Arsaces, and the Bactrians under Theodotus, both revolt from the Macedonians.

249 The sea-fight of Drepanum in Sicily, where the Romans under Claudius Pulcher are totally defeated by the Carthaginians under Adherbal.

246 Ptolemy kills Laodice in revenge of his sister Berenice, and overruns great part of Syria. Conon of Samos the astronomer.

243 The citadel of Corinth, called Acro-Corinthus, taken by Aratus on the 12th of August.

242 The Carthaginians defeated by Lutatius at the isles of Ægates, which makes them beg for peace; and so concludes the first Punic war. Apollonius of Perga surnamed the Great Geometrician.

241 Agis, king of Sparta, having attempted to settle an agrarian law, is put to death.

240 The first plays acted at Rome, which were these of Livius Andronicus, fifty-two years after the death of Menander. Livius Andronicus the first Roman dramatic poet.

238 The Carthaginians finish the Libyan war with their mercenaries, which had lasted three years and four months.

237 Amilcar carries a Carthaginian army into Spain, and with him his son Annibal, nine years old.

236 Archimedes of Syracuse, the mathematician, died 212.

235 The temple of Janus shut the first time after Numa.

234 The Sardinian war begins, and continues three years. C. Nævius the comic poet; died 203.

233 The original manuscripts of Æschylus, Euripides, and Sophocles, are lent about this time to Ptolemy by the Athenians, who gave them a pledge of fifteen talents.

232 Megalopolis is joined to the Achæan league by Lysiades, at the persuasion of Aratus.

231 The first divorce at Rome by Sp. Carvilius. Sardinia and Corsica subdued by the Romans.

229 The Romans make war against the Illyrians for their piracies, which continues one year, and then Teuta their queen begged for peace. Apollonius, the Rhodian poet.

228 The Roman ambassadors first appear at Athens, Corinth, &c. being invited by the Achæan and Ætolian leagues.

227 The war between Cleomenes and Aratus begins, and continues five years.

225 Cleomenes, after killing the first Ephori, restores the agrarian laws of Sparta. The Gauls enter Italy, but are defeated in Etruria by L. Æmilius. Fabius Pictor the first Roman historian.

224 The Romans first cross the Po pursuing the Gauls. The Colossus of Rhodes thrown down by an earthquake.

222 The battle of Sellasia in Laconia, where Cleomenes, king of Sparta, is defeated by Antigonus. Cleomenes retires into Egypt.

220 The social war in Greece between the Ætolians and the Achæans begins, and continues three years. King Philip joined the Achæans. Plautus of Umbria the comic poet, died 184.

219 Saguntum taken and destroyed by Annibal. Archagathus the first physician at Rome.

218 The *second Punic war* begins with passing the Alps, and continues seventeen years. The Romans defeated at Ticinum and Trebia.

217 The Romans defeated by Annibal at the lake of Thrasymene. Artabanus king of Parthia.

216 The Romans totally defeated in the battle of Cannæ in Apulia, August 2, according to their erroneous calendar, but about May 21 of the Julian year.

214 The Romans make an auxiliary war against Philip in Epirus, which is continued by intervals for fourteen years, till the first Macedonian war.

212 Syracuse, after a siege of three years, is taken by Marcellus upon the festival of Diana in autumn. He sent the spoils to Rome, consisting of paintings, statues, &c.

210 Hermippus of Smyrna, the peripatetic philosopher, and grammarian, flourished about this time; also Philopæmen, prætor of the Achæans, surnamed the last of the Greeks; he died in 183, aged 70.

208 Machanidas, tyrant of Lacedemon, is defeated at Mantinea by Philopæmen.

207 Asdrubal, having entered Italy with a large army to reinforce Annibal, is defeated and killed by Claudius Nero. Zeno of Tarsus, the stoic philosopher.

205 Ennius is brought to Rome by Cato the quæstor, being thirty-four years old, and then first gave harmony to the Roman poetry.

203 The war of Philip against the Rhodians assisted by Attalus; it continues six years till the end of the first Macedonian war.

202 The battle of Zama in Africa, where Annibal is totally defeated by Scipio soon after a small eclipse of the sun, which happened October 19.

201 The Carthaginians have a peace granted them on very ignominious terms, which finishes the second Punic war. Syphax, king of Numidia, dies.

200 Of the Julian period 4514; of Nabonassar 549; 145th Olympiad; Of Rome 554.

200 The *first Macedonian war* begins, and continues near 4 years. Aristophanes of Byzantium, the grammarian.

198 Battle of Panius in Cœlosyria, where Antiochus totally defeats Scopas, and then besieges and takes Sidon, whither he had retired.

197 Battle of Cynocephalæ in Thessaly, where Philip is defeated by Flaminius, and begs for peace from the Romans.

196 Caius Lælius, the Roman orator, lived at this time.

195 Annibal retires from Carthage to the court of Antiochus the Great, whom he instigates to war against the Romans.

192 The war of Antiochus the Great with the Romans, begins, and continues three years.

191 Lacedemon is joined to the Achæan league by Philopæmen.

190 The first Roman army enters Asia under L. C. Scipio, and totally defeats Antiochus in the battle of Magnesia in Lydia.

189 The Asiatic luxury first brought to Rome by the spoils of Antiochus.

188 Upon a quarrel between the Lacedemonians and Achæans, Philopæmen abrogates the laws of Lycurgus; but they are soon restored by the Romans.

187 Antiochus the Great is defeated and killed in Media, after plundering the temple of Jupiter Belus in Elymaïs.

185 Diogenes of Babylon the stoic philosopher, and Dinocrates tyrant of the Messenians.

184 A war between Eumenes and Prusias, which continued one year till the death of Annibal. M. Porcius Cato, surnamed the Censor.

183 Philopæmen defeated and killed by Dinocrates, tyrant of the Messenians.

182 The Lacedemonians enter a second time into the Achæan league.

180 Demetrius, being treacherously accused by his brother Perseus, is put to death by his father king Philip. Cleopatra regent of Egypt at this time. Statius Cæcilius the comic poet.

179 Some books of Numa found at Rome in a stone coffin and burnt, being 494 years after his death. Livy thinks they were forged.

175 Perseus, preparing for a Roman war, sends to Carthage, where his ambassadors have an audience of the senate at midnight for secrecy.

173 Ennius finishes the twelfth book of his Annals, being in the 67th year of his age. Attalus of Rhodes, the astronomer and grammarian.

171 Ptolemy's generals defeated by Antiochus in a battle between

between Pelusium and mount Casius. The *second Macedonian war begins.*

170 Antiochus Epiphanes takes Jerusalem, and two years after pollutes the temple with sacrifices of swine, and carries off 1800 talents to Antioch, which disaster was on the 25th of the Hebrew month Kisleu, the Macedonian Apellæus, or the 15th of the Julian December. Menelaus, surnamed Onias IV. high priest of the Jews at this time.

168 The battle of Pydna, June 22, in which Perseus king of Macedon is totally defeated by P. Æmilius. This terminates the kingdom of Macedon. An eclipse of the moon, which happened the night before, was foretold to the Roman army by Gallus.

167 The first library erected at Rome, composed of the books brought from Macedon.

166 Terence's first play, called Andria, acted, being approved of by Cæcilius, and bought by the Ædiles. Apollonius, the Syrian general, is defeated and killed by Judas Maccabeus.

164 Polybius of Megalopolis the historian, flourished.

163 The government of Judea, under the Hasmonean family or Maccabees, begins, and continues 126 years.

162 Hipparchus begins his astronomical observations at Rhodes, which he continues for thirty-four years. Demetrius, escaping from Rome to Antioch, kills Eupator, and takes possession of Syria.

161 The philosophers and rhetoricians first banished Rome. Judas Maccabeus, and Nicanor, die.

160 Terence's last play, called Adelphi, acted at the funeral of Paulus Æmilius. Carneades of Cyrene, the philosopher, and author of the third or New Academy.

159 Time measured at Rome by water, invented by Scipio Nasica, 134 years after the introduction of sun-dials.

158 Hipparchus observed the autumnal equinox on Sunday September 27, about mid-day.

156 Prusias, surnamed Venator, king of Bithynia, defeats king Attalus, and plunders and burns several of the temples of Pergamos. Mithridates, king of Parthia. Aristarchus of Alexandria, the great grammarian.

155 Carneades, in an embassy from Athens, alarmed the Roman senate with his eloquence.

152 Andriscus, pretending to be the son of Perseus, assumes the tyranny of Macedon.

150 Demetrius king of Syria is defeated and killed by Alexander Balus.

149 The third Punic war begins, and continues three years. Prusias king of Bithynia is put to death by his son Nicomedes, surnamed Philopater, who reigned fifty-nine years.

148 Jonathan Maccabeus defeats Apollonius prefect of Cœlosyria in the battle of Azotus, after which he took both that city and Ascalon.

147 The Romans make war against the Achæans, which is finished by Mummius the following year.

146 Carthage destroyed by P. Scipio, and Corinth by L. Mummius, who brought from thence the first fine paintings to Rome; the principal were the Bacchus, by Aristides, and Hercules in torture, from Dejanira's coat.

145 Lælius defeats Viriathus, who had occupied Lusitania the year before; this war continues afterwards for five years.

144 Jonathan Maccabeus betrayed and put to death by Tryphon.

143 Hipparchus observes the autumnal equinox on Wednesday September 26, about sun-set; and from the new moon of September 28, he began his new cycle of the moon, consisting of 111,035 days, being equal to 3760 lunations, or 304 years.

142 Simon takes the castle of Jerusalem by famine, after a long blockade.

141 The war of Numantia begins, and continues eight years. An eclipse of the moon, observed at Alexandria, on Tuesday, January 17, two hours before midnight.

138 The Roman army, under Mancinus, being 30,000, are ignominiously defeated by 4000 Numantines.

137 Ptolemy Physcon began a new restoration of learning at Alexandria, by drawing thither the most ingenious foreigners in all the arts and sciences; this he did to replenish that city, which was become a desert by his cruelties.

136 Scipio Africanus, with Sp. Mummius and L. Metellus, attended by Panætius the stoic philosopher, made their famous embassy into Egypt, Syria, and Greece.

135 The history of the Apocrypha ends. The Servile war begins in Sicily, and continues three years. Hipparchus observed the vernal equinox on Wednesday March 24, a little after midnight.

133 Numantia taken and destroyed by Scipio. The kingdom of Pergamus annexed to the Roman empire, being bequeathed by Attalus Philometer, the last king, to the Roman people. Tiberius Gracchus is put to death, about attempting an agrarian law.

130 Antiochus Sidetes, king of Syria, is defeated and killed by Phraates, king of Parthia. Aristonicus is defeated by Perperna.

129 Hipparchus observes the vernal equinox to be on Thursday March 23, about sunset; and afterwards that the star called *Cor Leonis* was 29° 50′ from the summer solsticial colure.

128 The battle of Damascus, in which Demetrius Nicator is totally defeated by Alexander Zebina, and is soon after killed at Tyre.

123 The Romans make war against the Baleareans for their piracies. Carthage is rebuilt by order of the Roman senate. Mithridates, surnamed the Great, king of Pontus.

121 Caius Gracchus is killed in attempting an agrarian law. The weather of this year was so favourable, that the wine of it was kept 200 years. Alexander Zebina is defeated and killed two years after he was dethroned, by Antiochus.

120 Castor of Rhodes, chronologer and historian, flourished.

119 Caius Marius, as tribune of the people, imprisons Metellus the consul, for opposing a law which he proposed about the bridges of Rome.

118 The Romans settle a colony at Narbonne in Gaul. Dalmatia is conquered by Metellus.

116 Cleopatra assumes the government of Egypt; at first endeavours to exclude her eldest son Ptolemy Lathurus, but is prevented by the populace of Alexandria. Lucilius, the first Roman satyrist.

115 Apollodorus of Athens, chronologer and grammarian.

113 Marcus Antoninus, sen. the Roman orator; he died in 87, aged fifty-six.

112 Antiochus Cyzicenus defeats Grypus in battle, and takes possession of Syria; but dividing it next year with Grypus, calls his own part Cœlosyria.

111 The Jugurthine war begins, and continues five years.

110 The famous sumptuary law, called *Lex Licinia*, made at Rome, by which the expence of eating for each particular day was limited. Lucius Crassus, the Roman orator, flourished.

109 The Teutones and Cimbri begin the attack of the Roman empire, which continues eight years. Jugurtha defeated in two battles by Metellus. Ptolemy is defeated, and Samaria taken, by John Hyrcanus.

107 Cicero is born on the 3d of the nones of January, which agreed with the beginning of November, according to the Julian year.

106 Ptolemy is artfully dethroned by Cleopatra. Jugurtha, having taken refuge with Bocchus, is by him delivered up to Marius.

105 Cæpio and Manilius ignominiously defeated by the Teutones, &c. on the banks of the Rhone, in which 80,000 Romans are killed.

104 Artemidorus of Ephesus, the geographer, flourished.

102 The Teutones defeated by Marius in two battles at Aquæ Sextiæ, (now Aix in Provence;) where 200,000 are killed, and 70,000 taken prisoners.

101 Marius and Catullus defeat the Cimbri, as they were endeavouring to enter Italy thro' Noricum, (now the Tirol;) 120,000 are killed, and 60,000 taken prisoners.

100 Of the Julian period 4614; of Nabonassar 649; 170th Olympiad; of Rome 654.

100 Julius Cæsar is born on the 4th of the Ides, or the 12th of the month Quintilis, afterwards called July.

99 Lusitania is conquered by the Romans under Dollabella.

97 Ptolemy Appion, king of Cyrenè, dies, and bequeaths his kingdom to the Romans. Mesopotamia is about this time occupied by the Parthians.

95 Hortensius began to plead when he was but 19 years old.

94 Antiochus Cyzicenus is defeated near Antioch by Seleucus, and kills himself when ready to be taken prisoner.

93 Seleucus, being defeated by Antiochus Pius, retires to Mopsuestia in Cilicia, where he is burnt alive. Tigranes, king of Armenia.

91 The Social or Marsic war begins, which continues three years, and is finished by Sylla in 88. Antiochus Pius, being defeated by Philip and Demetrius, retires among the Parthians. Tyrrhus, Egyptian general.

90 Asclepiades of Prusias, author of a new sect in physic; died after 63.

89 The Mithridatic war begins, and continues 26 years.

88 The Civil war between Marius and Sylla begins, and continues six years.

86 Sylla takes Athens on March 1, according to the Roman calendar, and sends Apellicon's library to Rome, in which was the original manuscript of Aristotle's works. Sylla cuts to pieces the army of Archelaus.

84 Mithridates begs peace of Sylla, which is granted him.

82 Carbo, with Marius junior, &c. are defeated at Præneste, and at the Porta Collina of Rome, by Sylla, who, after proscribing 40 senators and 1600 equites, is made dictator, and continues so for three years.

81 Cicero began to plead, and made his first oration, which was for Quinctius, having entered the twenty-sixth year of his age.

79 Sylla resigns the dictatorship, and dies the year after. Alexandra, by favouring the Pharisees, assumes the sole government of Judæa.

77 M. Emilius Lepidus dies.

76 Apollonius of Rhodes, rhetorician; Theodosius of Tripoli, mathematician; and Metrodorus Scepsius, philosopher, and minister to Mithridates king of Pontus, lived at this time.

75 Nicomedes, king of Bithynia, dying, bequeaths his kingdom to the Romans.

74 Lucullus renews the war against Mithridates, who had occupied Bithynia, and made a league with Sertorius.

73 The Servile war begins under Spartacus, Oenomaus, and Crixus, the gladiators.

71 Spartacus is defeated and killed by Crassus and Pompey, which finishes the Servile war. Tyrannio the grammarian.

70 Cicero makes his orations against Verres, being thirty-six years old. The censorship is revived at Rome, having been discontinued for sixteen years. M. Terentius Varro, the most learned of the Romans.

69 Lucullus defeats the two kings Mithridates and Tigranes, in a great battle in Armenia, the day before the nones of December, and then takes Tigranocerta, with all the royal treasures.

67 The battle of Jericho, in which Hyrcanus is defeated, and soon after dethroned, by his brother Aristobulus. The war against the Pirates began in the spring, and was ended about Midsummer, by Pompey.

66 Mithridates is defeated by Pompey in a night battle in the Upper Armenia. Crete is conquered by Metellus, after a war of two years, and reduced to a Roman province.

65 The reign of the Seleucidæ ends in Syria, which is reduced by Pompey to a Roman province. Antiochus Asiaticus the last king of Syria. T. Lucretius Carus, the poet.

63 The Cataline conspiracy detected by Cicero, in October, and defeated by Antony, about the middle of December. Mithridates, after the loss of a battle with his son Pharnaces, kills himself. Jerusalem is taken by Pompey, who restores Hyrcanus.

60 The first triumvirate between Pompey, Cæsar, and Crassus, concerted and concluded about the end of autumn, when Cæsar returned from the conquest of Lusitania.

59 Q. V. Catullus, the lyric poet; Andronicus of Rhodes, restorer of Aristotle; and Cato, jun. of Utica, lived.

58 Cicero is banished Rome, about the calends of April, by the instigation of Clodius, and retires to Thessalonica. Cæsar began to attack the Helvetii, April 1, having the year before obtained Cisalpine Gaul for five years, by the Lex Vatinia.

57 Cicero is recalled from banishment, and thanks the senate in an oration spoken upon the nones of September. Sallust the historian.

55 Cæsar passes the Rhine and defeats the Germans, and soon after makes his first expedition into Britain, whence he returns in September. Labienus, general under Cæsar in Gaul.

53 Crassus is killed, and his army cut to pieces by the Parthians, under Surenas, at Sinnaca in Mesopotamia, in the Roman month of June, viz. the 9th, and near the summer solstice.

50 The *Civil War* properly begins on the 22d of October, when the senate ordered Cæsar to disband his army. Cæsar besieges Pompey in Brundusium, December 26.

49 Pompey sails from Brundusium, January the 3d; and Cæsar enters it on the 4th; and comes to Rome about the 19th. He besieges Marseilles in the spring; defeats Pompey's lieutenants in Spain in the summer; returns to Rome in September; and passes into Epirus October the 15th.

48 The battle of Pharsalia, fought about the 20th of July of their erroneous calendar, but about May the 12th of the Julian year.

47 The war of Alexandria, that city being taken by Julius Cæsar, January the 14th.

46 The war of Africa, in which Cato kills himself at Utica, February the 5th. This is called *the year of confusion*, being corrected by Sosigenes, and consisting of fifteen months, and of 445 days.

45 The battle of Munda in Spain, gained over Pompey's son and lieutenants, on March the 17th; and Cæsar returned to Rome in October. On the death of Fabius, Maximus Caninius Rebilus was made consul for a few hours, December the 31st.

44 Cæsar killed in the senate-house, March the 15th, aged fifty-six. Diodorus Siculus, the historian, flourished.

43 The battle of Mutina, April the 15th. The *second triumvirate*, between Octavius, Antony, and Lepidus, began November the 27th. Cicero put to death, December the 7th.

42 Cassius and Brutus defeated at Philippi in two battles, having an interval of twenty days; the last being fought about the end of October.

41 The short Peruvian war, in which Antony's brother Lucius is overpowered by Octavius.

40 Jerusalem is tyrannically occupied by Antigonus, assisted by the Parthians.

39 Pacorus, general of the Parthians, is defeated and killed by Ventidius, fourteen years after the defeat of Crassus, on the same day of the same month of June, viz. the 9th, being the Vestalia.

38 The Spanish era begins. See p. 539.

37 Jerusalem is taken by Sosius and Herod, on January the 1st; and Antigonus is soon after put to death, which finishes the Hasmonæan family, 126 years after Judas Maccabeus.

36 Sextus Pompeius defeated in Sicily by Octavius and Lepidus; but Lepidus soon after arrogating too much, is degraded from the triumvirate, and banished to Circeii.

35 Octavius goes into Pannonia and Sicily, and returns November the 13th to Rome.
34 Antony takes Artabazus, king of Armenia, prisoner. Dioscorides, physician to Antony and Cleopatra.
32 Octavius and Antony, after a long misunderstanding, openly prepare for war.
31 The battle of Actium fought, Sept. 2, in which Antony and Cleopatra are totally defeated; from whence *the Roman emperors properly begin.* Asinius Pollio, orator and historian; he died four years after Christ, aged 80.
30 Alexandria is taken by Octavius, August 1; upon which Antony and Cleopatra put themselves to death. *Egypt is then reduced to a Roman province.* Strabo the historian, lived till twenty-five years after Christ.
27 Octavius receives, January the 13th, by a decree of the senate, the title of Augustus; the power of imperator for ten years; next the censorship; then the tribuneship; and at last a total exemption from the laws. S. Aurelius Propertius, elegiac poet.
25 The Egyptians adopt the Julian year, and fix their Thoth to begin always on August 29. Cornelius Nepos dies. Livy the historian flourished.
24 Ælius Gallus makes an unsuccessful expedition into Arabia. The senate, by a solemn oath, on January 1, confirm to Augustus the tribuneship, and exemption from the laws.
23 Antoninus Musa, physician; his great remedy was the cold bath.
21 Augustus goes into Greece and Asia for two years; he recalls Agrippa, gives him Julia in marriage, and the government of the empire in his absence. Tibullus, the elegiac poet, wrote.
19 Death of Virgil the poet, aged fifty-one.
18 Augustus reduces the senate to 300; but this being generally complained of, he limits them to 600, many being degraded. Celibacy is discouraged.
17 The Secular games celebrated.
16 Agrippa goes into Syria for four years. M. Lollius is defeated by the Germans in Gaul, which brings Augustus thither for three years, and by this he covers his intrigue with Terentia, wife to Mæcenas.
15 The Rhæti and Vindelici defeated by Drusus, August 1, being exactly three lustra, or fifteen years to a day from the taking of Alexandria by Augustus. M. Vitruvius Pollio, the architect.
13 Augustus assumes the office of Pontifex Maximus, March 6, and burns all the pontifical books, being about 2000, reserving only those of the Sibylline oracles.
12 The Pannonians are conquered by Tiberius. Agrippa, returning from Pannonia, dies in Campania, March 19, aged fifty-one.
11 Drusus conquers the Sicambri, Chauci, and several other German nations.
9 Drusus makes an expedition into Germany against the Chatti and Cherusci, of which he dies, in Friesland, July 20.
8 Augustus corrects the calendar, by ordering the twelve ensuing years to pass without intercalation. The month Sextilis is named Augustus by a decree of the senate.
7 Verrius Flaccus, grammarian, supposed author of the Capitoline marbles.
6 Tiberius retires to Rhodes for seven years, from a jealousy of the two young Cæsars, by way of imitating the retirement of Agrippa.
5 *Our Saviour* JESUS CHRIST *born on Monday December* 25, four years before the common era.
4 An eclipse of the moon observed at Jerusalem, March 13; the middle, 2 h. 45 m. after midnight. Herod dies, November 25, being the seventh of Cisleu.—Dionysius of Halicarnassus, the historian.
2 Julia is banished by Augustus for her adulteries to the little isle Pandatarium, off Campania. Caius Cæsar goes as general in the Armenian war.—Dionysius, the geographer.
1 An interview in the isle of Samos between Caius Cæsar and Tiberius.

REMARKABLE EVENTS *since the* BIRTH *of* CHRIST.

1 Of the Julian period 4714; of Rome 754.
2 Tiberius returns to Rome, and soon after Lucius Cæsar dies at Marseilles, eighteen months before his brother Caius.
3 Caius Cæsar dies at Limyra in Lycia, on his return from Syria.
4 The leap-year corrected, having been formerly every third year. Phædrus lived at this time.
8 Jesus, being twelve years old, disputes with the Jewish doctors in the temple in April, when the passover was ended.
9 Ovid is banished to Tomi, in the beginning of October.
10 Varus, with three legions, cut to pieces in Germany, by Arminius the German general.
14 Augustus dies at Nola in Campania, August 19, aged seventy-six. Tiberius succeeds to the empire.
15 Velleius Paterculus flourished; he died in 31.
17 Twelve cities in Asia ruined by an earthquake.
19 Germanicus dies at Antioch, being poisoned by Piso, about the beginning of December.
20 Agrippina brought the ashes of Germanicus to Rome in March, a little before the Megalensia, which were celebrated April 4.
26 Tiberius goes to the island Caprea, and never returns to Rome. John the Baptist begins his ministry about the 19th of October.
27 Jesus is baptized by John in the beginning of the year.
29 The empress Livia dies, upon which Tiberius became more cruel and abandoned.
31 Sejanus is disgraced, and soon after executed, Oct. 17.
32 Death of John the Baptist. Columella flourished.
33 *Our Saviour* JESUS CHRIST *crucified* on Friday April the 3d, at three o'clock, P. M. His *Resurrection*, on Sunday, April the 5th. His *Ascension*, on Thursday, May the 14th.
34 Apion of Alexandria, the grammarian, surnamed the Trumpet of the World.
36 St. Paul converted.
37 Tiberius dies at Misenum, near Baiæ, March 16, aged seventy-eight. Succeeded by Caligula.
39 St. Matthew writes his gospel. Pilate kills himself.
40 The name of Christians first given at Antioch to the followers of Jesus.
41 Caligula is put to death by Chæreas and the other conspirators, January 24. Claudius succeeds him.
43 Claudius's expedition into Britain.
44 St. Mark wrote his gospel.
45 Pomponius Mela the geographer flourished at this time.
47 The Secular games celebrated at Rome. Caractacus, the British king; and Ostorius, Roman general, in Britain.
48 The empress Messalina publicly marries C. Silius, but they are soon both put to death by Claudius.
51 Caractacus is carried in chains to Rome.
52 The council of the apostles at Jerusalem.
54 Claudius dies, October 13, aged 63. Nero succeeds.
59 Nero puts his mother Agrippina to death, and begins his public debaucheries.
61 Boadicea the British queen defeats the Romans, but is conquered soon after by Suetonius.
62 St. Paul sent in bonds to Rome by sea from Sidon in the beginning of winter, and is shipwrecked at Melita, or Malta.
64 Rome set on fire July 17, and burned for six days, upon which began the first persecution against the Christians. Quintus Curtius, the historian.
65 Seneca, Lucan, and others, put to death.
66 Nero goes into Greece, and has public trials of skill with tragedians, musicians, and charioteers. The *Jewish war* begins in May.
67 St. Peter and St. Paul put to death about June 29. St. Linus, supposed first bishop of Rome.
68 Nero dies about June 10, aged thirty-two. Succeeded by Galba.

69 Galba put to death January 16. Otho, being defeated at Bedriacum, kills himself, April 20. Vitellius's army defeated near Cremona, October 29. Vespasian becomes emperor of Rome.
70 Titus takes and destroys Jerusalem on Saturday September 8.
71 Josephus lived about this time; died in 93, aged 56.
73 The philosophers expelled Rome.
74 Silius Italicus flourished about this time; when he died is uncertain.
77 The Parthians revolt. Julius Agricola governor of Britain.
79 Vespasian dies, June 24, aged sixty-nine. Herculaneum and Pompeii are buried by an irruption of mount Vesuvius, November 1. Pliny the historian dies.
81 Titus dies, September 13, aged forty-one, having reigned but two years, and is succeeded by Domitian. Martial lived at this time; died in 104, aged 85.
86 The Capitoline games instituted by Domitian about January 12, and celebrated every fourth year.
88 The Secular games celebrated. The war of Dacia begins, and continues fifteen years. Epictetus the stoic.
89 Quintilian lived at this time.
90 Agrippa of Bithynia, the mathematician, flourished.
91 Statius of Naples, the poet; he died in 96.
92 Cornelia Maximilla the vestal is buried alive for her prostitution. Agrippa observes in Bithynia a conjunction of the moon with the pleiades, November 29, five hours before midnight. St. Ignatius.
93 Tacitus the historian; he died after the year 99.
95 The second persecution against the Christians begins about November, and continues till Domitian's death. Juvenal the poet; died in 128.
96 Domitian is put to death by Stephanus and the other conspirators, September 18, aged forty-five.
98 Nerva dies, January 27, aged seventy-two. Menelaus observed at Rome a transit of the moon over the spica of Virgo, January 11, five hours after midnight.
99 Death of John the Evangelist, aged ninety-two.
101 Of the Julian period 4814; of Rome 854.
102 Pliny junior being proconsul in Bithynia, sends Trajan his famous account of the Christians, contained in lib. x. ep. 97.
103 Dacia is reduced by Trajan to a Roman province.
106 Trajan's expedition into the east against the Parthians.
107 The third persecution against the Christians.
109 Plutarch flourished; died in 119.
111 Suetonius the historian flourished about this time.
114 Trajan erects his famous column at Rome in autumn. Ælian flourished; died in 140, aged sixty.
115 An insurrection of the Jews of Cyrenè.
116 Lucius Annæus Florus flourished.
117 Trajan dies at Selinus in Cilicia, August 10, aged sixty-four. Theon senior the astronomer, of Smyrna.
118 The fourth persecution against the Christians.
121 Adrian builds the wall in Great Britain from Carlisle to Newcastle.
126 Adrian goes into Asia and Egypt for seven years.
127 Aristides, a philosopher, of Athens, lived at this time.
130 Adrian rebuilds Jerusalem, and raises there a temple to Jupiter. Cosroes, king of the Parthians.
131 The Jews rebel, and begin a second war. St. Polycarp flourished; died in 167.
132 Salvius Julianus compiles the perpetual edict, which was the body of laws for the prætors. Barcocheba the Jew dies.
133 An eclipse of the moon observed by Ptolemy at Alexandria, on Tuesday, May 6, 11 h. 15 m. P. M.
135 The Jewish war ends, when they were all banished Judea, and temples raised to Venus, &c. in all their holy places, which continued about 180 years.
136 The second great canicular year of the Egyptians begins July 20. Arrian the historian and philosopher.
138 Adrian dies at Baiæ, July 10, aged seventy-two.
139 Justin Martyr writes his first apology for the Christians; dies in 163.
140 Ptolemy observes the vernal equinox at Alexandria, March 22, about one o'clock in the afternoon.
141 A number of heresies appear about this time.
143 Appian the historian wrote about this time.
145 Antoninus defeats the Moors, and afterwards the Germans and Dacians.
146 The worship of Serapis is introduced at Rome by the emperor, and his mysteries were celebrated, May 6.
148 Justin the historian, and Aulus Gellius the grammarian, flourished.
152 Antoninus stops the persecution against the Christians.
156 Attilius Titianus is put to death by the senate for aspiring to the empire, which is the only instance of proscription in the reign of Antonius Pius.
161 Antonius Pius dies March 7, aged 75. Marcus Aurelius succeeds. A new war begins with the Parthians, and continues three years. Hermogenes became an ideot at the age of twenty-four.
163 Galen flourished, died in 193, aged seventy.
169 The war with the Marcomanni begins.
174 The war with the Marcomanni, Vandals, &c. finished by Antonius.
175 Avidius Cassius rebels, and is slain.
177 Another war with the Marcomanni, which lasts three years.
178 Diogenes Laertius lived at this time, died about 222.
180 Marcus Aurelius dies at Sirmium in Pannonia, March 17, aged 59; Commodus succeeds. Lucian died about this time, aged ninety.
181 Commodus makes peace with the Germans and returns to Rome.
183 A violent war in Britain ended by Marcellus.
185 Lucilla conspires against her brother Commodus, and is put to death.
186 Maternus conspires in Spain, and comes into Italy.
191 Commodus is put to death by Martha and Lætus, December 31, aged thirty-one. Pertinax is killed, March 28, upon which four different persons assume the empire, viz. Julianus, Pescenius Niger, Severus, and Albinus. Niger defeated by S. Severus, in the battle of Issus, who besieges Byzantium for three years. Disputes first begin about the time of Easter.
198 Albinus is defeated in Gaul and killed at Lyons, February 19.
200 Severus goes into the east and conquers the Parthians, and continues there and in Egypt three years.
201 Of the Julian period, 4914; of Rome, 954.
202 The fifth persecution against the Christians begins about April, and continues two years.
204 The secular games celebrated at Rome, in the beginning of June.
206 Clemens Alexandrianus and Minutius Felix.
207 Severus goes into Britain, where he continues till he dies.
209 Severus builds his wall across Britain, from the Firth of the Forth.
211 Severus dies at York, February 4, aged sixty-six.
212 Caracalla kills his brother Geta and many others, March 28.
213 Oppian flourished; time of his death uncertain.
217 The Septuagint found in a cask. Caracalla is killed near Edessa by Macrinus, April 8, aged forty-three.
218 Macrinus is put to death by the soldiers, June 7; Heliogabalus succeeds.
220 Julius Africanus the chronologer, lived at this time.
222 The Goths have an annual tribute not to invade the empire. Heliogabalus dies March 19, aged eighteen. Alexander Severus becomes emperor.
228 The kings of the Parthians, surnamed Arsacides, end, being conquered by Artaxerxes, king of Persia. Dion Cassius the historian.
231 Origen flourished till 254.
232 Ammonius begins a school of platonic philosophers at Alexandria.
234 Alexander marches into the East, defeats the Persians and triumphs afterwards at Rome, September 25.

235 The

235 The sixth persecution against the Christians, upon the death of Alexander, who is killed in Gaul, March 18.
237 The two Gordians killed in Africa by Pupienus in June.
238 Balbinus and Pupienus put to death by the soldiers, during the capitoline games, in March. Gordian the younger made emperor.
240 Sabinianus revolts in Africa, but is defeated.
241 Gregory, surnamed Thaumaturgus; died in 266.
242 Gordian makes an expedition against the Persians.
244 Gordian is put to death by Philip, who seizes the empire.
245 Philip makes peace with Sapor and returns to Rome.
247 Herodian the historian flourished at this time.
249 The two Philips are killed, the elder at Verona, and the younger at Rome, some time in autumn. Decius emperor of Rome.
250 The seventh persecution against the Christians begins in April.
251 St. Cyprian lived; died in 258.
252 A great pestilence over the Roman empire.
257 The eighth persecution against the Christians.
258 The empire is harrassed successively by thirty tyrants; Cyriades is the first of the 30 tyrants; dies next year.
260 Valerianus is taken prisoner by Sapor king of Persia, and flead alive.
261 Longinus; died 273.
264 Odenatus, king of Palmyra, governs the eastern empire for Gallienus.
267 The Scythians and Goths defeated by Cleodamus and Athenæus.
268 Gallienus is killed at Milan, February 21, aged fifty.
269 Claudius gains a great victory over the Goths, in which 300,000 are killed. Zenobia takes possession of Egypt.
272 The ninth persecution against the Christians.
273 Zenobia, queen of Palmyra, defeated by Aurelian at Edessa.
274 Aurelian gives up Dacia to the Barbarians.
275 Aurelian is killed near Byzantium, January 29.
276 Tacitus dies at Tarsus, April 13.
277 Probus makes an expedition into Gaul.
280 Probus goes into the east and defeats the Persians.
282 Probus is put to death at Sirmium, November 2.
284 The era of Dioclesian begins August 29, according to the fixed Egyptian year, though he did not enter upon his reign till September 17.
286 The empire is attacked by northern nations, and several provinces are usurped by tyrants.
290 The Gregorian and Hermogenian codex's published.
291 The two emperors and the two Cæsars march to defend the four quarters of the empire. Ælius Spartianus the historian.
293 Carausius is killed by Alectus, after a seven years usurpation of Britain.
295 Britain recovered to the emperors, after a ten years usurpation. Alexandria besieged and taken by Dioclesian.
301 Of the Julian period 5014.
303 The tenth persecution against the Christians begins at Nicomedia, February 23, and continues ten years.
304 Dioclesian and Maximianus resign the empire and live retired, April first.
306 Constantius dies July 25; succeeded by Constantine the Great, &c.
308 There were four emperors reigning at this time.
311 Lactantius flourished.
312 Maxentius defeated and killed in battle at Rome, by Constantine, September 24, when the indictions begin.
313 The tenth persecution ends June 13, by an edict of Constantine and Licinius.
319 Constantine begins to favour the Christians.
323 Constantine gives full liberty to the Christian religion.
324 Licinius defeated at Adrianople, July 3, and then at Chalcedon, Sept. 18, and banished to Thessalonica.
325 The first general council of Nice began June 19, and ended August 25; it consisted of 318 bishops.
326 Crispus being falsely accused is put to death by his father Constantine. Eusebius Pamphilius; died 342.
328 The seat of the empire removed from Rome to Constantinople.
330 Constantinople solemnly dedicated, by Constantine, May 11.
331 The emperor orders all the heathen temples to be destroyed. St. Athanasius; died 371.
334 Three hundred thousand Sarmatian slaves revolt from their masters, and are dispersed through the empire.
336 Death of Arius, the heresiarch.
337 Constantine the Great dies, on Whitsunday, May 22, aged sixty-six.
340 Constantine junior defeated and killed by Constans, at Aquileia, about the end of March.
341 St. Hilary; died 367, aged eighty.
342 Jamblichus; died about 363.
343 A persecution of the Christians in Persia, by Sapor.
350 Constans killed in Spain, by Magnentius, January 18.
354 Gallus is put to death, by Constantius.
356 Eutropius the historian and sophist.
357 Julian defeats and brings prisoner to Rome Cronodomarus, a German king.
358 An earthquake ruins 150 cities in Greece and Asia. Libanius the sophist.
359 Ammianus Marcellinus; died about 380.
360 Constantius and Julian quarrel and prepare for war.
361 Constantius dies at Tarsus, November 3, aged forty-five. Gregory Nazianzen; died 389.
363 Julian endeavours in vain to rebuild the temple of Jerusalem, and dies, June the 26th, in an expedition in Persia. Aurelius Victor.
364 The Roman empire divided into the eastern and western, upon the death of Jovian, February 16. Valens emperor of the east; Valentinian of the west.
370 St. Basil; died 379, aged fifty-one.
373 Firmus, tyrant of Africa, is defeated and hanged by Theodosius senior, Roman general, who died 376.
374 St. Ambrose made bishop of Milan; died 397.
376 The Goths, being expelled by the Huns, are allowed to settle in Thrace. Fritigernes and Athanaric, Gothic generals.
379 The Lombards first leave Scandinavia and defeat the Vandals. Theodosius the Great, emperor of the east. Ausonius; died 394.
381 The second general council of Constantinople began in May and continued to the end of July.
383 Gratian, emperor of the west, is defeated and killed by Andragathius, August 25. Pappus, of Alexandria, the mathematician.
387 St. Jerome; died 420, aged seventy-eight.
388 The tyrant Maximus defeated and killed at Aquileia, July 28, by Theodosius.
394 Theodosius defeats both Eugenius and Arbogastes, near Aquileia, September 6. St. Augustine; died 430, aged seventy-six.
395 Theodosius the Great died January 17, aged sixty; succeeded by Arcadius.
396 St. Chrysostome; died 407, aged 53.
398 Gildo defeated by his own brother Mascezeles, and kills himself.
401 Of the Julian period 5114.
403 Macrobius flourished; died in 415.
404 Fergus, first king of Scotland upon record.
405 Stilicho defeats Radagaisus and 200,000 Goths, in the mountains of Fesulæ. John Stobæus flourished.
406 The Vandals, Alans, and Suevi, spread into France and Spain, by a concession of Honorius. Pelagius, the heretic; died about 430.
408 Isdegerdes, king of Persia, is appointed by the will of Arcadius, guardian to Theodosius; Arcadius dies May 1, aged 31. Hypatia, the mathematician and daughter to Theon, lived.

410 Rome taken and plundered by Alaric king of the Visigoths, August 24. Servius the commentator on Virgil.
411 Synesius bishop of Cyrene and platonic philosopher.
412 The Vandals begin their kingdom in Spain, under Gunderic. St. Cyril bishop of Alexandria.
413 The kingdom of the Burgundians begins in Alsace, under Gundicar.
414 The Visigoths begin the kingdom of Toulouse, under Wallia.
416 Orosius, the historian, flourished.
417 The Alans defeated and extirpated, by the Goths, which extends the kingdom of Toulouse into Spain.
419 Socrates, the ecclesiastical historian, surnamed the Scholastic.
420 The kingdom of the French begins upon the Lower Rhine, under Pharamond.
423 The western empire usurped, by John, surnamed the Notary, assisted by Castinus, upon the death of Honorius, August 15, aged thirty-nine.
425 Theodosius endeavours to restore learning at Constantinople, by establishing public schools, &c.
426 The Romans leave Britain, and never return. The country is harrassed by petty tyrants for twenty years.
427 The Romans recover Pannonia from the Huns, after fifty years possession. The Vandals pass into Africa in May. Zosimus the historian.
428 The French defeated by Aëtius, surnamed defender of the empire.
431 The third general council of Ephesus began, June 22, and continued till the end of July. Nestorius the heretic bishop of Constantinople.
435 The Theodosian codex published, February 15.
439 Genseric takes Carthage, and begins the kingdom of the Vandals in Africa, upon the 19th of October. Sozomen the ecclesiastical historian.
445 Vortigern, first king of Britain, after the Romans quit the island.
446 The Britons make their famous complaint to Aëtius and the Romans, against the incursions of the Scots and Picts.
447 Attila, with his Huns, ravage all Europe; surnamed the Scourge of God.
449 The Saxons first come into Britain, being invited by Vortigern.
450 Theodosius II. dies July 29, aged forty-nine, having reigned forty-two years; is succeeded by Marcianus.
451 The fourth general council of Chalcedon, began October 8, and ended November 1. Attila defeated by Aëtius, on the plain of Chalons.
452 The city of Venice takes its rise about this time.
455 Rome taken by Genseric, in July. The kingdom of Kent begins.
456 The Suevi defeated by Theodoric, in a great battle, on the river Ebro, on Friday, October 5.
457 Vortimer defeated by Hengist, in the battle of Crayford in Kent. Marcianus dies about the end of January.
463 Victorius of Aquitain invents the Pascal cycle, of 532 years.
466 Euaric, with his Goths, defeated in Gaul by Ecdicius.
474 Leo I. dies in January, and Leo II. or junior, being an infant, dies in November.
475 Hengist treacherously massacres 300 British nobles, May 1. Zeno is dethroned by Basiliscus, but recovers next year.
476 The western empire finishes, 523 years after the battle of Pharsalia, by the defeat of Orestes, August 23, when the kingdom of Italy begins. Prince Arthur made patrician by Ambrosius, afterwards British monarch; died 542, aged seventy.
480 Great part of Constantinople thrown down by an earthquake, which lasted forty days; the greatest shock was felt on September 24.
485 The battle of Soissons, gained by Clovis against Siagrius the Roman general in Gaul.
487 A famous victory gained by the Britons, under Ambrosius and Prince Arthur, over Ella and the Saxons.
490 Theodoric with his Ostrogoths, leaving Mæsia in winter, enters Italy and defeats Odoacer at the river Sontium, March 28; a second time at Verona, and a third at Abdua.
491 Ella founds the second Saxon kingdom of Sussex, including that county and Surry. Zeno, being seized with an epilepsy, is buried alive, April 6.
493 The kingdom of Italy passes from the Heruli to the Ostrogoths, by the taking of Ravenna, February 27, after a siege of near three years.
496 Clovis baptized, and Christianity embraced in France.
501 Of the Julian period 5214.
501 Gondebaud publishes his laws of the Burgundians, called *La Loy Gombette*.
503 Anastasius's army cut to pieces by Cabades.
505 Celer defeats Cabades and puts an end to the Persian war.
506 Anien, chancellor of Alaric, reforms the Theodosian codex, and publishes it at Aire in Gascony, Feb. 2.
507 The battle of Vouille, near Poitiers, where Alaric is defeated and killed by Clovis.
510 Paris is made the capital of the French dominions.
511 Prince Arthur defeats the Saxons in the famous battle of Badon-hill, or Bath.
513 Boetius the philosopher flourished; died 524.
514 Constantinople besieged by Vitalianus, whose fleet is burnt, by a speculum of brass, by Proclus.
515 The computing of time by the Christian era is introduced by Dionysius.
519 Prince Arthur defeated at Charford by Cerdic, who begins the third Saxon kingdom of Wessex.
521 Thrasamond king of the Vandals, defeated and killed by the Moors.
523 The battle of Voiron, in which Clodomir king of Orleans is killed by Gondomar. Priscian the grammarian.
526 Erchenwin founds the fourth Saxon kingdom of Essex.
529 The codex of Justinian is published, April 16. The Persian war begun, by Belisarius. Tribonianus the famous lawyer.
532 Kingdom of Burgundy conquered by Childebert and Clotaire. An insurrection at Constantinople, in which 30,000 are killed in one day. Cosroes II. the great king of Persia; dies 585.
533 The digest of Justinian is published, December 30.
534 Kingdom of the Vandals finished by Belisarius, who took Carthage about the end of the year. Procopius the historian and secretary to Belisarius.
536 Rome taken by Belisarius, December 10. Belisarius disgraced in 561; dies in 565.
537 Count Marcellinus, the chronologer, flourished at this time.
539 Theodebert, king of Metz, enters Italy and takes the camps both of the Romans and Goths in one day.
540 Vitiges taken prisoner by Belisarius in Ravenna.
542 The consulship of Basilius, being the last at Rome. Prince Arthur and Modred are killed in the same battle in Cornwall.
543 A great plague, which came from Africa, and desolated Asia and Europe.
546 Rome taken by Totila, and pillaged in a barbarous manner.
547 Ida founds the fifth Saxon kingdom of Northumberland.
551 The manufacture of silk introduced into Europe from India, by some monks.
553 The fifth general council, or second of Constantinople, began May 4. Totila is defeated and killed in Tuscany, by Narses, in the end of July.
554 Teia is defeated and killed at Cumæ by Narses, in February, who thus finished the Ostrogoths in Italy.
556 Gildas, surnamed the Wise, the British historian, lived at this time; died in 570.
558 A terrible plague all over Europe, Asia and Africa, which continues near fifty years.
560 Chramnes, rebelling against his father Clotaire, is defeated, and burnt alive in a cottage.

561 In

561 In a conspiracy against Justinian, November 5, Belisarius, being mentioned by the conspirators, is disgraced, but is restored the following year.
565 Justinian dies November 13, aged eighty-three. Agathias the historian lived.
567 Queen Frédegonde the cruel wife to Chilperic; died 590.
568 The Lombards invited from Pannonia, by Narses, enter Italy and found a kingdom.
569 Exarchs are sent to Ravenna, by the eastern emperors, against the Lombards.
572 Gregory of Tours, surnamed the father of the French history; died 595. The cruel queen, Brunehaut, wife to Sigebert, king of Austrasia; died 613.
575 Uffa founds the fourth Saxon kingdom of East Anglia. The Lombards defeated by Mummol, general to Gontran king of Orleans.
576 Cosroes the Great is defeated by the emperor Justin's army, under Justinian the Roman general.
578 Justin II. dies October 5
580 Cosroes the Great is again defeated, and dies of grief.
581 Latin ceased to be spoke about this time in Italy.
582 Crida founds the kingdom of Mercia, being the seventh Saxon kingdom in Britain. Tiberius II. dies August 14.
583 The Suevi, in Spain, conquered by the Visigoths; which finishes their kingdom.
589 Philippicus gains a complete victory over the Persians.
592 Ceaulin defeated and dethroned, in the battle of Wanborough, in Wilts, by Ceolric.
593 Cosroes, being dethroned, is restored by Mauricius; dies in 627.
597 Augustin, the monk, comes into England with forty monks, died in 605.
601 Of the Julian period 5314.
602 Mauricius is put to death by Phocas, on Friday, November 23.
604 Cosroes defeats the Roman army.
606 Here begins the power of the *Popes*, by the concessions of Phocas, emperor of the east.
610 Phocas is put to death by Heraclius, on Monday, October 5.
613 The French Mayres du Palais, first introduced by Clotaire, as regents of the kingdoms he united.
614 The Persians take Jerusalem, kill 90,000, and carry off the cross of Christ.
615 The Persians over-run Africa and take Alexandria.
617 Edwin defeats and kills Ethelfrid, in the battle of Retford. Cosroes refuses peace to Heraclius, unless he would abandon Christianity, and adore the sun.
621 Heraclius recovers himself against the Persians, and defeats them ever after.
622 The Hegira of Mahomet, begins on Friday, July 16; he died in 632, aged sixty-three.
625 Sain, the Persian general, defeated by Theodorus.
627 Cosroes put to death, by his son Siroes.
632 The battle of Merga, in which the Saracens, under Abubecher, defeat the Persians, on Tuesday, June 16.
633 Edwin king of Northumberland, killed in the battle of Hatfield, by Penda king of Mercia.
634 Theodorus and Bahanes defeated by the Saracens, who take Damascus, August 23.
637 Jerusalem is taken by the Saracens.
640 Alexandria is taken by the Saracens, and the grand library there burnt.
641 Heraclius dies March 11. Constantine III. is poisoned by Martina, his step-mother, June 22.
643 Maurice, governor of Rome, revolts against the emperor, but is killed by Isaac, ex-chancellor of Ravenna.
644 Omar, caliph of the Saracens, is killed in the temple of Jerusalem, which he had made a mosque.
645 Penda, king of Mercia, defeats Cenowalch, and keeps possession of Wessex for three years.
648 Cyprus taken by the Saracens, under Muavias.
653 The Saracens take Rhodes, and cut to pieces the famous colossus.
655 The battle of Leeds, in which Penda, king of Mercia, is defeated and killed by Oswy, king of Northumberland.
658 The Saracens obtain peace of the emperor Constans, agreeing to pay him 100,000 crowns yearly.
663 Grimoald, duke of Beneventum, takes possession of the kingdom of Lombardy.
668 Metius, the Armenian, usurps the eastern empire, upon Constans being murdered in a bath at Syracuse, July 15; Metius is soon defeated and killed, by Constantine V.
669 The Saracens ravage Sicily.
673 Constantinople besieged by the Saracens, in vain, when their fleet was destroyed with the Greek fire, by Callinicus at Cyzicum. Callinicus, the mathematician, flourished.
675 The Saracens attempt to land in Spain, but are defeated by Wamba.
680 The fourth general council of Constantinople, surnamed in Trulo, began November 7, and continued till September 16 following.
684 Egfrid, king of Northumberland, sends an army into Ireland, but is defeated.
685 Constantine V. died in September.
686 Sussex is subdued by Ceadwalla, and united to the kingdom of Wessex.
688 Kent is so wasted by the West Saxons, that it remains feeble during the remainder of the heptarchy.
690 Pepin Heristel defeats king Thieri, and engrosses the power of the whole French monarchy; he dies in 714.
694 Justinian II. is dethroned and banished by Leontius, who cuts off his nose.
697 Leontius is dethroned in September, by Absimarus, who also cuts off his nose. At this time lived the venerable Bede; he died in 735, aged seventy.
701 Of the Julian period 5414.
704 Justinian is restored, by the assistance of Trebellus king of the Bulgarians.
706 Justinian defeats the Bulgarians.
709 Ina, king of Wessex, publishes about this time his laws of the Saxons.
711 Justinian II. is put to death by Philippicus, who succeeds him as emperor of the East.
713 The Saracens conquer Spain, under Muça, being brought in by count Julian; they defeated and killed Roderic in an obstinate battle fought September 3.
717 The Saracens besiege Constantinople unsuccessfully. Charles Martel defeats king Chilperic.
726 The controversy about images, by the Iconoclasts, begins, and occasions many insurrections in the eastern empire.
727 Ina, king of Wessex, begins the tax of Peter-pence for the support of a college at Rome.
732 The Saracens defeated by Charles Martel, between Tours and Poictiers, in October; he dies in 741, aged 50.
736 Leo, the emperor of the East, destroys all the images in his empire, and persecutes the monks; dies of a cholic in 741.
740 The duchy of Spoleto seized by the Lombards, and recovered by the pope.
743 Fredegaire, the French historian, lived about this time; also Pepin, maire du palais, of Neustria, afterwards king of France.
746 A dreadful pestilence over Europe and Asia for three years.
748 The computing of years from the birth of Christ, began to be used in histories about this time.
749 The race of Abbas become caliphs of the Saracens, and encourage learning.
750 The Merovingian race in France ends.
751 The second race of the French kings begins.
752 The exarchs of Ravenna conquered by the Lombards, after having continued 183 years.
756 The Saracens in Spain revolting from the house of Abbas, begin the kingdom of Corduba.

762 The

762 The city of Bagdad built by Almansor, and made the capital for the caliphs of the house of Abbas.
763 A violent frost began, October 1, and continued about 150 days, to the end of February following.
770 Constantine dissolves the monasteries in the East, obliging the monks and nuns to marry.
771 Orlando, surnamed Furioso, died in 778.
774 Pavia is taken by Charlemagne, which finished the kingdom of the Lombards, after it had lasted 206 years. Astulfus last king of Lombardy.
775 Alcuinus, an English monk, flourished under Charlemagne.
776 Nicephorus, having conspired, in May, against his brother Leo IV. is banished to Chersonesus.
778 The battle of Roncevaux.
784 Charlemagne defeats Witikind and the Saxons in a battle which lasted three days.
787 The seventh general council, or second of Nice, began Sept. 24, and ended about the middle of October.
792 Ethelbert, king of East Anglia, treacherously murdered by Offa king of Mercia, who thus takes possession of East Anglia.
794 Offa, by way of atonement for his villainy, begins the tax called Peter-pence in Mercia.
795 Constantine is dethroned, and put to death by his mother Irenè.
800 The emperors of the West, or of Germany, begin December 25 in Charlemagne, previously king of France and the conqueror of Lombardy.
801 Of the Julian period 5514.
802 The empress Irenè is deposed and banished to Lesbos, October 31. Joannes Damascenus, surnamed Mefuè the Arabian, a Christian, and physician to the caliph Rasjidus; died about 846.
807 Jupiter was eclipsed by the moon, January 31, three hours after midnight, being both in 2° 27′ of Libra.
810 A civil war among the Saracens between Alaminus and Almamon.
811 Nicephorus is defeated and killed by Crunnus king of the Bulgarians, July 6. Eginhard the historian; died 842.
813 Michael, emperor of the East, is defeated by Crunnus, May 23, and retires into a monastery, July 11. Crunnus takes Adrianople in December. Biorno first king of Sweden.
816 Learning is greatly encouraged among the Saracens by Almamon; he made an observation on the sun's greatest declination, and found it to be 23° 34′.
819 Almamon ordered his astronomers to measure a degree of latitude on the plains of Singar near Babylon, and found it to be 56⅔ Arabian miles.
820 Leo V. is killed in the temple at Constantinople by Michael, on December 25.
822 Constantinople besieged by the Saracens under Thomas the Slave, but raised by the Bulgarians; and Thomas is besieged and taken in Adrianople in Oct.
823 The Saracens of Spain take possession of Crete, and give it the name of Candia.
826 Harold V. king of Denmark, dethroned by his subjects for being a Christian.
827 The Almagest of Ptolemy translated into Arabic by order of Almamon.
828 The kingdom of England begins under *Egbert*.
829 Michael II. surnamed the Stammerer, died Oct. 1.
830 The sons of Louis shut him up in a monastery at Soissons; but he is soon released.
832 Theophilus banishes the painters out of the eastern empire from his hatred against images.
833 The three eldest sons of Louis again rebel against their father.
838 The Picts defeated, and their nation extirpated, by Kenneth king of Scotland. Aistan, bishop of Sherborn, English minister; died 868. Pepin II. king of Aquitain; died 864.
840 Lewis le Debonnaire, or the Pious, died at Ingelheim, June 20, aged 64.
841 The battle of Fontenai, where Lotharius is defeated by his two brothers, July 25.
842 Theophilus, emperor of the East, died January 30.
843 The French peers assemble at Thionville, make a new partition of the French dominions among the three brothers, March 16.
844 Ramirus king of Leon, defeats Abdurrahman king of Corduba, and kills 7000 Saracens. Charles is defeated by Pepin in Aquitain, July 7. Swithin bishop of Winchester; died 854.
848 The Venetian fleet is totally defeated by the Saracens in the bay of Crotona.
853 The Normans get possession of some cities in France.
855 The emperor Lotharius, being sick of the world, retires to a monastery, and dies September 28.
859 A remarkably violent frost, when they used carriages on the Adriatic. Photius, patriarch of Constantinople; deposed 886.
865 A civil war among the Saracens.
867 The Danes, under Ivar, being brought into England by earl Bruern, conquer Northumberland. Michael III. emperor of the East, is put to death by Basilius.
868 The government of Egypt becomes independent of the Saracen caliphs of Bagded.
872 Clocks first brought to Constantinople from Venice. The battle of Wilton, in which Alfred is defeated by the Danes.
875 Charles le Chauve, or the Bald, both emperor and king of France.
877 Charles le Chauve dies at Brios, passing the Alps, on the 5th or 6th of October, aged 55, being poisoned by his physician, one Zedekiah a Jew.
878 Alfred conceals himself in the isle of Athelney in Somersetshire, but soon after defeats the Danes in the battle of Edington in that county.
879 Kingdom of Arles begins. Baldwin earl of Flanders; died 919.
882 Albategni, the Arabian mathematician, observes the autumnal equinox at Aractus, on September 19, one hour and fifteen minutes after midnight.
883 Albategni observes, about this time, that the first star of Aries was 18° 2′ from the equinoctial point.
884 Charles le Gros, or the Fat, possesses all the dominions of Charlemagne.
886 The university of Oxford founded by Alfred about this time. Basilius died March 1.
887 Paris besieged by the Normans, but bravely defended by Goslin bishop of Paris.
888 The dominions of Charles le Gros are divided into five kingdoms upon his death, January 13.
890 Alfred composes his famous body of laws about this time.
891 Arnolph, emperor of Germany, defeats 90,000 Normans between the Rhine and the Meuse, in Sept.
896 Arnolph besieges and takes Rome from Guido, who had made himself emperor.
897 Haron caliph of Egypt at this time; died 905.
901 Of the Julian period 5614.
902 The Saracens defeated by Himerius at sea, Oct. 6.
904 The Hungarians ravage Italy. A frost of 120 days began in the end of this year.
905 Haron, caliph of Egypt, and the last of the race of Tulun, conquered and killed.
910 A war begins in England against the Danes, which continues for twelve years.
911 Leo VI. died June 11: he wrote several learned treatises in this age of ignorance.
912 The Normans establish themselves in France under Rollo, surnamed the Great Duke of Normandy; died 907. The Carlovingian race of emperors end in Louis III. who died January 21.
916 Ordonno II. defeats the Saracens in Spain, and kills 70,000 of them a few days after an eclipse of the sun, which happened April 3.
917 William, surnamed Longsword, duke of Normandy; died 943.

919 Phocas,

919 Phocas, having raised a sedition at Constantinople, is killed by Romanus, who is assumed into the empire, Dec. 24. He forces the empress Zoe into a monastery.
922 The battle of Placentia, in which Berenger is defeated by Rodolph king of Burgundy.
923 Fiefs begin to be established in France, when they chose Rodolph, king of Burgundy, for their king, about the beginning of July.
925 Sigifrid, comte de Ringelheim, the first marquis of Brandenburgh.
926 Hugh, being made king of Italy, gives the kingdom of Arles to Rodolph II.
932 Arnulph, duke of Bavaria, defeated at Verona by Hugh king of Italy.
933 A frost of 120 days began in the end of this year.
936 The Saracen empire is divided, by usurpation, into seven kingdoms.
937 Luitprand, the historian; died 970.
939 Ramirus defeats the Saracens in Spain soon after the eclipse of the sun, July 17.
941 Turketul chancellor and English minister.
942 The eastern emperors take possession of the kingdom of Naples.
945 Berenger pactions with Hugh for the reversion of the kingdom of Italy.
947 Alfarabius, the Arabian astronomer, flourished at this time.
952 Anlaff, Danish king of Northumberland.
955 Hugh, surnamed the White, gets the duchies of Burgundy and Aquitain from Lothaire.
959 The power of the monks in England is very high. St. Dunstan, the English minister; died 988.
961 Nicephorus Phocas recovers Candia from the Saracens.
964 The kingdom of Italy conquered by Otho, and united to the German emperors.
965 Hugh Capet duke of Paris, afterwards king of France. Geber the Arabian astronomer.
967 Antioch is recovered by Nicephorus from the Saracens.
968 An eclipse of the sun, December 22, observed at Constantinople about ten o'clock, A. M.
969 The race of Abbas lose Egypt, it being seized by the Fatimides, who build Grand Cairo.
971 Three hundred thousand Bulgarians defeated, and their empire abolished, by Bardas.
973 Otho the Great died at Magdeburgh, May 7.
975 Pope Boniface VII. is deposed, and banished for his crimes. Azizus caliph of Egypt; died 996.
976 Bardas, surnamed Sclerus, usurps the eastern empire for ten years.
977 Otho II. defeats and subdues the Bohemians.
980 The two emperors of Constantinople recover Apulia and Calabria.
987 The third race of the French kings begins, July 3, in Hugh Capet.
991 The figures in arithmetic are brought into Europe by the Saracens from Arabia.
992 Olaus first king of *Norway*.
993 Conrade the Pacific, king of Arles and Burgundy, died, having reigned fifty-seven years.
994 The kings of Denmark and Norway invade England with a great army.
996 Otho III. makes the empire of Germany elective.
999 Boleslaus first king of *Poland*.
1001 Of the Julian period 5714.
1002 A general massacre of the Danes in England, on Sunday, November 13. Avicenna of Bochara, the Arabian physician; died 1050, aged 80.
1005 All the old churches are rebuilt, about this time, in a new manner of architecture.
1006 A pestilence all over Europe, which lasts 3 years.
1009 A civil war among the Saracens in Spain, which continues till 1091, when they become tributary to the Saracens of Africa.
1012 Brithric, English admiral.
1013 The Danes, under Sueno, get possession of England.
1014 A violent storm, September 28, which brought an inundation over Flanders.
1016 Edmund II. surnamed Ironside, fought six battles in England with Canute II. king of Denmark, most of which he lost by the treachery of Edric.
1018 The Normans first enter Italy in a body.
1022 A new species of music introduced by Aretin the monk.
1023 Rodolph, king of Burgundy, being expelled by his subjects, is re-established by the emperor Henry.
1028 Constantine dies in November, aged seventy, having compelled Romanus to divorce his wife and accept the empire, with his daughter Zoe as wife. Robert, surnamed the Devil, duke of Normandy.
1031 The emperor Romanus drives the Saracens out of Syria. The Normans conquer Apulia from the Greeks.
1032 The kingdom of Arles or Burgundy is bequeathed to the emperor Conrad by Rodolph.
1033 A great eclipse of the sun, June 29, observed about mid-day in France.
1035 The kingdoms of Castile and Arragon begin in Spain. William, surnamed the Bastard, duke of Normandy, afterwards king of England.
1037 The battle of Bar le Duc, in which Eudes, comte de Champagne, is defeated, September 17, and killed by the emperor Conrad.
1039 The emperor Conrad dies at Utrecht, June 4.
1040 Godwin, earl of Kent, English minister.
1041 The empress Zoe dethrones Michael, and raises Constantine, who marries her, April 21.
1042 The Turks take possession of Persia.
1045 The emperor Henry III. comes to Verona in October, and calls a council at Sutrium, where the three usurping popes are deposed.
1046 Leofric duke of Mercia; died 1057.
1052 Empress Zoe, wife to three emperors, died, aged seventy. Peter Damiani; died 1072.
1053 Pope Leo IX. defeated and taken prisoner in the kingdom of Naples, by the Normans, June 18. Michael Cerularius flourished at this time.
1058 Robert Guiscard drives the Saracens out of Sicily.
1059 Berenger; died 1088, aged ninety.
1065 Jerusalem taken, by the Turks, from the Saracens.
1066 The conquest of England, by William, surnamed the Bastard, duke of Normandy, in the battle of Hastings, on Saturday, October 14.
1070 Arzachel, of Toledo, observed the declination of the sun, and found it to be 29° 34′. He left 402 observations on the apogée of the sun.
1071 The emperor Romanus defeated and taken prisoner, by Azun the Turkish general.
1075 Henry IV. defeats the Saxons, at Neustadt in Thuringia, June 9.
1076 The emperor Henry IV. and the pope quarrel about the nomination of the German bishops.
1077 The emperor of Germany goes bare-footed to the pope at Canusio, about the end of January.
1079 Arzachel, the Spanish mathematician, and archbishop Langfranc, flourished.
1080 Doomsday book begun to be compiled, from a survey of all the estates in England; and finished in 1086.
1081 William of Spires, the mathematician, living at this time; and Edgar Atheling, died about 1110.
1083 The emperor Henry IV. besieges and takes Rome, on Friday, June 2.
1085 Toledo taken from the Saracens by Alfonso VI. and made the capital of Castile.
1087 Suidas author of the historical Greek Lexicon.
1088 The northern division of Portugal conquered from the Saracens by Alfonso VI. Egbert totally defeats Henry IV. at Gleicha in Saxony, December 24. Henry the first *earl* of Portugal.
1091 The Saracens in Spain call in Joseph king of Morocco, who thus gets possession of all their dominions in Spain.

1092 Peter, surnamed the Hermit, preaches the crusades.
1093 Conrad, son to the emperor Henry, rebels against his father.
1095 Ulstan, bishop of Worcester, deprived of his bishoprick for his not understanding the French language. Sigebert the historian.
1096 The first crusade to the Holy Land, under these commanders, viz. Godfrey of Boulogne, Baldwin earl of Hainault, Hugh comte de Vermandois, Robert duke of Normandy, Robert earl of Flanders, Raimond comte de Thoulouse, and Bohemond prince of Tarentum.
1098 Godfrey, with his crusaders, takes Antioch in June, after a siege of eight months; they defeat Corbagat, June 27.
1099 They take Jerusalem, July 15. The knights of St. John instituted.
1101 Of the Julian period 5814.
1102 The Norman family of Guiscard take the title of king of Naples and Sicily, from being dukes of Calabria. Roger II. king.
1103 Amadeus III. *earl* of Savoy at this time. When or how Savoy became a distinct earldom, historians are not agreed. The territory was long held by the Burgundians.
1104 Baldwin king of Jerusalem defeats the Saracens, and takes Ptolemais.
1106 The battle of Tinchbray in Normandy, where Robert, the duke, is defeated and taken prisoner by his brother, king Henry.
1109 Joseph king of Morocco defeats the Spaniards in the famous battle of the seven counts, near Badajos.
1110 Learning is revived at the university of Cambridge.
1114 Peter Abelard flourished; died in 1143, aged 63.
1117 Ann Comnena, the historian, flourished at this time.
1118 The order of knights templars instituted.
1119 Lewis le Gros defeated by Henry I. at Brenneville.
1120 Prince William, with a number of English lords, drowned in their return to England, near Barfleur, November 26.
1122 John Comnenus defeats the Scythians, &c. who had passed the Ister.
1127 The pope declares war against Roger king of Sicily.
1135 Roger king of Sicily takes Beneventum and Capua from the pope.
1139 Alphonso defeats five Saracen kings, at Ouriques; takes Lisbon, and is proclaimed *king* of Portugal.
1140 King Stephen defeated and taken prisoner in the battle of Lincoln, February 2. William of Malmsbury, the historian.
1141 King Stephen, being exchanged for the earl of Gloucester, begins to recover the kingdom. Peter Lombard, bishop of Paris, surnamed the Master of the Sentences; died 1164.
1144 Otho Frisingensis introduces the peripatetic philosophy into Germany about this time.
1146 The empress Matilda retires out of England.
1147 The second crusade to the Holy Land, by the preaching of St Bernard.
1148 The Christians besiege Damascus, but are obliged to raise it.
1150 The civil war revived at Bologna by Wernerus, being the first restorer after Justinian.
1151 The canon law composed by Gratian, after twenty-four years labour.
1152 Jeffrey of Monmouth, the historian, lived.
1153 The treaty of Winchester, by which Stephen grants the reversion of his kingdom to Henry, about the end of November.
1154 The party names of Guelfs and Gibbelines begin.
1161 Eustathius, the commentator on Homer, flourished.
1162 The emperor Frederic destroys Milan, and leaves nothing but the churches.
1164 The council of Clarendon in England against Becket, January 25. The Teutonic order begins.
1166 Maimonides of Corduba, the most learned of the Jews, and Henry of Huntingdon, lived at this time.
1171 Dermot, king of Leinster, calls in the English to assist him against the other Irish kings. Becket murdered.
1172 Henry II. of England takes possession of Ireland, and returns about the beginning of February.
1176 The dispensing of justice by circuits first appointed in England.
1177 Saladin defeated and repulsed before Jerusalem.
1181 The laws of England are digested about this time, by Glanville.
1184 Andronicus orders all the Latins in Constantinople to be murdered.
1185 Alfonso king of Portugal died, having reigned 73 years. Gui de Lusignan, last king of Jerusalem; died 1194.
1186 The great conjunction of the sun, moon, and all the planets, in Libra, happened this year, on Sept. 14.
1187 The kingdom of Jerusalem ended, that city being taken by Saladin, sultan of Egypt.
1188 The third crusade.
1189 The kings of England and France go to the Holy Land.
1192 The battle of Ascalon, in which Richard king of England defeats Saladin.
1194 Naples becomes subject to the German emperors till 1250.
1195 The Saracens from Africa enter Spain with a large army, defeat king Alfonso, July 19, and kill 50,000 Spaniards.
1196 The emperor Henry VI. takes full possession of Naples and Sicily.
1201 Of the Julian period 5914.
1202 Gervase of Canterbury, the historian.
1203 The fourth crusade sets out from Venice, and arrives at Chalcedon, June 24.
1204 Constantinople taken by the French and Venetians, July 20. Normandy is conquered, and reunited to France, after about 300 years separation.
1205 The emperor Baldwin is defeated, and taken prisoner by the Scythians, near Adrianople.
1207 The first towns erected into corporations in Normandy were those of Rouen and Falaise, made this year.
1209 The works of Aristotle, being just imported from Constantinople, are condemned by the council of Paris.
1210 The persecution against the Albigenses is very hot, being begun the year before.
1211 Saxo Grammaticus, the historian, flourished at this time; and archbishop Langton, who died 1228
1212 The victory over the Moors at Naves de Tolose, where 200,000 of them are killed, July 12.
1214 The battle of Bouvines, gained by the French over Otho IV. July 25.
1215 Magna Charta signed by king John and the barons at Runneymead, between Windsor and Staines, June 15.
1216 Peter de Courtenay, eastern emperor, is imprisoned for three years in passing Epirus, by Theodore Comnenus, prince of Epirus.
1217 The battle of Lincoln, May 19, where the French are defeated by the earl of Pembroke, lord protector.
1221 St. Antony of Padua flourished; died in 1231.
1223 Louis VIII. franchised all the slaves in France.
1225 John de Sacro-bosco, of Halifax in Yorkshire, the mathematician; died at Paris in 1244.
1226 Trent, Verona, and Padua, possessed by Ecelinus for thirty-four years.
1227 The Tartars, under Gingis-kan, over-run all the Saracen empire.
1230 Several persons murdered in the university of Paris, in their disputes about Aristotle.
1231 The Almagest of Ptolemy was translated from the Arabic into Latin about this time, by the order of Frederic II.

1234 The inquisition, begun in 1204, is now trusted to the Dominicans.
1241 Matthew Paris, the historian; died 1259. Enguerrand de Couci; died 1253.
1242 The battle of Taillebourg.
1245 General council of Lyons for renewing the crusades.
1248 The fifth crusade, under Louis IX. who set out on Friday, June 12, and wintered in Cyprus.
1249 Damietta in Egypt taken by Louis IX. June 5.
1250 Louis IX. defeated in Egypt, and taken prisoner, April 5. Melec Sala, sultan of Egypt; died 1250. The kingdom of Naples restored under Conrad I.
1252 Albertus Magnus; died 1280, aged seventy-five.
1253 The famous astronomical tables are composed by Alphonso XI. king of Castile, about this time.
1254 St. Thomas Aquinas; died 1274.
1258 The empire of the Saracens ends, by the Tartars taking Bagdad.
1261 The Greek emperors recover Constantinople from the French in July. Roger Bacon; died 1284, aged seventy-eight.
1263 The earl of Leicester, at the head of the barons, makes war against king Henry III.
1264 Battle of Lewes, in which Henry is taken prisoner, May 14. The commons of England first summoned to parliament, according to some.
1265 Battle of Evesham, gained by prince Edward over the earl of Leicester, August 4.
1266 Battle of Beneventum, February 26.
1267 Police of the city of Paris established about this time by Stephen Boileau. Cimabue, the first of the modern painters at Florence; died 1300.
1268 Battle of Celano in Italy, fatal to Conradin, Aug. 25.
1270 Prince Edward sets out for the Holy Land in May, and was absent till the 25th of June 1274.
1273 The empire of the present Austrian family begins in Rodolph of Habsburgh.
1277 Nepotism first avowed at Rome by pope Nicholas III.
1278 Ottogar, king of Bohemia, defeated and killed in battle, by the emperor Rodolph.
1279 The famous mortmain act passes in England in November.
1282 The Sicilian vespers, when 8000 French were massacred, March 30. Lewellyn prince of Wales defeated and killed in the battle of Llandweir, December 11. The kingdom of Sicily begins under Peter, king of Arragon.
1283 Wales conquered by king Edward, and united to England. Raymond Lulli.
1284 Charles king of Naples defeated by Peter king of Arragon's fleet, under Roger de Lauria, near Naples, June 5.
1291 Ptolemais taken by assault, May 19, by sultan Melac, which finished the croisades. John Duns, surnamed Scotus; died 1308, aged forty-three.
1292 Humphrey Bohun, constable of England; died 1298.
1293 There is a regular succession of English parliaments from this year.
1294 The parties of the Neri and the Bianchi begin in Tuscany.
1295 The Visconti family created dukes of Milan.
1296 Thebit, the Arabian astronomer, and first discoverer of the motion of trepidation. Roger Bigod, earl of Norfolk, and earl marshal of England; died 1306.
1297 The emperor Adolphus is deposed, defeated, and killed in battle, by Albert, afterwards emperor, in the battle of Spires, July 2.
1298 The present Turkish empire begins in Bithynia. Battle of Falkirk, July 22. Sir William Wallace, regent of Scotland; died 1304.
1301 Of the Julian period 6014.
1301 Dante, with the white faction, banished Florence, by Charles of Valois and Boniface VIII. A violent quarrel between Philip the Fair and the pope.
1302 The mariner's compass invented or improved by Flavio.
1304 Dante, the Florentine poet; died 1321, aged 56.
1307 The beginning of the Swiss cantons. Pierce Gaveston, English minister; died 1311.
1308 The popes remove to Avignon for seventy years.
1310 The knights of St. John take Rhodes, and settle there.
1312 The order of the knights templars condemned and extinguished in the council of Vienna, March 22.
1313 Molay, grand master, with a number of the templars, are burnt alive at Paris, March 11.
1314 The cardinals set fire to the conclave, and separate. The battle of Bannockburn, July 25.
1316 James Dosso, bishop of Oporto, the son of a cobler, is chosen pope by his single vote.
1318 A severe famine in Great Britain.
1321 Abulfeda finished his Arabian geography; died 1383. Peter Remi, French minister, hanged in 1328.
1322 Battle of Muldorff, September 28, where Frederic of Austria was taken prisoner by Louis, surnamed the Bavarian.
1326 Queen Isabella brings an army into England against her husband Edward II. September 22.
1327 Edward II. is deposed by parliament in the beginning of January.
1329 The battle of Mount Cassel, August 23, gained by king Philip over the Flemings.
1331 The knights of the Teutonic order first enter Prussia, and settle.
1332 Nicephoras Gregoras, the astronomer and historian; died 1350. Edward Baliol; died 1363.
1337 The first comet whose course is described with an astronomical exactness appeared this year, in the beginning of June. James d'Arteville, brewer, of Ghent; died 1346.
1338 King Edward III. begins his war against France.
1340 The French defeated by Edward III. in a sea-fight near Helvoetsluys; it was followed with a truce, which lasted four years.
1341 John Cantacuzenus usurps the eastern empire for seventeen years; dies 1375.
1342 The knights and burgesses first sit together in the same house of parliament in England.
1343 Leontius Pilatus, of Thessalonica, restorer of Greek learning in Italy.
1344 Edward III. renews the war against France.
1345 Andrew of Hungary, and husband to Joan queen of Naples, strangled and hanged at Aversa, near Naples, September 18, by a conspiracy of his wife.
1346 The battle of Cressy, August 26.
1347 Rienzi's usurpation at Rome, as an ancient tribune of the people. Calais taken by king Edward, August 4.
1348 A terrible plague in Europe, which carried off near the fourth part of its inhabitants.
1349 The order of the garter instituted in England, April 23.
1352 The Turks first enter Europe.
1354 Francis Petrarch, and Jovanni Boccacio, flourished at this time.
1356 Battle of Poictiers, September 19, in which John king of France was taken prisoner by Edward, surnamed the Black Prince.
1360 The treaty of Bretigni; May 8.
1361 Matthew of Westminster, surnamed Florilegus; died about 1380. Charles the Wicked, king of Navarre; died 1387.
1362 Law pleadings in England changed from French to English, as a favour of Edward III. to his people, in his fiftieth, or jubilee year.
1364 Battle of Cocherel, May 6. Battle of Avrai, Sept. 29.
1367 Battle of Neiara in Castile, April 4. Henry, comte de Trestamar, afterwards king of Castile.
1369 John Wickliff, the head of the Lollards.
1372 Earl of Pembroke defeated at sea by Boccanegra, the Spanish admiral.
1373 John Gower, of Stitenham, Yorkshire, the first English poet; died 1402.

1376 John

1376 John Froissart, Flemish historian; died 1400.
1377 The popes return from Avignon to Rome, Jan. 17.
1378 The schism of double popes, which continues thirty-eight years, till the council of Constance.
1381 Wat Tyler's insurrection, in the beginning of July.
1382 Battle of Rosebeck in Flanders, between the French and Flemish.
1384 Philip the Bold, duke of Burgundy, succeeds to the earldom of Flanders. Michael de la Pole, earl of Suffolk; died 1388.
1388 Battle of Otterburn, July 31, between Hotspur and the earl of Douglas. William of Wickham, bishop of Winchester; died 1426.
1392 Emanuel Chrysoloras, of Constantinople, preceptor in Greek to Leonard Aretin, secretary of Florence. Henry Percy, surnamed Hotspur, lived.
1395 Sigismund king of Hungary, defeated at Nicopolis, by Bajazet I. September 28.
1396 Geoffrey Chaucer, of Woodstock, the English poet; died 1440.
1401 Of the Julian period 6114.
1401 Naples and Sicily united under Ladislaus.
1402 The battle of Angoria, where Bajazet is taken prisoner, on Friday, July 28. The battle of Halidown-hill, May 7.
1403 The battle of Shrewsbury, July 22, in which Hotspur is killed.
1405 A conspiracy of the archbishop of York, the earl of Northumberland, and others, against king Henry, which is soon suppressed.
1409 The council of Pisa begins March 22.
1411 Edmund Mortimer, earl of March; and lord chancellor Beaufort, duke of Exeter. John Huss, and Jerome of Prague, all flourished at this time.
1414 The council of Constance begins November 16, in which two popes voluntarily submitted to deposition.
1415 The battle of Agincourt, October 25. Thomas duke of Clarence; died 1421.
1416 Amadeus VIII. created *duke* of Savoy, by Sigismund emperor of Germany.
1417 Kingdoms of Denmark and Norway united under Edric IX. in the 6th year of his reign over Denmark.
1420 The treaty of Troyes signed May 21. The island of Madeira discovered by the Portuguese.
1421 The battle of Beauge, April 3, where the duke of Clarence is killed. Earl of Buchan, constable of France; died 1424.
1423 Battle of Crevant, gained by the earl of Salisbury, in June.
1424 Battle of Verneuil, gained by the duke of Bedford, August 16.
1428 The siege of Orleans, the first blow to the English power in France, begun October 12, and continued to May 12.
1429 The battle of Herrings, February 12. Battle of Patay, gained by Richmont.
1434 Cosmo de Medici recalled from banishment, which was the rise of that family in Florence.
1435 The treaty of Arras, between Charles VII. and the duke of Burgundy, September 21.
1436 Paris retaken by the French, on Friday, April 13. John Talbot, earl of Shrewsbury; died 1453.
1437 Ulugh Beigh, emperor of Samarcand, author of the Persian astronomical tables; murdered by his son, in 1445, aged fifty-seven.
1439 The famous pragmatic sanction settled in France.
1440 The art of printing discovered at Mentz, and was gradually improving for twenty-two years, by John Guttemberg, John Faustus, and Peter Schoeffer.
1441 Francis Sforza duke of Milan, William de la Pole duke of Suffolk, and John Corvino Huniades, lived.
1444 Battle of Varnes, gained by the Turks over Ladislaus king of Hungary, November 10.
1446 The sea breaks in at Dort, and drowns 100,000 people, April 17.
1447 The Visconti family ends in Milan, and the Sforzas succeed.
1450 Battle of Fourmigni, by which Richmont recovers Normandy to the French, April 18.
1453 Constantinople taken by the Turks, May 29. Constantine Poligodas, last of the eastern emperors. The English government ends in France with the battle of Castillon, July 7.
1454 Thomas a Kempis; died 1471.
1455 The battle of St. Albans, May 31.
1456 Richard Nevil earl of Warwick, surnamed the king maker; died 1471.
1460 Battle of Northampton, February 19. Battle of Wakefield, December 31.
1461 The battle of Towton, March 29. Regiomontanus, died 1476, aged forty.
1462 The first book printed, which was the vulgate bible, in two volumes.
1464 The league against Louis XI. called *la guerre du bien public*. Edward duke of Somerset; died 1471. Rodericus Agricola; died 1485, aged 43.
1466 The second book printed, which was *Cicero de officiis*.
1467 Charles the Bold, duke of Burgundy; died 1478, aged forty-six.
1469 Battle of Banbury, July 26. Battle of Stamford in the beginning of March. Henry VI. restored October 6, and continues till April 11.
1471 Battle of Barnet on Easter day, April 14. The battle of Tewksbury, May 4.
1473 The study of the Greek language brought into France, by Tiphernas.
1475 The constable, de St. Paul, beheaded in the Greve at Paris, December 19.
1476 Charles the Bold, duke of Burgundy, defeated by the Swiss, at Granson and Morat, the first on April 5, and the second on June 20.
1477 A third defeat of the duke of Burgundy, where he is killed, at Nancy, January 5.
1478 Laurence de Medici expelled Florence, and an anathema against him, by Sixtus IV. which greatly distressed learning. Kingdoms of Castile and Arragon in Spain, united under Ferdinand V. king of Castile.
1481 Savonarola of Ferara, a friar; died 1598, aged 46. Laurence de Medici; died 1492, aged 44.
1482 J. Picus, of Mirandola; died 149, aged thirty-seven. Philip de Commines, French minister; died 1539.
1483 Anne of Beaujeu, French regent; died 1522.
1485 The battle of Bosworth, August 22. Thomas lord Stanley.
1488 The battle of St. Aubin, where the duke of Orleans is taken prisoner by Anne of Beaujeu, June 28. Lewis de la Trémouille; died 1525.
1491 William Grocyn introduces the study of the Greek language into England. Lewis Sforça, surnamed the Moor; died 1510.
1492 Bretagne reunited to France. America discovered by Columbus.
1493 Capnio introduced the Hebrew and Greek language into Germany.
1494 Charles VIII. of France takes the city of Naples. Poyning's act passes in Ireland.
1495 Battle of Fornova, in Italy, between Charles VIII. and the Venetians, &c. July 6. Cæsar Borgia; died 1507.
1496 John Colet, dean of St. Paul's, and founder of the school.
1497 The Portuguese first sail to the East Indies. Vasquez di Gama.
1498 Alexander ab Alexandro; 1521, aged 50. Americus Vesputius; died 1508.
1499 Louis XII. takes possession of the Milanese, by a conquest of twenty days, in July, and makes his entry in Milan, October 6. Dr. Thomas Lynacre; died 1524.

1500 Maximilian divides the empire into six *circles*, and adds four more, in 1512.
1501 Of the Julian period 6214.
1503 Battle of Cerignole, which finished the French power in Naples, April 28. Cardinal Ximenes, Spanish minister; died 1517, aged 80. Leonardo da Vinci.
1505 Albert Durer of Nuremberg, flourished at this time.
1506 Nicolas Machiavel, flourished about this time.
1507 Louis Ariosto of Ferrara, flourished at this time.
1508 The famous league of Cambray against the Venetians, signed and confirmed December 10.
1509 The battle of Aignadel, May 14. Gaston de Foix duke de Nemours. Basilius czar of Muscovy.
1511 Raphael, the painter, flourished; died 1520, aged 37.
1512 The battle of Ravenna, on Easter day, April 11. Erasmus flourished about this time.
1513 The French defeated at Novarro by the Swiss. The battle of the Spurs. The battle of Flowden, Sept. 9. John duke of Albany, regent of Scotland; died 1536.
1514 Polydor Virgil lived at this time.
1515 Battle of Marignan, which lasted two days, French against the Swiss, the 13th and 15th of September. Cornelius Agrippa.
1516 The treaty of Noyon, August 16. Francis Guicciardini flourished about this time.
1517 Luther began the reformation; died 1546, aged 63.
1518 Cardinal Wolsey, and Zuinglius, flourished.
1519 Charles I. of Spain becomes emperor of Germany by the title of Charles V.
1521 Copernicus of Thorn in Prussia, flourished.
1522 The isle of Rhodes taken by the Turks from the knights, December 25. Michael Angelo Bonaroti.
1523 Paracelsus flourished about this time.
1524 Queen Katherine of England, and Clement Marot, flourished about this time.
1525 The battle of Pavia, where Francis I. was made prisoner, February 24. Sir Thomas More, lord chancellor; died 1535. Julio Romano flourished.
1526 Paul Jovius flourished about this time.
1527 Rome taken and plundered by Charles the Fifth's army, May 6. Francis Rabelais flourished.
1528 Andrew Doria; died 1560, aged ninety-three. Olaus Magnus flourished about this time.
1529 The name of Protestants begins from the diet of Spires. The peace of Cambray, August 5.
1530 The union of Smalcald about the end of December.
1531 Thomas lord Cromwell; died 1540. Hieronymus Vida flourished about this time.
1532 The treaty of Nuremberg, August 2.
1533 Ignatius Loyola, founder of the Jesuits; died 1556, aged sixty-five. John Basilowitz czar of Muscovy.
1534 The reformation takes place in England, March 30. Ann Bullen, queen of England; died 1536. Julius Cæsar Scaliger flourished about this time.
1535 Charles the Fifth's expedition into Africa, ends August 14. Barbarossa, the Turkish general; died 1547. Archbishop Cranmer flourished.
1536 Jane Seymour, queen of England; died 1537. John Leland flourished about this time.
1538 The treaty of Nice between Charles V. and Francis I. which lasted four years, June 18. Peter Aretin flourished about this time.
1539 A rebellion at Ghent occasions Charles the Fifth's passing through France, which he entered in November. Ann of Cleves, queen of England; divorced 1540.
1540 Katherine Howard, queen of England; died 1542. Robert Stephens flourished about this time.
1541 Melancthon flourished about this time.
1543 Katherine Parr, queen of England, died this year. John Calvin flourished about this time.
1544 The battle of Cerisolles, April 14. The treaty of Crespi, September 18.
1545 The council of Trent begins, and continues eighteen years. Conrad Gesner flourished about this time.
1546 Camerarius flourished about this time.
1547 Fiesque's conspiracy in Genoa. Elector of Saxony taken prisoner in the battle of Mulberg, April 24. The battle of Pinkie, Sept. 10. Seymour duke of Somerset, lord protector; died 1551. Hieronymus Cardan lived at this time.
1548 The interim granted by Charles V. to the protestants, May 15. Jo. de Sepulveda, the peripatetic and restorer of learning in Spain, flourished.
1551 Dudley duke of Northumberland, English minister; and Annibal Caro, flourished at this time.
1552 The treaty of Passau, July 31.
1553 Edward VI. died July 6, aged sixteen. Cardinal Pole, English minister; died 1558.
1557 The battle of St. Quintin, August 10. Constable de Montmorency; died 1567.
1558 Calais taken by the French, January 8. Queen Mary died November 7. Francis duke of Guise, French minister. Elizabeth queen of England. Ronsard, French poet, flourished at this time.
1559 The peace of Cateau Cambresis about the beginning of February. Geo. Buchanan; died 1582, aged 76.
1560 The conspiracy at Amboise, which begins the civil wars in France, in March.
1561 Sir Nicolas Bacon lord-keeper of England. Camoens, the Portuguese poet, flourished.
1562 Battle of Dreux, December 19. Admiral Coligny. Peter Ramus flourished about this time.
1563 The council of Trent finishes, December 4.
1566 The first commotions in the Netherlands begin in April, when the request of the 400 was presented to the governess, Margaret duchess of Parma. Theodore Beza flourished.
1567 The battle of St. Denis, November 10. Ferdinand duke of Alva. James Cujas lived at this time.
1568 Queen Mary is defeated in the battle of Glasgow, May 13, and retires into England in June.
1569 Battle of Jarnac, May 13; of Moncontour, Oct. 3.
1571 The famous victory over the Turks at Lepanto, Oct. 7. Don John of Austria. Henry Stephens.
1572 Massacre of Paris, on Sunday, August 24. Catharine of Medicis.
1573 Earl of Morton regent of Scotland. Paul Veronese.
1574 Duke of Guise, surnamed Balafré. Montagne.
1575 University of Leyden founded. Francis Hotomanus.
1576 The league begins in France upon the edict of pacification signed in May. Palladio the architect.
1578 Battle of Rimenant, August 1; of Alcaçar, Aug. 4, in which Don Sebastian is killed. Cardinal Baronius.
1579 The republic of Holland begins by the union of Utrecht, January 22. Philip II. of Spain takes possession of Portugal. Riccoboni flourished.
1581 Alexander Farnese duke of Parma. Joseph Scaliger.
1582 Pope Gregory introduces the new stile the 5th of October, being counted the 15th.
1583 Robert Dudley earl of Leicester. Torquato Tasso.
1584 William prince of Orange murdered at Delft, June 30. Edmund Spencer flourished at this time.
1585 Duke de Mayenne. Sir Philip Sidney flourished.
1586 The earl of Leicester is sent to assist the Dutch; in January misbehaves, and is recalled. Battle of Zutphen, September 22. Sir Thomas Gresham. Tycho Brahe flourished about this time.
1587 Queen Mary beheaded, February 8. The battle of Coutras, October 10. Sir James Melvill.
1588 The Spanish Armada destroyed, July 27. The duke of Guise killed, December 13, at Blois. Sir Francis Drake.
1589 Henry III. of France, murdered by Clement, July 22. Sir Walter Raleigh.
1590 The battle of Ivry, which ruined the league, March 4. Marshal Biron.
1593 Duke de Sully, French Minister. Cardinal Perron.
1594 The Jesuits expelled France, which continued for nine years, and began Dec. 19. Isaac Casaubon.

1595 Shakespeare flourished about this time.
1596 Cadiz taken by the English, June 21. Annibal Caracci flourished about this time.
1597 Cervantes flourished at this time.
1598 The edict of Nantes in April. The peace of Vervins, June 10. President de Thou flourished.
1600 The battle of Newport, July 2. William Camden.
1601 Of the Julian period 6314.
1601 The siege of Ostend begins, June 25. Lord-chancellor Bacon lived at this time.
1603 Queen Elizabeth died March 24, aged 70. England and Scotland united in James I.
1604 Ostend taken by the Spaniards, after a siege of above three years, September 10. Malherbe flourished.
1605 The famous dispute between the pope and the Venetians. The gunpowder plot, November 5.
1607 Chancellor Brulart de Sillery. Boccalini lived.
1608 Galileo discovers the satellites about the planets by the telescopes, then just invented in Holland by Metius.
1609 The treaty of twelve years between the Spaniards and the Dutch, April 4. President Jeannin. Helvicus lived at this time.
1610 Nine hundred thousand Moors expelled Spain in March. Henry IV. murdered by Ravaillac, on Friday, May 4, about four o'clock P. M. Duke of Lerma, Spanish minister. Andrew du Chesne; died 1640.
1611 Concini, marshal d'Ancre, French minister. Lopez de Vega flourished at this time.
1612 Carr, earl of Somerset, English minister. Ben Jonson.
1613 Barneveldt, pensionary of Holland; died 1619, aged seventy-two. John Kepler lived at this time.
1614 Napier invents the logarithms; died 1617, aged 67. Marquis de Spinola.
1615 John Barclay flourished about this time.
1616 A short civil war in France. King James restores Flushing, the Brille, &c. to the Dutch, in May. Sir Robert Cotton lived at this time.
1618 The Synod of Dort begins, November 1, and continues till April 26, 1619. Count Mansfield; died 1626. Fabri de Pieresc lived at this time.
1619 Harvey discovers the circulation of the blood. The thirty years war in Germany begins August 26.
1620 The battle of Prague, by which the elector palatine lost his electorate, October 29. Guido Rheni.
1621 The civil war with the Hugenots begins in France, and lasts nine years. Henry duke de Rohan; died 1638, aged sixty-one. Gaspar Barthius; died 1658, aged seventy-one.
1622 Heidelberg taken by the emperor, and their famous library sent to Rome, September 16. G. Villiers duke of Buckingham, English minister, died 1628, aged 36. Peter Paul Rubens, died 1640, aged 63.
1623 Sir Henry Spelman; died 1641.
1624 Duke d'Olivarez, Spanish minister. Cardinal Bentivoglio; died 1644, aged 65.
1625 King James died at Theobalds, March 27, aged 59. John Meursius; died 1639, aged 60.
1626 The league of the Swedes, Dutch, and protestant princes of Germany, against the emperor. Cardinal Richelieu, French minister. Gerrard John Vossius; died 1650, aged seventy-three.
1628 Duke of Buckingham murdered, August 23. Rochelle taken by Louis XIII. October 18. Count Tilly; died 1632. Quevedo; died 1647.
1629 Nine members are imprisoned, March 4, for their speeches in the house of commons. Inigo Jones; died 1651.
1630 Grotius; died 1645, aged sixty-two.
1631 The battle of Leipsic, August 28. Died chancellor Oxenstiern, Swedish minister. Archbishop Usher; died 1655, aged seventy-five.
1632 The battle of Lutzen, in which Gustavus Adolphus is killed, November 6. Weston earl of Portland, English minister.
1633 Lord keeper Coventry. Antony Vandyke; died 1641, aged forty-two.
1634 Battle of Nortlinghen, where the Swedes were dedefeated, November 26. Duke of Weimar. John Selden; died 1654, aged seventy.
1635 Gassendi, and Descartes, flourished at this time.
1637 Mr. Hampden's trial for the ship-money. John Pym.
1638 The two battles of Rheinfeldt upon the 18th and 21st of February. Archbishop Laud.
1639 Earl of Strafford, English minister. Voiture, French poet, lived at this time.
1640 The Scots army enters England, August 20, and takes Newcastle the 27th. The *parliament* meets November 3. Portugal again becomes a separate kindom under the duke of Braganza, John IV.
1641 Marquis of Montrose. Chillingworth flourished about this time.
1642 King Charles demands the five members, January 4, which begins the civil war. Battle of Edgehill on Sunday, October 3. Lord Falkland. Salmatius.
1643 Bristol surrenders to prince Rupert, July 26. The siege of Gloucester raised September 5. The first battle of Newbury, September 20. Nicholas Poussin; died 1356, aged sixty-two.
1644 The battle of Marston Moor, July 2. Earl of Essex's army surrenders in Cornwall, September 2. The second battle of Newbury, October 27. Cardinal Mazarine, French minister. Mothe le Vayer.
1645 The battle of Naseby, June 14. Don Lewis de Haro, Spanish minister. Duke de Rochefoucald
1646 Prince of Condé. Paul Scarron flourished.
1647 Cardinal de Retz. Henry Hammond flourished.
1648 The peace of Westphalia. The battle of Lens, August 16; and, soon after, the civil war of Frondeurs at Paris begins. Ann of Austria regent of France. Thomas Hobbes lived at this time.
1649 King Charles I. beheaded, January 30, aged 49. Interregnum for twelve years. Samuel Bochart.
1650 Battle of Dunbar, September 3. Mezeray lived.
1651 The battle of Worcester, September 3. Archibald marquis of Argyle. Dr. John Wallis flourished.
1652 The first war between the English and Dutch begins May 19; in which there were seven different engagements at sea. Chancellor Seguier. J. Fred. Gronovious flourished at this time.
1653 Oliver Cromwell made protector. Blaise Pascal.
1654 Peace between the English and Dutch, signed April 5. Admiral Blake. John Milton flourished.
1655 The English, under admiral Penn, take possession of Jamaica, May 7. Thomas Bartholin flourished.
1656 Henry vicomte Turenne and marshal; died 1675, aged 64. Edmund Waller lived at this time.
1657 Peter Corneille flourished about this time.
1658 The battle of Dunkirk, June 4, and that city, delivered to the English, June 17. Admiral de Ruyter. J. B. Poquelin Moliere lived at this time.
1659 The peace of the Pyrenees, signed October 28. Du Cange flourished about this time.
1660 The restoration of Charles II. May 29. Peace of Oliva, May 3. The government in Denmark made absolute, October 18. General Monk, duke of Albemarle; died 1670, aged 62. Algernon Sidney.
1662 The royal society is established, July 15. Dunkirk restored to the French, November 7. James duke of Ormond. Samuel Butler lived at this time.
1663 Hen. Finch earl of Nottingham. Charles le Brun.
1664 The battle of St. Godart, July 22. The treaty of Temeswar, September 7. The second Dutch war begins in November. Admiral Van Tromp. Louis Maimbourg lived at this time.
1665 The Dutch defeated off Harwich, June 3. The battle of Villa Viciosa, June 7. The plague rages in London

London in July. John de Wit penſionary of Holland. Ralph Chudworth lived at this time.

1666 The ſea-fights of June 1, which laſted four days; and of July 25. The fire of London, September 2. Academy of ſciences began their meetings. The action of Pentland-hills, November 27. Montecuculi, Auſtrian general. Giles Menage.

1667 The peace of Breda, July 10. John Maitland, duke of Lauderdale. Charles de St. Evremond.

1668 The peace of Aix-la-Chapelle, ſigned April 22. George Villiers, duke of Buckingham. Benedict de Spinoſa.

1669 The iſle of Candia taken by the Turks, September 6. J. Baptiſt Colbert, French miniſter. Huygens.

1670 Antony Aſhley Cooper, earl of Shaftſbury; and ſir Chriſtopher Wren, flouriſhed at this time.

1671 Frederic William, ſurnamed the Great, elector of Brandenburgh. Iſaac Barrow.

1672 Louis XIV. over-runs great part of Holland, having taken Utrecht, June 10. The prince of Orange is made ſtadtholder, and John de Wit put to death, Auguſt 12. William prince of Orange ſtadtholder of Holland, afterwards king of Great Britain. Sir William Temple lived at this time.

1673 René Rapin, the hiſtorian, flouriſhed at this time.

1674 The battle of Senef, Auguſt 1. The battle of Turkeim, December 27. Dr. Thomas Sydenham.

1675 The battle of Altenheim, July 22, five days after the death of marſhal Turenne. Robert Boyle.

1676 Samuel Puffendorff, lived at this time.

1677 Francis marſhal de Luxemburgh, and Carlo Maratti, flouriſhed at this time.

1678 The peace of Nimeguen, July 31. The popiſh plot diſcovered by Oates, Sept. 6. The earl of Danby impeached, Dec. 21. James Dalrymple. lord Stair.

1679 The excluſion bill firſt moved in parliament, on Sunday, April 27. John de la Bruyere.

1680 The great comet firſt obſerved November 3, and continued viſible till March 9, 1681. John de la Fontaine flouriſhed.

1682 Marſhal Schomberg, and Bouhours, flouriſhed.

1683 Lord Ruſſel is beheaded, July 21. The ſiege of Vienna by the Turks, raiſed September 2. Le Tellier de Louvois, French miniſter. John Dryden.

1684 George Saville, marquis of Halifax; and Racine.

1685 Charles II. died February 6, aged fifty-five. The duke of Monmouth defeated at Sedgemoor, July 6, beheaded. The edict of Nantes revoked, Oct. 12. Marſhal de Vauban. N. Boileau Deſpreaux.

1686 Spencer earl of Northumberland, Engliſh miniſter; and Humphry Prideaux, flouriſhed.

1687 George Frederic count de Waldeck, and John George Grævius, lived at this time.

1688 The revolution in Great Britain begins November 5. King James abdicates, and retires to France, December 23. Peter Bayle flouriſhed.

1689 King William and queen Mary proclaimed, Feb. 16. The action of Killicrankie, July 27. John Locke.

1690 The battle of Flerus, June 21. Battle of the Boyne, July 1. Edward Stillingfleet, biſhop of Worceſter.

1691 The battle of Aghrim, July 12; and Limerick ſurrenders October 3, which finiſhed the war in Ireland. John lord Somers, lord chancellor. Archbiſhop Tillotſon.

1692 The ſea-fight off La Hogue, May 19. The battle of Steenkirk, July 24. The duchy of Hanover made the ninth electorate, Dec. 9. Admiral Edward Ruſſel, earl of Orford. Gilbert Burnet, biſhop of Saliſbury.

1693 The battle of Landen, July 19. Battle of Marſiglia, September 24. Louis, prince of Baden. Boſſuet, biſhop of Meaux.

1694 Huy taken, September 18. Queen Mary dies, December 28, aged thirty-three. Madam de Maintenon. Senator Vincent de Filicaia.

1695 Namur taken by king William, July 25. The vote for new coining the money, December 10. Nicolas Malebranche flouriſhed.

1696 The aſſaſſination plot diſcovered, Feb. 14. Caſſini.

1697 The battle of Zentha, September 1. The peace of Ryſwick, September 11. Henry Dodwell.

1698 The firſt treaty of partition, ſigned Aug. 19. Penſionary Henſius, and John Gronovius, flouriſhed.

1699 The peace of Carlowitz, Jan. 26. The Dutch guards ſent to Holland about the end of March. Lord chief juſtice Holt. Dr. William Lloyd, biſhop of Worceſter; died 1717, aged ninety.

1700 The Dutch and proteſtants of Germany introduce the new ſtile, omitting the laſt eleven days of February. The ſecond treaty of partition, Feb. 21. Charles II. king of Spain; died October 21. Frederic I. firſt king of Pruſſia. Michael Chamillard, French miniſter. Madame Dacier.

1701 Of the Julian period 6414.

1701 Victor Amadeus II. duke of Savoy, takes the title of king of Sardinia. Sir Iſaac Newton.

1702 King William died March 8, aged 52. War declared againſt France and Spain, May 4. Vigo taken by the Engliſh and Dutch, Oct. 12. Prince Eugene of Savoy, and Fenelon archbiſhop of Cambray, flouriſhed.

1703 Charles earl of Sunderland; and Godfrey William Leibnitz, lived at this time.

1704 Gibraltar taken by admiral Rook, July 24. Battle of Hochſtet, or Blenheim, Auguſt 2. Sea-fight off Malaga, Auguſt 13. John duke of Marlborough, and Daniel Huet, biſhop of Avranche, flouriſhed.

1705 James earl of Stanhope, and Sir Godfrey Kneller, painter, flouriſhed.

1706 Battle of Ramilies, May 12. Union between England and Scotland, ſigned July 22. Battle of Turin, Auguſt 27. Count Guido Staremberg, Dutch general; and John Flamſtead, lived at this time.

1707 Battle of Almanza, April 14. Marſhal duke de Berwick, French general.

1708 Battle of Oudenarde, June 30. Minorca taken by general Stanhope, September 18. Action off Wynnandale, September 28. City of Liſle taken, October 12. Admiral Byng, lord Torrington.

1709 Battle of Pultowa, June 30. Battle of Malplaquet, Sept. 11. Marſhal Villars, French general. Dr. Richard Bentley.

1710 Dr. Sacheverel ſentenced, March 23. Queen Anne changes her miniſtry, Auguſt 8. Battle of Saragoſſa, Auguſt 9. General Stanhope taken priſoner at Brihuega, November 26. Battle of Villa Vicioſa, November 29. Robert Harley earl of Oxford, Britiſh miniſter. Dr. Hare biſhop of Chicheſter.

1711 Henry St. John lord Bolingbroke. Joſeph Addiſon.

1712 The duke of Ormond ſeparates the Britiſh forces from the allies, July 5. Action of Denain, July 13. Sir Simon Harcourt, lord chancellor. Sir Rich. Steele.

1713 The peace of Utrecht ſigned March 30. J. B. Colbert de Torcy, French miniſter. Matthew Prior.

1714 The acceſſion of George, elector of Hanover, to the kingdom of Great Britain, Auguſt 1, when queen Anne died, aged 50. The peace of Baden, Auguſt 27. William earl Cowper, lord chancellor. Francis Atterbury, biſhop of Rocheſter; baniſhed.

1715 Louis XIV. died Auguſt 21, aged 77, reigned 72. The rebellion begins in September. The action of Sherriff Muir, and the ſurrender of Preſton, were both on November 13. John duke of Argyle, and John Hardouin, flouriſhed.

1716 Philip duke of Orleans, regent of France. John Le Clerc.

1717 Cardinal Alberoni, Spaniſh miniſter, diſgraced, 1719; died 1752, aged 88. James Lenfant.

1718 The quadruple alliance in May. The Spaniſh fleet deſtroyed off Paſſaro by admiral Byng, July 31. The peace of Paſſarowitz. Thomas earl of Macclesfield, lord chancellor. Abbé Vertot.

1719 Battle

1719 Battle of Franca Villa, June 9. Vigo taken by lord Cobham, October 10. The Mississippi scheme at its height in France, in November and December. John Law, comptroller-general of the finances. Dr. John Freind.

1720 The South-Sea scheme begins April 7; was at its height about the end of June; and was quite sunk about September 29. The plague breaks out at Marseilles. Bernard de Montfaucon.

1721 Sir Robert Walpole, earl of Orford, British minister. Dr. Samuel Clarke.

1722 Dr. Jonathan Swift flourished.

1723 The bishop of Rochester found guilty of treasonable correspondence; deprived June 1, and banished June 22. Dr. Edmund Halley.

1724 Philip V. resigns his kingdom to his son Louis, January 15, who reigns about one year and two months. J. Albertus Fabricius.

1725 The first treaty of Vienna, between the emperor and Spain, signed April 30. The treaty of Hanover, between Great Britain, France, and Prussia, signed September 3. Cardinal Fleury, French minister. Dr. John Arbuthnot.

1726 Herman Boerhaave, physician, &c. flourished.

1727 The siege of Gibraltar by the Spaniards, began May 20, and continued till April, 1728. King George I. died June 11, aged 68. Dr. Edward Chandler, bishop of Durham.

1728 The congress of Soissons, began May 14. Cardinal Polignac flourished.

1729 The treaty of Seville, October 29.

1730 Dr. Benjamin Hoadley, bishop of Winchester, lived at this time.

1731 The second treaty of Vienna, between the emperor, Great Britain, and the Dutch, signed March 16. Count Zinzendorff, chancellor of Austria. Alexander Pope, the great poet, wrote.

1732 The pragmatic sanction confirmed by the diet of the empire, January 11. Count Osterman, vice-chancellor of Russia. Charles Rollin.

1733 Augustus I. king of Poland, died February 1. The Polish war begins in October, and spreads into Germany and Italy. Charles lord Talbot, lord-chancellor. Abbé du Bos.

1734 The battle of Parma, June 18. Philipsburg surrenders July 8. The battle of Guastalla, on Sunday, September 8. William Pulteney, earl of Bath. Bernard de Fontenelle.

1735 Don Carlos, king of Naples and Sicily. John earl of Granville. Dr. Thomas Sherlock, bishop of London.

1736 The preliminaries of peace between the emperor and king of France, April 30. Dr. George Berkeley, bishop of Cloyne.

1737 Philip earl of Hardwicke, lord chancellor; and Colin Maclaurin, mathematician; lived at this time.

1738 The peace of Vienna, signed November 7, by which the cession of Lorraine was made to France, the duchy of Tuscany to the family of Lorraine, and Naples, &c. confirmed to don Carlos. James Thomson, poet, author of the Seasons.

1739 Letters of marque issued out in Britain against Spain, July 21, and war declared October 23. Dr. Joseph Butler, bishop of Durham.

1740 The emperor Charles VI. dies October 9, which begins the war in Germany; it continues eight years. Henry Fielding, novelist and play-writer.

1741 The battle of Molwitz, on Monday, March 30. Charles de Secondat, baron Montesquieu; died 1755, aged sixty-seven.

1742 The battle of Czaslow, May 6. Dr. Stephen Hales.

1743 The battle of Campo Santo, January 17. The battle of Dettingen, June 16. George Frederic Handel.

1744 The sea-fight off Toulon, February 10. War declared against France, March 31. Dr. James Bradley.

1745 The battle of Fontenoy, April 30. The battle of Friedberg, May 24. Cape Breton taken, June 17. The rebellion begins in July. The action of Preston Pans, September 21. Count Saxe, marshal of France. Dr. Conyers Middleton.

1746 The action near Falkirk, January 17. The battle of Culloden, April 16, gained by William Augustus duke of Cumberland. William Hogarth.

1747 Prince of Orange made stadtholder, May 2. The French fleet defeated by admiral Anson, &c. May 3. The battle of Laffeldt, June 21. Bergen-op-Zoom taken, September 5. French Fleet defeated by admiral Hawke, October 14. George lord Anson; died 1762, aged sixty-two. Jacques Cassini.

1748 The preliminaries are signed April 30. The peace of Aix-la-Chapelle, October 7. Sir John Barnard; died 1764, aged eighty.

1749 Philip earl of Chesterfield; died 1773, aged 79.

1750 The interest on the public funds reduced to 3 per cent. February 28. Allen earl Bathurst.

1751 Frederic prince of Wales dies March 20, aged 44. Marshal James Keith. Thomas Simpson.

1752 The new stile introduced into Great Britain, the 3d of September being accounted the 14th. Don Philip duke of Parma.

1753 Henry count Bruhl, and Dr. Edward Young, lived.

1754 The French attack an English fort on Monongahela and Logstown on the Ohio, April 17. Mr. Washington intercepts a small body of French, June 1. Fort Necessity surrendered to the French, July 3. John duke of Bedford. Dr. John Leland.

1755 Alcide and Lys taken, June 10. Bradock defeated near fort Du Quesne, July 9. The French defeated near lake George, September 8. Subsidy treaty of Petersburg, September 30. Lisbon ruined by an earthquake, Nov. 1. Admiral Edward Boscawen.

1756 Geriah surrenders to admiral Watson, February 13. War declared against France, May 17. Sea-action off Minorca, May 20. Calcutta taken, June 20. Minorca surrenders, June 29. Oswego taken, August 14. Battle of Lowoschitz, October 1. William Pitt, earl of Chatham.

1757 Calcutta retaken, January 2. Chandenagore taken, March 23. Battle of Prague, May 6. Battle of Kollin, June 18. Battle of Plaissy, June 23. Battle of Hastenbeck, July 26. Battle of Jagersdorf, August 30. Convention of Closter Seven, September 8. Isle of Aix taken, Sept. 23. Battle of Rosbach, November 5. Battle of Breslau, Nov. 22. Battle of Lissa, December 5. Hostilities renewed, and Harburgh taken, December 29. Marshal Daun. Dr. Thomas Secker, archbishop of Canterbury.

1758 Sea-fight off Madras, April 29. Senegal taken, May 1. Fort St. David's taken, June 2. Battle of Crevelt, June 23. Siege of Olmutz raised, July 1. Battle of Ticonderoga, July 8. Louisburgh taken, July 26. A second sea-fight off Madras, August 3. Cherburgh taken, August 8. Battle of Zorndorf, August 25. Action near St. Cas, Sept. 11. Battle of Hochkirken, Oct. 14. Goree taken, Dec. 29. General James Wolfe. P. Francis Courayer.

1759 Battle of Bergen, April 13. Guadaloupe surrenders, May 1. Battle of Zulicau, July 23. Battle of Minden, August 1. Battle of Cunnersdorf, August 12. Sea-fight off Lagos, August 18. Third sea-fight, near Pondicherry, September 10. Battle of Quebec, September 13. M. Conflans defeated by sir Edward Hawke, Nov. 20. Prussians surprised at Maxen, November 21. Henry Fox, lord Holland. Dr. Zachary Pearce, bishop of Rochester.

1760 Battle of Wondivash, January 22. Thurot defeated by captain Elliot, February 29. Battle near Quebec, April 28. Battle of Warbourg, July 31. Battle of Pfaffendorf, Aug. 15. Montreal surrenders, Sept. 8. King George II. dies, Oct. 25, aged seventy-seven. Fr. Ar. de Voltaire.

1761 Pondicherry surrendered, January 15. Belleisle surrendered, June 7. King George III. married, September 8. Crowned, September 22. Schweidnitz surprised by the Austrians, October 1. Colberg surrendered, December 17. Charles Townshend. George lord Lyttelton flourished.

1762 War declared against Spain, January 3. Czarina dies, Jan. 5. Martinico surrendered, February 4. Grenada, &c. surrendered, March 4. Peace between Russia and Prussia, May 5. War declared by Portugal against Spain, May 23. St. John's taken, June 27. Czar dethroned, July 9. Havannah surrendered, and prince of Wales born, August 12. St. John's retaken, Sept. 18. Manilla taken, Oct. 6. Preliminaries signed, Nov. 3. Edward Augustus, duke of York.

1763 The peace of Paris, February 10. The peace of Hubertsberg, between Prussia, Austria, and Saxony, Feb. 15. Expulsion of the Jesuits from France completed. Famine at Naples. Augustus king of Poland dies, aged sixty-seven. Forty-nine British gentlemen murdered at Patna, October 6. Patna taken, November 6. Robert Henley, earl of Northington.

1764 Prince of Brunswick married to princess Augusta, January 16. Count Stanislaus Poniatowski unanimously elected king of Poland, September 6. Plague at Naples. C. V. Linnæus flourished.

1765 The regency bill passed, May 15. Sujah Dowlah defeated near Corah Jehanabad, by general Carnac, May 3; and soon after Bengal established by lord Clive under the British government. Ministry changed, July 10. Duke of Cumberland dies, October 31. The dauphin dies, December 20. Chevalier de St. George dies, December 31.

1766 The American stamp-act repealed, March 18. Insurrection in Spain, which obliged their king to leave Madrid, March 25. Ministry changed, July 30. Embargo laid on the exportation of corn, Sept. 26. King of Denmark married to princess Caroline, October 1. David Hume.

1767 Expulsion of the Jesuits from Spain, March 31. Duke of York dies at Monaco, September 17. The dissidents have their privileges established in Poland, and the expulsion of the Jesuits from Naples, November 21. Jean Jaques Rousseau.

1768 Act making the Irish parliament octennial passed, February 3. War between the Russians and Turks begins in autumn. Robert lord Clive; died November 22, 1774. David Garrick.

1769 First battle of Choczim, April 30. Second battle, July 13. Third battle, September 17. Russian fleet enter the Mediterranean in December. Captain James Cook. Thomas Gray, poet.

1770 Lord Camden dismissed as chancellor, January 16. Duke of Grafton resigns, January 28, and is succeeded by lord North. The right of Falkland island settled. Battle near the river Pruth, Aug. 2. Bender taken by storm, Sept. 28. M. Choiseul disgraced in France, Dec. 23. Oliver Goldsmith, poet.

1771 Lord mayor of London committed to the Tower, March 27. The Turkish fleet burnt by the Russians at Cisme, Natolia, July 5. Dr. W. Warburton, bishop of Gloucester.

1772 Revolution in Denmark, when the queen was imprisoned, January 17. Augusta, princess dowager of Wales, dies February 8, aged fifty-three. Insurrection at Christianstadt, which ended in a revolution in Sweden, rendering the king absolute, August 13; and completed at Stockholm, August 19. Dr. William Hunter, anatomist.

1773 Review of the fleet at Portsmouth by his majesty, June 27. The order of the Jesuits suppressed by the pope, August 17. Disturbances in America begin, by the destruction of tea on-board three ships at Boston, December 18. Monf. D'Alembert.

1774 Dr. Franklin's petition dismissed, January 29. Literary property determined, February 22. Grenville's act for elections made perpetual, March 31. Boston port-bill passed, March 31. Louis XV. dies, May 10, aged sixty-four. Turkish army ruined, June 20. Peace between the Russians and Turks, near Schumla, July 21. The ancient parliament of Paris restored, Nov. 12. Charles Stewart, pretender. L. Euler, mathematician.

1775 Hostilities in America begin at Lexington, April 19. Action of Bunker's-hill, June 17. Dr. S. Johnson.

1776 Congress assume independency, May 15; and declare it, July 4. Attack on Charlestown, June 28. General Howe lands on Staten island, July 3. Battle on Long island, August 27. New York taken, September 15. Dr. Robert Lowth, bishop of London.

1777 Ticonderoga taken by general Burgoyne, July 6. General Howe embarks his army off Staten island, July 24; and lands in Chesapeak-bay, August 30. Philadelphia taken, Sept. 26. Battle of German Town, Oct. 4. General Burgoyne's army surrenders at Saratoga, Oct. 16. Monf. Buffon.

1778 Treaty between France and the Americans, Feb. 6. Philadelphia evacuated, June 18. Action in the Jerseys, June 28. Austrians and Prussians begin hostilities, July 7. Action at sea between the English and French fleets, July 27. Siege of Rhode island, August 9; raised the 30th. Pondicherry taken, Oct. 17. French routed at St. Lucia, Dec. 18. Voltaire and Linnæus, died. Monf. Diderot.

1779 St. Vincent's taken by the French, June 17; Grenada, July 3.

1780 Rodney took twenty-two sail of Spanish ships, January 28. Engagement with Langara, Jan. 16. Riots in London, July. War against Holland, Dec. 20.

1781 St. Eustatia taken, February 3; retaken, November 17. Earl Cornwallis surrendered his army, Oct. 19. Death of lord Hawke, October 17.

1782 Minorca taken, February 5. Admiral Rodney beat count de Grasse, April 12. Independence of America admitted, November 30.

1783 Preliminaries of peace, January 20. Armistice between England and Holland, February. Definitive treaty, September 3.

1784 Peace ratified with America, March 24; with Holland, May 24.

1785 Irish propositions attempted and rejected.

1786 Droit d'aubaine abolished in France. Commercial treaty with France, signed October 29.

1787 Amsterdam taken possession by Prussia, October 9. Agreement between France and England to disarm, October 9. Quarrel between king of France and parliament begun.

1788 War between the Turks, Germans, and Russians. Treaty between Great Britain and Russia, June 13. Stadtholdership guaranteed to the prince of Orange by the United States of Holland, June 27. Russia declares war against Sweden, June 30. George III. attacked by an alarming disorder, Nov. 6. French notables assembled, Nov. 6. Ockzakow taken, Dec. 17.

1789 General illumination in England on the king's recovery, March 10. Insurrection in France, March. States-general of France convened, May 5. French king makes concessions, June 26. Revolution in France, July 3. Bastille destroyed, July 20. Insurrection in Brabant, August 10. Bender taken, October 8. Ghent surrendered, November 23; and Brussels, December 12. Dauphin of France; died June 9, 1795.

1790 Joseph II. emperor of Germany, died February 20. The French clergy deprived of their benefices, and have small pensions decreed in lieu of them, February. Parliaments abolished in April; titles suppressed, June 19. Ceremony of the confederation, July 14. Neckar resigns, and retires to Swisserland, September 4.

1791 Mirabeau dies in March. Louis and his family escape

escape from Paris, but are stopped at Varennes, June 21. Treaty of Pilnitz, July. Riots in Birmingham, July.

1792 Leopold II. emperor of Germany, dies suddenly, March 1. Gustavus III. king of Sweden, shot by Ankarstrom, March 15. French declare war against Germany. Duke of Brunswic publishes his manifesto, July 25. Swiss guards, and all the servants at the Thuilleries, murdered, August 10. Royal family of France imprisoned. Princess Lamballe, and 1000 others, massacred in Paris. Royalty abolished, and France declared a republic, September 20. Battle of Gemappe, November 7.

1793 Louis XVI. perishes under the guillotine, Jan. 21. The French republic declares war against England, Holland, and Spain, February 1. French defeated near Tournay by the duke of York, May 8. Dumourier endeavours to restore royalty. Marat murdered by Charlotte Cordey, July 14. Toulon submits to lord Hood, August 23; who is obliged to leave it, December 19. General Custine executed in July; and the queen of France, by the guillotine, October 16. The heads of the Girondist party executed, Oct. 30. The duke of Orleans guillotined.

1794 Martinico taken by sir Charles Grey, March 23. Elizabeth, sister to the late king of France, guillotined, May 12. Lord Howe's victory over the French fleet, June 1. Earthquake and eruption of mount Vesuvius, June, 13-24. Robespierre and his party executed by torch-light, July 28. Trial of Thomas Hardy, &c. for high treason, began Oct. 28.

1795 Revolution in Holland; the stadtholder arrives in England, January 20. Prince of Wales married to the princess Charlotte of Brunswic, April 8. Peace between Prussia and France, April 10. Warren Hastings acquitted, after a trial of seven years, April 23. Captain Molloy's court martial, April 28. Dauphin of France died at Paris, June 9. Three French ships taken by lord Bridport, June 23. Quiberon expedition fails, July 21. Peace between France and Spain, July 22. Cape of Good Hope taken from the Dutch, September 23. Censeur of 74 guns, and great part of the Mediterranean fleet, captured by the French, October 7. Gold mine discovered in Ireland, October 9. Stanislaus, king of Poland, made a formal surrender of his crown; his kingdom partitioned between Russia, Austria, and Prussia, November 25. Church of St. Paul, Covent-garden, burnt.

1796 Daughter of Louis XVI. sets out for Vienna; at Basle she is exchanged for the French deputies arrested by Dumourier. Princess of Wales delivered of a daughter, January 7. Charette, chief of the Vendeans, shot, March 18. Sir Hugh Palliser died, 19. Vice-admiral Cornwallis tried for disobedience of orders, and acquitted, April 8. Amboyna and Banda taken from the Dutch, 18. Sir Sidney Smith taken at Havre de Grace, 19. Kidd Wake, for making faces at the king, sentenced to the pillory and five years imprisonment, May 8. Bonaparte, a very successful French general at this time. Dutch fleet taken by admiral Lucas at the Cape, August 17. Spain declares war against Great Britain, Oct. 11. King of Sardinia dies, 17. Catharine II. empress of Russia, dies, aged 68, November 17. Lord Malmesbury's negociation at Paris fails, December 20. The French expedition to Bantry bay in Ireland fails, at the end of the year. The million-bank dissolved by act of parliament. Bread 1s. 3d. the quartern loaf. Powder-mills at Hounslow blown up.

1797 Bonaparte defeats the Austrians near Verona, taking 23,000 prisoners and sixty pieces of cannon, Jan. 14. He defeats the pope's army near Ancona, takes 12,000 prisoners, February 10. Admiral Jarvis (now viscount St. Vincent) with fifteen sail defeats the Spaniards with thirty-seven, and takes four sail of the line, 14. French land 1200 men in Wales, who are all made prisoners, 18. Bank of England stops paying in gold, 26. Mutiny among the sailors in the grand fleet at Portsmouth, settled amicably, April 16. Princess royal of England married to the prince (afterwards duke) of Wirtemberg, May 18. Mutiny at the Nore, 27; at the termination of which Parker and several others are executed. Nelson lost his right arm in an attack on Santa Cruz, Teneriffe, July 24. Lord Malmesbury's second journey to France fruitless, September 19. Admiral Duncan defeats the Dutch, takes ten ships and three admirals, October 11. King of Prussia died November 16. Seven-shilling pieces first issued, 29.

1798 Pope Pius VI. deposed; leaves Rome, February 22. French subjugate Swisserland, March 5. King of Poland dies, 11. Sir Sidney Smith escapes from prison, May 6. Malta taken by the French, June 12. Bonaparte lands in Egypt, July 8. Battle of the Nile, August 1. Sir J. B. Warren defeats and takes the French armament destined for Ireland, Oct. 12. Income-tax brought forward, December 3.

1799 Mr. Cherry, captain Conway, Mr. Graham, &c. assassinated at Benares by Vizier Aly, January 15. Naples taken by the French, 24. Galvana died at Bologna, Spallanzani at Pavia, and Hedwig at Leipsic, during this month. Kien Long, emperor of China, died, in his 90th year, March 5. Battle of Osterach, 21. Suwarrow's successes against the French, April 27, 28, June 19, August 15. Seringapatam taken, Tippoo Saib killed, May 4. General Massena successful against the Austrians, 25-28. Massena defeated by the archduke Charles, June 5. Duke d'Angoulesme married to the princess-royal of France at Mittau, 9. Earl Howe died, aged 72, August 5. The pope dies at Valence, in his eighty-second year, 19. Surinam taken from the Dutch, 23. Dutch fleet taken by admiral Mitchel, 28. Bonaparte arrives in France from Egypt, October 16. He changes the government of the republic, and is appointed first consul, November 10. General Washington dies, November 15.

1800 Bonaparte makes overtures for peace to the British government, which are rejected, January 1, 17. Battle of Novi, 8. George Steevens died, 22. Cardinal Gregorio Barnaba Chioramonte elected pope at Venice; he takes the name of Pius VII. Feb. 14. General Suwarrow dies, April 2. Battle of Stockach, May 4. Hadfield shoots at the king at Drury-lane playhouse; he is tried and acquitted as insane, May 15. Died sir F. Buller, June 5. The union-bill passes both houses in Ireland, 13. Battle of Marengo; Kleber assassinated in Egypt; 14. First stone of the wet-dock, at the Isle of Dogs, laid, July 12. Unsuccessful attempt of the English upon Ferrol in Spain, August 25. Malta taken by the English, September 5. Conspiracies to kill Bonaparte, October 10, and December 24. Embargo laid by Russia upon British ships, September 10, November 27. Union between Great Britain and Ireland voted by the parliament in both kingdoms. His majesty closed the British parliament on the 31st of December, being the last day of the century.

1801 Of the Julian period 6514.

1801 Lavater died at Berne, January 3. The first parliament of the United Kingdom of Great Britain and Ireland met, 22. Peace signed between the French republic, and the emperor of Germany, at Luneville, February 9. The English ministry changed, and Mr. Pitt retires, in March. Bread, 1s. 10½d. the quartern loaf. Paul I. emperor of Russia, dies, March 23, succeeded by Alexander. Peace between France and Naples, 28. The Danes take possession of Hamburg, 29. Sir Hyde Parker passes the Sound, and makes a truce with the Danes, April 2.

CHRONO'METER,

CHRONO'METER, [χρονος, time, and μετρον, Gr. measure.] An instrument or machine used in measuring time; such are dials, clocks, watches, &c. The term is, however, more particularly used for a kind of clock, so contrived as to measure a small portion of time with great exactness, even to the sixteenth part of a second; such a one was invented by the late ingenious Mr. George Graham; which is of great use for measuring small portions of time in astronomical observations, the time of the fall of bodies, the velocity of running waters, &c. But long intervals of time cannot be measured by it with sufficient exactness, unless its pendulum be made to vibrate in a cycloid; because otherwise it is liable to err considerably, as all clocks are which have short pendulums that swing in large arches of a circle. Various other contrivances have been in use, under the name of *chronometers*, for the purpose of measuring time under different circumstances. A chronometer of *musical time*, or time-table, has likewise been invented; for which see the article MUSIC.

CHRO'NOSCOPE, [of χρονος, time, and σκοπος, a mark.] The same as a pendulum to measure time.

CHRU'DIM, a town of Bohemia, and capital of a circle of the same name; situated on a river called Chrudimka; the circle contains thirty-three towns. It is principally remarkable for the great number of fish-ponds, and an excellent breed of horses: 100 miles south-east of Dresden, and fifty east of Prague.

CHRY'SA, in ancient geography, a town of Mysia, on the sinus Adramyttenus; extinct in Pliny's time; it had a temple of Apollo Smintheus. *Homer*. The country of the fair Chryseis, who first gave rise to the quarrel between Agamemnon and Achilles.

CHRY'SALIS, *s.* [from χρυσος, gold, because of the golden colour in the nymphæ of some insects.] A term formerly used by naturalists for aurelia, or the first apparent change of the maggot of any species of insects into a torpid state; now called *pupa*. See ENTOMOLOGY.

CHRY'SAME, a Thessalian priestess of Diana Trivia She fed a bull with poison, which she sent to the enemies of her country, who ate the flesh, and became delirious, and were an easy conquest. *Polyæn*.

CHRYSANTHEMO'IDES. See OSTEOSPERMUM.

CHRYSAN'THEMUM, *s.* [χρυσος, gold, and ανθος, a flower.] In botany, a genus of the class syngenesia, order polygamia superflua, natural order compositæ dioscoideæ. The generic characters are—Calyx: common hemispherical, imbricate; scales close incumbent; the interior ones larger by degrees; the innermost terminated by a parched scale. Corolla: compound radiated; corollets hermaphrodite tubular, numerous in the disk; females more than twelve in the ray; proper of the hermaphrodites funnel-form, five-cleft, patulous, length of the calyx; of the females strap-shaped, oblong, three-toothed. Stamina: in the hermaphrodites, filaments five, capillary, very short; antheræ cylindric, tubular, shorter than the corolla. Pistillum: in the hermaphrodites, germ ovate; style filiform, longer than the stamens; stigmas two, revolute; in the females, germ ovate; style filiform, equal with the hermaphrodites; stigmas two, obtuse, revolute. Pericarpium: none; calyx unchanged. Seed: solitary, oblong, without any pappus. Receptaculum: naked, dotted, convex.—*Essential Character*, Calyx hemispherical, imbricated; the marginal scales membranaceous; pappus margined; receptacle naked.

Species. I. Leucanthema, with white corollas. 1. Chrysanthemum frutescens, or canary ox-eye: shrubby, leaves fleshy, linear, pinnate-toothed, trifid at the end. Stem shrubby; near two feet high, dividing into many branches; leaves of a greyish colour, cut into many narrow segments; flowers axillary, standing upon naked peduncles singly, and greatly resembling those of common chamomile. There is a succession of these great part of the year, for which this plant is chiefly esteemed. It grows naturally in the Canary Islands. Cultivated in 1699 in the Oxford garden.

2. Chrysanthemum serotinum, or creeping-rooted chrysanthemum: leaves lanceolate, serrate at top, acuminate at both ends. Root perennial, creeping far under the surface. The stems are strong, and three or four feet high. The flowers appear in September.

3. Chrysanthemum atratum, or fleshy-leaved chrysanthemum: all the leaves wedge-shaped, oblong, gashed, fleshy. Radical leaves wedge-form, lobed at the tip; stem-leaves lanceolate, serrate; stem one-flowered; calyx with a dark edge. Haller makes this a variety of the fifth species; and Allioni says, that it scarcely deserves to be distinguished from it. It is found in the pastures of the Alps in Swisserland and Savoy, and in Austria. Perennial. Introduced in 1775, by Pitcairn and Fothergill.

4. Chrysanthemum alpinum, or alpine ox-eye: leaves wedge-shaped, pinnatifid, segments entire; stems one-flowered. Found in the south of France, Swisserland, the Valais, Savoy, about Tubingen, on the Pyrenees, in Arragon, &c. perennial.

5. Chrysanthemum leucanthemum, or common ox-eye, or great daisy: leaves stem-clasping oblong, the upper serrate, the lower toothed. Root perennial, somewhat creeping; stem from twelve to eighteen inches and upwards, erect, rigid, angular, at the bottom often purplish and hairy, above naked, simple, or little branched. Flowers terminal, solitary, large, and showy. Seeds attenuated to the base, deeply grooved all round, and purplish black; or, according to Linnæus, black with white streaks, and a yellow cylindric hollow head: and, as Scopoli says, ten angles. By the accurate Gærtner they are described as from ovate inversely pyramidal or turbinate, at first ferruginous, beautifully variegated with ten milk-white ridges; but afterwards blackish, with the ridges pale bay-colour; the top is bald. This species is very common in dry meadows and pastures, sometimes on walls, and in corn fields; flowering from May to July, and increasing greatly by seed. The fresh leaves chewed discover a sweetish unpleasant taste, somewhat like parsley, but not hot or biting; they have been recommended in disorders of the breast, both asthmatical and phthisical, and as diuretics, but are now seldom called for. Allioni, however, speaks with some respect of it. The young leaves may be eaten in salads; and John Bauhin relates that they use them for this purpose at Padua. According to Linnæus, horses, sheep, and goats, eat it; cows and swine refuse it. Mr. Curtis mentions it as a singularity, that as so many beautiful varieties of the common daisy are met with in almost every garden, we never see this plant in a similar state. He has, however, been credibly informed that two double varieties of this exist near Air in Scotland. Haller affirms that the varieties of this plant are innumerable, and he mentions several; among others one in which the florets of the ray are fistulous: it is highly probable, therefore, that culture would produce as many varieties of this as the common daisy has afforded. Parkinson makes mention of it with double flowers. Besides the common names of *great* and *ox-eye daisy*, Dr. Withering mentions that the plant is called *moon-flower*, and the flowers *moons*. Gerard gives us the name of *maudlin-wort*.

6. Chrysanthemum montanum, or mountain ox-eye: bottom leaves spatulate-lanceolate, serrate; upper, linear. Perennial; stems many, erect, simple, and one flowered, but in a state of cultivation becoming branched; leaves smooth; flower only half the size of the foregoing in its wild state, but equalling it in cultivation. According to Gerard, this is only a variety of the foregoing; and Allioni is of opinion that it is scarcely different. Upon the whole, then, it seems to be only a variety of that mutable species, arising from its high situation. Mr. Miller says, that he received it from Verona, near which place it grows in plenty.

7. Chrysanthemum graminifolium, or grass-leaved ox-eye: leaves linear; toothed at the end, or the whole length. Gouan affirms, that in all the plants which he has examined,

examined, except a few small ones growing from the fissures of rocks, the root-leaves were toothed from end to end; those, indeed, were only three-toothed at the tip, as in Jacquin's figure.

8. Chrysanthemum monspeliense, or Montpelier oxeye: lower leaves palmate; leaflets linear, pinnatifid. An elegant plant, without scent; perennial, with erect branching stems.

9. Chrysanthemum balsamita: leaves ovate, oblong, serrate, eared. Found by Tournefort in the Levant.

10. Chrysanthemum inodorum: leaves pinnate, multifid; stem branching, diffused. Found in corn-fields and by road-sides, flowering from July to September. Annual. Old authors usually rank this plant with the chamomiles; Linnæus had placed it among the matricarias; but, on account of the scariose or skinny edge of the calycine scales, he has removed it into this genus.

11. Chrysanthemum achilleæ, or milfoil-leaved chrysanthemum: leaves bipinnate, pinnas imbricate; stem stiff and straight, many-flowered. Stem erect, somewhat angular, a foot high; leaves like those of milfoil, only eight times as large, with eminent, but scarcely visible, dots scattered over them, and a few white hairs underneath; the ends finish in a whitish point. Native of Italy; perennial. Probably this and the italicum are one species.

12. Chrysanthemum corymbosum, or corymbed chrysanthemum: leaves pinnate, gash-serrate; stem many-flowered. Stem erect, from eighteen inches to two or three feet high, and more. The whole plant is without smell or taste; perennial; flowering in July and August. Native of the south of France, Swisserland, Germany, Austria, Carniola, Hungary, Siberia, and in mountainous woods.

II. Chrysanthema, with yellow corollas. 13. Chrysanthemum indicum: leaves simple, ovate, sinuate, angular, serrate, acute. Root perennial; stem herbaceous, annual, four feet high, upright, round; branches oblique, subdivided, smooth, and even. The many varieties of this species differ not only in colour, but in size and doubleness. These are cultivated through the whole empire of Japan, for the beauty of their flowers, which display themselves during the summer and autumnal months. Also in China and Cochinchina.

14. Chrysanthemum pinnatifidum, or cut-leaved chrysanthemum: shrubby, leaves smooth, drawn to a point at the base, pinnatifid; segments gashed. Resembles the foregoing so much as to seem only a variety; but the leaves of this are oblong, not ovate, and nearly four times the size, as indeed all vegetables are in these islands. Found by Masson on the highest rocks of the island of Madeira, near the torrents. As the indicum is so apt to vary, this may, perhaps, be no more than a variety.

15. Chrysanthemum arcticum: leaves simple, wedgeform, subpalmate, multifid, obtuse. Native of Kamtschatka and Siberia.

16. Chrysanthemum pectinatum: leaves pinnate, linear, parallel, acute, quite entire; peduncles solitary, one-flowered. Native of Spain and Italy; perennial.

17. Chrysanthemum segetum, or corn-marygold: leaves stem-clasping, the upper laciniate, the lower tooth-serrate. Whole plant smooth; stem a foot or more in height, upright, striated, branched; each branch terminated by one large yellow flower. besides the names of *corn-marygold*, and *yellow* or *golden corn-flower*, it is called *yellow-bottle* in Kent; *buddle*, which is a corruption of bottle, in Norfolk; *golds*, or, as it is more commonly pronounced, *goulds*, or *gowls*, in the midland counties; *goulans*, or *goldins*, in the north of England; and *gules*, *gools*, *guills*, or *yellow gowans*, in Scotland; from the golden colour of the flowers, which, however they may give a brilliancy to the fields in tillage, and please the eye of the passing traveller, as Linnæus observes, are no very agreeable sight to the farmer; this plant being a very troublesome weed in sandy soils. Linnæus informs us, that it was imported into Sweden along with corn from Jutland, about the end of the last century, and that there is a law in Denmark to oblige the farmers to extirpate it. A large quantity, which grew on arable land, was cut when in flower, dried, and eaten by horses as a substitute for hay. The Germans use it for dying yellow. Linnæus observes that the flowers follow the sun remarkably. They appear from June to October, and the plant is annual.

18. Chrysanthemum myconis, or tongue-leaved chrysanthemum: leaves tongue-shaped, obtuse, serrate; scales of the calyx equal. This resembles the foregoing greatly; but the stem is erect, even, and roundish. Native of Portugal, Spain, and Italy; annual.

19. Chrysanthemum Italicum: leaves bipinnate, serrate; rays of the flowers the length of the disk; stem procumbent. This resembles the next species very much; but the stem is more branched, many-flowered, and more erect. The ray of the flower is white, the length of the disk. Observed in Italy by Arduini. There is the same reference to Micheli in this and the eleventh species; perhaps they are the same plant repeated.

20. Chrysanthemum millefoliatum: leaves bipinnate toothed; stem decumbent; rays of the corolla shorter than the disk. Disk of the flower entirely without chaffs. It differs from the next species in the diameter of the disk, not exceeding the length of the calyx; whereas in that the disk is twice as broad. It borders on the foregoing species. The habit is that of milfoil, but the leaves are a little larger. Native of Siberia. This plant is low and bushy, but the flower-stems rise near two feet high. It begins to flower in June, and continues till September. Tournefort first discovered it in the Levant.

21. Chrysanthemum bipinnatum: leaves bipinnate, serrate, villose; rays shorter than the disk. Observed in Siberia by Gmelin.

22. Chrysanthemum coronarium, or garden chrysanthemum, or Cretan corn-marygold: leaves pinnate, gashed broader outwards. Stem furrowed, leafy, branching, three feet high. Gærtner removes all the species of chrysanthemum which have the seeds crowned with a manifest margin to the genus PYRETHRUM. Of *pyrethrum* he remarks, that it is only *tanacetum* with a ray. Native of Crete, Sicily, the Lower Valais, and mount Frals. Of this plant there are single and double flowers, both white and yellow. There is also a variety with fistular florets, called quill-leaved chrysanthemum; but the seeds of this degenerate to the common sort.

23. Chrysanthemum flosculosum, or bastard chrysanthemum: all the florets uniform, hermaphrodite. A procumbent, ever-green, undershrub; flowers small, terminating, solitary, of a deep yellow colour. Native of the Cape of Good Hope, and was introduced before 1605, by Parkinson.

24. Chrysanthemum Japonicum: leaves petioled, gashed at the tip, and toothed. Stem simple, erect, striated, villose; leaves alternate, oblong, smooth, green above, pale underneath, two inches long.

25. Chrysanthemum ceratophylloides: stem one-flowered; pinnas deeply cut. The whole plant is extremely smooth; stem simple, one-flowered, leafy, straight, growing to a foot in height. Grows on the mountains Tende and Briga; perennial.

26. Chrysanthemum Arragonense: stem one-flowered; root-leaves heaped, linear, silky, slightly three-toothed at the tip; upper stem-leaves quite entire, acute. Stems low and shrubby, seldom above a foot high, putting out several slender woody branches, with narrow pale-green leaves. From the end of each branch a naked peduncle is produced, six inches long, sustaining one flower of a sulphur colour. The flowers appear in June and July, but the seeds seldom ripen in England. Found in La Sierra de Villaroya, near Purujosa, in Arragon.

27. Chrysanthemum procumbens: leaves sinuate-gashed, blunt; stem procumbent. Stem perennial, three feet high, frequently creeping, slender, and very much branched. There

CHRYSIS, CLATHRUS, CLAVA, CLAVARIA, CLIO, AND COMBRETUM.

1 *Chrysis calens*, 2 *ignita*, 3 *viridula*, 4 *Clathrus fungiformis*, 5 *Clava parasitica*, 6 *Clavaria laciniata*, 7 *Clio pyramidata*, 8 *limacina*, in a state of rest, 9 the same with the membranes expanded, 10 Branch of the *Combretum decandrum*.

There are many varieties, but the flowers of all are small. It is found both wild and cultivated, in China and Cochinchina.

Propagation and Culture. 1. This plant will perfect seeds in England, when the seasons are favourable; but, as cuttings take root very easily during any of the summer months, the seeds are rarely sown. Being a native of warm countries, it will not live in the open air in England during the winter; therefore, when the cuttings have made good roots, they should be each planted into a separate pot, and placed in the shade till they have taken fresh root; then remove them to a sheltered situation till autumn, and thence into the green-house, giving them free air in mild weather, and frequently refreshing them with gentle waterings in winter. In summer they will require more moisture, and should be treated in the same manner as other hardier exotics.

2. Multiplies very fast by its creeping roots, and will thrive in any soil or situation.

6. Sow the seeds in a shady border; they will come up in about six weeks. Transplant them, when fit to remove, into another shady border, where they may remain, and keep them clean from weeds.

7, 12. These rarely perfect seeds in England, but being perennials, may easily be increased by parting the roots. The best time for this is in autumn.

8. This sort ripens every year in England, by which the plant is easily propagated; for, if the seeds are sown in the spring on a common border, the plants will come up in six weeks; when these are fit to remove, they may be transplanted into a nursery-bed, at about a foot distance every way, and kept clean from weeds till autumn, when they may be removed to the places where they are designed to remain. As these plants extend their branches pretty far on every side, they should be allowed at least two feet room; therefore they are not very proper furniture for small gardens, where there is not room for these large growing plants; but in large gardens they may have a place for the sake of variety. If planted in poor dry land, or upon lime-rubbish, they will not grow so vigorous as in good ground; but they will endure the cold better, and continue longer; when very succulent, they are apt to rot in winter; but, where they grow from the joints of old walls, they continue in vigour several years.

17. In order to destroy this weed, Linnæus recommends to dung the ground in autumn; then to give the land a summer fallow, and to harrow in about five days after sowing.

20. Is very hardy, will live in the open air, and may be increased easily by slips; but does not perfect seeds in England, unless in warm dry seasons.

22. These plants are always esteemed as annual, so the seeds are usually sown upon a slender hot-bed in the spring, and the plants treated in the same manner as the African marigold, for the culture of which we shall refer the reader to the article TAGETES; but, as the plants which rise from seeds do many of them produce single flowers, although the seeds are saved from the best double flowers, therefore many persons now propagate these plants from cuttings, whereby they continue the double sorts only; these cuttings, taken from the plants the beginning of September, and planted in pots, will readily take root; and, if they are placed under a hot-bed frame to screen them from the frost in winter, letting them have free air in mild weather, they will live through the winter; and in the spring these plants may be transplanted into the borders of the flower-garden, where they will flower in June, and continue in succession till the frost puts a stop to them. By this method all the varieties may be continued without variation, but the plants which are propagated this way by cuttings will become barren soon, and will not produce seeds. See AMELLUS, ANACYCLUS, ANTHEMIS, ARCTOTIS, ATHANASIA, BALTIMORA, BIDENS, BRUNIA, BUPHTHALMUM, CACALIA, CARPESIUM, CHRYSOGONUM, COREOPSIS, COTULA, ECLIPTA, ETHULIA, HELENIUM, HELIANTHUS, OSTEOSPERMUM, OTHONNA, POLYMNIA, PROTEA, SENECIO, SILPHIUM, SPILANTHUS, and VERBESINA.

CHRYSAN'THIUS, a philosopher in the age of Julian, known for the great number of volumes he wrote.

CHRYSA'OR, a son of Medusa by Neptune. Some report, that he sprung from the blood of Medusa, armed with a *golden sword*, whence his name χρυσος αορ. He married Calirrhoe, one of the Oceanides, by whom he had Geryon, Echidna, and the Chimæra. *Hesiod.*

CHRYSAO'REUS, a surname of Jupiter, from his temple at Stratonice, where all the Carians assembled upon any public emergency. *Strabo.*

CHRYSER'MUS, a Corinthian, who wrote an history of Peloponnesus, and of India, besides a treatise on rivers.

CHRY'SES, a priest of Apollo, and father of Astynome, called from him *Chryseis*. When Lyrnessus was taken, and the spoils divided among the conquerors, Chryseis fell to the share of Agamemnon. Chryses, upon this, went to the Grecian camp to solicit his daughter's restoration; and when his prayers were fruitless, he implored the aid of Apollo, who visited the Greeks with a plague, and obliged them to restore Chryseis. *Homer.*

CHRYSIP'PUS, a natural son of Pelops, highly favoured by his father, for which Hippodamia, his stepmother, ordered her own sons, Atreus and Thyestes, to kill him, on account of which they were banished. Some say that Hippodamia's sons refused to murder Chrysippus, and that she did it herself. They farther say, that Chrysippus had been carried away by Laius, king of Thebes, to gratify his unnatural lusts, and that he was in his arms when Hippodamia killed him. *Apollodorus.*—A famous stoic philosopher of Tarsus, who wrote about 311 treatises. Among his curious opinions was his approbation of a parent's marriage with his child, and his wish that dead bodies should be eaten rather than buried. Being told that some persons spoke ill of him, "It is no matter," said he, "I will live so that they shall not be believed." He died through excess of wine; or, as others say, from laughing too much on seeing an ass eating figs on a silver plate, 207 B. C. in the 80th year of his age. *Val. Max.*

CHRY'SIS, *s.* the GOLDEN-FLY; in entomology, a genus of insects belonging to the order of hymenoptera. The mouth is armed with jaws, but has no proboscis; the antennæ are filiform, bent, and consist of twelve articulations; the abdomen is arched, with a scale on each side; the anus is dentated, and armed with a sting; the wings lie plain; and the body appears as if gilt. The ignita, or flaming chrysis, is beautified. The fore-part of its head is green and gold, and the hinder azure. The thorax is likewise azured over, with a mixture of green, and terminates at its extremity with sharp points on both sides. The abdomen is green and gold before, and of a coppery-red behind, imitating molten copper highly polished. The whole insect is dotted on its upper part, which gives it a great resplendency of colour. The antennæ are black, and legs green intermixed with gold. This species dwells in holes of walls between the stones, and in the mortar that cements them. It is often seen issuing from such holes, where it nestles and performs its work. The larvæ, which resembles those of the wasp, likewise inhabit the holes of decayed walls. Of this insect there are twenty-seven species now ascertained.

CHRY'SIS, *s.* in botany. See HELIANTHUS.

CHRYSI'TRIX, *s.* [from χρυσεις, golden, and θριξ, hair.] In botany, a genus of the class polygamia, order dioecia, natural order of calamariæ. The generic characters are—Calyx: glumes bivalve, many, imbricate; valvelets ovate-oblong, close, cartilaginous, permanent. Corolla: chaffs extremely numerous, heaped into a fascicle, setaceous, membranaceous, coloured, bright, longer than the calyx, permanent. Stamina: filaments solitary, between the chaffs capillary, the length of the chaffs; antheræ linear, growing on each filament, except the tip of

of the filament. Pistillum: common germ oblong, obtuse; style filiform, length of the stamens; stigma simple.—*Essential Character*. Glume bivalve; corolla, of numerous, setaceous, chaffs; stamina many, solitary, between the chaffs; pistillum, one; none in the male plants.

There is only one species, called Chrysitrix Capensis, or Cape golden-hair. Root perennial; leaves ensiform, equi-distant, even, a palm or foot in length; scape very much like a leaf, compressed, membranaceous, terminated by a bivalve spathe, one valve straight as if it were continued from the scape; the other, which is the lower, gaping and ovate. The flower comes forth from the upper edge of the scape, like a fastigiate fascicle of golden bristles straitened by a cartilaginous perianthium. Jussieu remarks, that this herb has grassy root-leaves; a compressed ancipital scape towards the top cloven on one side at the edge, putting forth a single sessile head, with a one-valved coriaceous spathe below it, and that the germ is sometimes abortive. Native of the Cape of Good Hope.

CHRYSOAS'PIDES, *s.* Soldiers in the armies of Persia, whose arms were all covered with silver, to display the opulence of the prince whom they served. *Justin.*

CHRY'SO-BE'RYL, *s.* [from χρυσο, gold, and βηρυλλο, beryllus.] The yellow beryl; a gem, or precious stone, found at Brasil. See MINERALOGY.

CHRYSOBA'LANUS, *s.* [χρυσο, gold, and βαλανο, a drupe, *Linn.*—Βαλανο is an acorn, and is put also for other fruits, as chesnuts, beech-mast, &c.] In botany, a genus of the class icosandria, order monogynia, natural order pomaceæ. The generic characters are—Calyx: perianthium one-leafed, bell-shaped, five-cleft, divisions expanding, withering. Corolla: petals five, oblong, flat, spreading, inserted by their claws into the calyx. Stamina: stamens very many, placed in a circle, erect, inserted into the calyx; antheræ small, twin. Pistillum: germ ovate; style of the shape and length of the stamens, inserted laterally at the base of the germ; stigma obtuse. Pericarpium: drupe ovate, large, one-celled. Seed: nut ovate, marked with five furrows, wrinkled, five-valved.—*Essential Character*. Calyx five-cleft; petals five; style lateral; drupe with a five-furrowed, five-valved, nut.

There is only one species, known by the name of chrysobalanus icaco, or cocoa plum. It is described by Jacquin as an irregular shrub, from three to ten feet high, covered with a ferruginous bark with pale spots. Leaves ovate-roundish, obtuse, entire, coriaceous, shining, on very short petioles, alternate, two inches long; racemes branched, corymbed, lax, terminating, and axillary, short; the last common peduncles three-flowered. Flowers inodorous, small, with white petals, having almost the character of the plum. Fruits roundish, about an inch in diameter, either quite entire, or with five, six, or seven, grooves; red, purple, yellow, whitish, or variegated, but never blue, as Catesby describes it; whence the shrub of the Bahama islands may perhaps be a different sort. The skin is very thin, and the pulp is small, white, with very little smell, adhering very firmly to the nut, the consistence of a baked apple, the taste sweet with some austerity, but not unpleasant. They are sold in the markets in the West Indies, and are eaten both raw and preserved. The nut or stone varies in form, but approaches to the ovate-acuminate, and sometimes has six or seven angles. Native of the Caribbee islands, and the neighbouring continent, near the sea. There are several varieties.

Propagation and Culture. As these trees are natives of the hot parts of America, they will not thrive in England unless they are kept in a warm stove. They are propagated by seeds, which must be obtained from the countries where the plants naturally grow; these must be sown in the spring in small pots filled with light earth, and plunged into a hot-bed of tanners' bark, observing frequently to water the pots, but not to let them have much at each time. In six weeks the plants will come up, and, if properly managed, will be fit to remove in a month after, when they should be carefully separated, and each planted into a small pot filled with light kitchen-garden earth, and then plunged into the hot-bed again, observing to shade them from the sun till they have taken fresh root; after which they must have air every day in proportion to the warmth of the season, and their waterings during the summer should be frequent, but sparing. In the autumn the plants must be removed into the bark-stove, and plunged into the tan-bed; and in winter the plants must not have too much water, lest it occasion their throwing off their leaves. In summer they must have a good share of air, and the plants in the stove should be constantly treated in the same manner as other tender plants from the same countries.

CHRYSOCOL'LA, *s.* [from χρυσο, gold, and κολλα, cement.] Gold solder, or borax. See BORAX.

CHRYSO'COMA, *s.* [from χρυσο, gold, and κομη, the head of hair; the head, flowering, or leafy top, of trees and herbs.] GOLDY-LOCKS; in botany, a genus of the class syngenesia, order polygamia æqualis, natural order of compositæ discoideæ. The generic characters are—Calyx: common hemispherical, imbricate; scales linear, outwardly convex, acuminate. Corolla: compound tubular, longer than the calyx; corollets hermaphrodite, tubular, numerous, equal; proper funnel-form, border five-cleft, revolute. Stamina: filaments five, filiform, very short; antheræ cylindric, tubular. Pistillum: germ oblong, crowned; style filiform, scarcely longer than the florets; stigmas two, oblong, depressed, involute. Pericarpium: none; calyx scarcely changed. Seeds: solitary, ovate-oblong, compressed; pappus hairy. Receptaculum: naked, flat.—*Essential Character*. Calyx hemispherical, imbricate; style scarcely longer than the florets; pappus simple; receptaculum naked.

Species. I. Shrubby. 1. Chrysocoma oppositifolia, or opposite-leaved goldy-locks: shrubby; leaves opposite, obovate; flowers fascicled, peduncled. A shrub, with brachiate distorted branches; flowers yellow, terminating. Native of the Cape.

2. Chrysocoma comaurea, or great shrubby golden-locks: shrubby; leaves linear, straight, smooth, decurrent by the back. This species grows also naturally at the Cape of Good Hope. This rises with a ligneous stalk about a foot high, dividing into many small branches, which are garnished with narrow leaves, of a deep green, coming out on every side without order; the back part of each leaf has a small short appendix, which runs along the stalks. The flowers are produced at the end of the branches, on slender naked foot-stalks, and are of a pale yellow. This plant flowers great part of the year, for which it is chiefly esteemed; and the seeds ripen very well in autumn.

3. Chrysocoma seriacea: shrubby, silky-white; leaves linear, channelled; small branches panicled at top. This is easily distinguished by its very white silky leaves, branches, and peduncles, and by its yellow flowers; leaves near an inch long, flaccid. The bark and wood have an acrid pungent taste. This is a native of Spain; and is used by the inhabitants against the tooth-ach.

4. Chrysocoma montana: shrubby; leaves oblong, quite entire; flowers solitary. Stem shrubby, with round villose branches. Forskael gathered it on mount Horeb.

5. Chrysocoma patula: undershrubby; leaves linear, smooth; branches divaricate. Stem compound, with the branches by threes or fours, even. Native of the Cape.

6. Chrysocoma cernua, or small shrubby golden-locks: shrubby; leaves linear, recurved, subscabrous; flowers, during impregnation, drooping. The sixth species is a native of the Cape of Good Hope, and is a less plant than the second; it has a shrubby stalk, branching out in the same manner; the leaves are shorter, and a little hairy; the flowers are not half so large, of a pale sulphur colour, and nod on one side before they are blown. This also flowers great part of the year, and ripens seeds very well.

7. Chrysocoma ciliata, or heath-leaved goldy-locks: under-

underſhrubby; leaves linear, ſtraight, ciliate; branches pubeſcent. The ſeventh ſort is alſo a native of the Cape; this has a low ſhrubby ſtalk, which branches out on every ſide; leaves very narrow, ſhort, rough, and reflexed; the flowers ſtand ſingle on the top of naked peduncles, which ariſe from the upper part of the branches; theſe flowers are larger than thoſe of the laſt, and ſtand erect.

8. Chryſocoma tomentoſa: underſhrubby; leaves and branches tomentoſe. Leaves linear, ſtraight; flowers as in the others.

9. Chryſocoma ſcabra: underſhrubby; leaves lanceolate-ovate, recurved, toothlet-ſerrate; peduncles pubeſcent. Height nine to twelve inches, about the middle dividing into many woody branches covered with a brown bark, and theſe into ſmaller green ones, on which are very narrow, ſubhirſute, alternate, leaves. Peduncles long, ſlender, with a few ſmall leaves on them. Heads of flowers at firſt roundiſh, not hirſute; afterwards longer, and contracted towards the end. Scales of the calyx many, narrow, green. Corollas very ſmall, yellow It flowers in Auguſt and September; and is a native of the Cape.

II. Herbaceous. 10. Chryſocoma linoſyris, or German goldy-locks: herbaceous; leaves linear, ſmooth; calyxes lax. The tenth ſort grows naturally in Germany, Swiſſerland, France, Italy, &c. This has a perennial root; the ſtalks riſe two feet and a half high, are round, ſtiff, and cloſely garniſhed with long, narrow, ſmooth leaves, which come out without any order, of a pale green colour; the upper part of the ſtalk divides into many ſlender peduncles, each ſuſtaining a ſingle head of flowers, of a bright yellow, and diſpoſed in form of an umbel. The peduncles ſwell under the flower, according to Haller and Pollich; this Allioni denies. Very ſhort briſtles on the receptacle. Pappus grows reddiſh by age. The plant, when handled, ſends forth a very fine aromatic ſmell. Cultivated in 1683 by Mr. James Sutherland.

11. Chryſocoma biflora, or two-flowered goldy-locks: panicled; leaves lanceolate, three-nerved, dotted, naked. Root perennial, creeping, ſpreading on every ſide to a conſiderable diſtance, ſending up many erect ſtalks, with flat ſpear-ſhaped leaves, ending in points. This flowers in June and July, and the ſeeds ripen in autumn.

12. Chryſocoma villoſa: leaves lanceolate, villoſe; calyxes cloſe. Stem a foot and half high, upright, round, hoary, branched. Flowers yellow. Seeds ſmall, hirſute, crowned with dun-coloured hairs. Native of Siberia.

13. Chryſocoma purpurea: herbaceous; leaves elliptic-lanceolate, ſubſerrate, pubeſcent; panicle terminating, corymbed. Found in the iſle of Tanna, on the 12th of Auguſt, 1774.

Propagation and Culture. Moſt of theſe plants are perennial, and natives of the Cape of Good Hope. They may be increaſed by cuttings, which, if planted in a common border, in any of the ſummer months, and covered with hand-glaſſes, will eaſily take root, provided they are ſhaded from the ſun, and duly watered; when theſe have gotten good roots, they ſhould be carefully taken up, and each planted in a ſeparate pot, filled with light earth, placing them in the ſhade till they have taken new root; then they may be expoſed with other hardy exotic plants till autumn, when they muſt be removed into the green-houſe during the winter ſeaſon; they ſhould enjoy a large ſhare of free air in mild weather, for they only require protection from froſt, and muſt not be too tenderly treated. Some of them, as the ſecond and ſixth, ripen their ſeeds very well, and may be increaſed by ſowing theſe in the ſpring on a border of light earth; but the way of raiſing them by cuttings is more expeditious, and therefore moſt common. See GNAPHALIUM, CONYZA INULOIDES, SOLIDAGO LANCEOLATA, and XERANTHEMUM.

CHRYSOGO'NIA, *ſ.* [from χρυσος, and γινομαι, to become.] The tincture of gold.

CHRYSO'GONUM, *ſ.* [from χρυσος, gold, and γονυ, the knee, or a joint.] GOLDEN-JOINT; in botany, a genus of the claſs ſyngeneſia, order polygamia neceſſaria, natural order of compoſitæ oppoſitifoliæ. The generic characters are—Calyx: common five-leaved, flat, ſpreading; leaflets lanceolate, nearly the length of the flower. Corolla: compound radiate; corollets hermaphrodite, very many in the diſk; females five in the ray: proper, in the hermaphrodites funnel-form, five-toothed, erect; in the females ligulate, oblong, truncate, three-toothed. Stamina: in the hermaphrodites, filaments five, very ſmall; antheræ cylindric, tubular. Piſtillum: in the hermaphrodites, germ very ſmall; ſtyle ſetaceous, length of the corollet; ſtigma obſcure: in the females, germ larger, covered with its proper perianth; ſtyle ſhorter; ſtigmas two, revolute. Pericarpium: none; calyx unchanged. Seeds: of the hermaphrodites, none; of the females, ſolitary, inverſe, heart-ſhaped, depreſſed-quadrangular, with the ſides widiſh, crowned with a three-toothed ſcale gaping inwards, contracted towards the baſe: each ſeed lies concealed within its proper four-leaved glume, the outward ſcale being ovate and wider; the three remaining ones very narrow, cloſely converging, and gaping when the ſeed is ripe. Receptaculum: chaffy, flat; chaffs linear, obtuſe.—*Eſſential Character.* Calyx, five-leaved; ſeed, involved in a four-leaved calycle; pappus one-leafed, three-toothed; receptaculum, chaffy.

There is but one ſpecies, called chryſogonum virginianum. The leaves reſemble thoſe of common baum, moderately hairy, oppoſite, on long petioles; on the top a golden flower. Chaffs of the receptacle difform; thoſe of the diſk ſimple, linear-oblong, obtuſe, concave, pubeſcent on the outſide, one to each floret; thoſe of the ray compound, four to each floret, united into a ſheath for the ſeed, the outer one larger than the reſt, obovate, convex on one ſide, concave on the other, lying on the back of the ſeed, the three inner ones narrow, linear-oblong, cloſing the aperture left by the outer, ſo that two cover the ſides of the ſeed, whilſt the third is on the middle of the belly, and bears the germ of the barren floret before it. Seeds obovate, convex without, concave within, having two obſcure grooves on them, and of a pale bay colour. Pappus membranaceous, one-leafed, turbinate, ſhorter by half than the ſeed, opening inwards, and having ſix teeth or fewer on the upper margin. Native of Virginia, where it was firſt obſerved by Gronovius. See LEONTICE and ZINNIA.

CHRYSOLO'RUS (Emanuel), one of thoſe learned men in the fourteenth century, who brought the Greek literature into the weſt. He was a man of rank, and deſcended from an ancient family, ſaid to have removed with Conſtantine from Rome to Byzantium. He was ſent into Europe by the emperor of the eaſt to implore the aſſiſtance of the Chriſtian princes againſt the Turks. He afterwards taught at Florence, Venice, Pavia, and Rome; and died at Conſtantinople, in 1415, aged 47. He wrote a Greek grammar, and ſome other ſmall pieces.

CHRY'SOLITE, *ſ.* [χρυσος, gold, and λιθος, a ſtone.] A precious ſtone of a duſky green, with a caſt of yellow. It is a ſpecies of topaz. See MINERALOGY.

If metal, part ſeem gold, part ſilver clear;
If ſtone, carbuncle moſt, or *chryſolite.* *Milton.*

CHRYSOME'LA, *ſ.* in entomology, a genus of inſects belonging to the order of coleoptera. The antennæ are ſhaped like bracelets, and thicker on the outſide; and neither the breaſt nor the elytra are marginated. There are no leſs than two hundred and ſeventy one ſpecies enumerated by Dr. Gmelin, principally diſtinguiſhed by differences in their colour. They are to be found almoſt every where, in woods, gardens, &c. Their progreſſive motion is ſlow; and ſome when caught emit an oily liquor of a diſagreeable ſmell. The glittering colours with which ſeveral ſpecies of chryſomelæ are adorned, and which ſeem

seem to exhibit the brilliancy of gold and copper, have occasioned their bearing that pompous name. The larvæ of these insects have in general an oval body, rather oblong and soft; on the fore-part of which are situated six feet, which are scaly, as is also the head. They prey upon the substance of leaves, rejecting the fibrous part. Those of the leaping crysomelæ infest the cotyledons and tender leaves of plants. Of this genus is that very pernicious insect called by the country people the *turnip fly*, which infests turnips and many crops in the garden, destroying often whole fields while in their seedling leaves. In very hot summers they abound to an amazing degree, and make a pattering like rain, by jumping on the leaves of the turnips or cabbages.

To illustrate this beautiful genus of insects, we have in the annexed engraving delineated the following species: Fig. 1. Chrysomela polita, green underneath, shot with copper colour; the head and thorax of a bright coppery gilt colour; the elytra of a faint red, minutely spotted; and the wings beneath the elytra are red. It dwells on the willow, poplar, &c. 2. Staphylea, nearly of the same colour, but more elongated. 3. Graminis, of an oval shape, and very convex; its colour is all over of a fine glossy green blended with a yellowish tint, which produces a gold-green reflection; the thorax is sloped off before at the junction with the head. It feeds on the dead-nettle, mint, hedge-nettle, and other labiated plants. 4 and 5. Two varieties of the chrysomela fastuosa, flying; they nearly resemble the preceding in colour, though much smaller. 6. The sanguinolenta; its head and thorax are blue; the elytra are raven-grey, with a shining steel glass, and margined at the sides with a band of beautiful red; the wings are also red, folding close under the elytra: it is very common in woods and forests. 7. Chrysomela armorica; the head and thorax of a bluish steel-colour; the elytra red, with one black spot at the extremity of each. 8. The hæmoptera; a species nearly round, all over of a beautiful violet colour, very smooth and shining: its wings, concealed under the elytra, are red. 9. Chrysomela populi; a beautiful insect of a rich deep blue on the head, thorax, and under parts; the elytra are of a bright chesnut; and it is drawn flying, to shew its wings, which are membranaceous, and of a pale yellow or straw-colour. 10. The boleti; its head and thorax are of a steel-colour; the anus black; the elytra bright chesnut, with a black transverse band in the center. 11. Chrysomela Banksii, named from sir Joseph Bankes, who introduced it; the whole insect is of a dark olive colour, but bright and shining on the back and escutcheon. 12. The punctata, all over red, spotted with black. 13. The tenebriosa, a large species, almost round, and wholly black; the legs are greatly serrated; the escutcheon and top of the elytra bright and shining, with steel reflections. 14. The sulphurea, a small species, elongated, and all over of a bright brimstone colour. 15. Chrysomela mordigera; its thorax black; escutcheon and elytra red. 16. The four-spotted chrysomela; the head and thorax black; escutcheon steel-coloured; elytra deep orange, with two black equi-distant spots on each. 17. The cervina; of a slender form, and of a reddish straw colour. 18. The caraboides; very much elongated, and all over of a deep shining verditer green. These abound greatly in England, but are of a much smaller size than most of the foreign species.

CHRYSOPHYL'LUM, *s.* [from χρυσος and φυλλον, golden leaf.] In botany, a genus of the class pentandria, order monogynia, natural order dumosæ. The generic characters are—Calyx: perianthium five-parted, small; leaflets roundish, obtuse, permanent. Corolla: monopetalous, bell-shaped; border five-cleft; segments roundish, very much expanded, shorter than the tube. Stamina: filaments five, subulate, placed on the tube, converging; antheræ roundish, twin, incumbent. Pistillum: germ roundish; style very short; stigma obtuse, subquinquefid. Pericarpium: berry globular, ten-celled, large. Seeds: solitary, bony, compressed, marked with a scar, shining.—*Essential Character.* Corolla, bell-shaped, ten-cleft; segments alternate, spreading; berry ten-seeded.

Species. 1. Chrysophyllum cainito, or broad-leaved star-apple: leaves ovate, striated in parallel lines, tomentose, and shining underneath. Leaves alternate, petioled, quite entire; peduncles lateral, one-flowered, numerous, very short. Browne has two species of chrysophyllum, which he calls—1. Star-apple-tree, and 2. Damson-plum. The latter is made a distinct species by Swartz. Both have the leaves ferruginous underneath. The fruit of the first is larger and globular; of the second, smaller and smooth. The last, he says, is found wild in many parts of Jamaica, but seldom grows to any considerable size: the first is cultivated all over the country, and thrives with very little care; it rises commonly to a considerable size, and spreads much; but its branches, like those of the other sort, are very slender and flexile, and hang down when charged with fruit. This is full of milk, and the fruit retains it even in the most perfect state; but, though this juice be rough and astringent in the bark, &c. and even in the fruit before it ripens; yet, when it grows to full perfection, it becomes sweet and gelatinous, with an agreeable clamminess, and is very much esteemed. The juice of this fruit, a little before it is perfectly ripe, being mixed with a small quantity of orange juice, binds the body extremely, and doubtless would make a very powerful remedy on many occasions; or eating the two fruits together would have the same effect. Perhaps the action of the fire might take off much of the native roughness of the juice, if it were to be inspissated by that means. The germ has ten distinct cells, but most of the seeds are abortive; and, when the fruit is ripe, it seldom contains above four or five. There are several varieties.

2. Chrysophyllum argenteum, or narrow-leaved star-apple: leaves sickle-ovate, shining, and tomentose underneath. The leaves of this are green and smooth on their upper surface, without the parallel lines which mark the foregoing; underneath they are of a silvery shining green. The fruit is roundish, of a dirty blue purple, the size of a middling plum, and eatable; the pulp is soft, blueish, slightly milky, and has the taste of the others. It is a native of Martinico.

3. Chrysophyllum glabrum, or smooth-leaved star-apple: leaves quite smooth on both sides. This tree grows fifteen feet in height, erect, and branching; leaves ovate, acute, quite entire, shining on both sides, petioled, hardly two inches in length; fruit blue, the form and size of a small olive, with the taste of the foregoing; but seldom eaten, except by slaves and children.

Species from Swartz. 4. Chrysophyllum monopyrenum, or one-seeded star-apple, or damson-plum: leaves elliptic, acuminate, golden-tomentose beneath; fruit ovate, one-seeded. 5. Chrysophyllum microcarpum, or small star-apple: leaves ovate, smooth, pubescent beneath; berries oblique, oblong, one-seeded. 6. Chrysophyllum rugosum, or wrinkled star-apple: leaves oblong, long, acuminate, smooth on both sides; fruit acuminate, wrinkled. These, with the other species, are natives of the West Indies.

Propagation and Culture. These trees are preserved in several curious gardens for the beauty of their leaves, especially the first sort, whose under sides shine like sattin, the upper sides are of a deep green. The leaves continue all the year, and make a very pretty appearance in the stove at all seasons. Being natives of the hottest parts of the world, they cannot be preserved in this country, without being kept in the warmest stoves; and should always remain in a hot-bed of tanners' bark, otherwise they will make but little progress. They are propagated by seeds, which must be procured from the places of their growth, for they do not produce fruit in Europe. These seeds must be fresh, otherwise they will not grow; if they are sent over in sand, it will preserve them from drying too much; when the seeds arrive, they must be sown as soon as

CHRYSOMELA, CICADA, AND CICINDELA.

No. 1 to 18 Different Species of Chrysomelæ, 19 to 26 Cicadæ, 27 to 30 Cicindelæ.

as possible in small pots filled with light fresh earth, and plunged into a good hot-bed of tanners' bark. If the seeds are good, and the bed in a proper temperature of warmth, the plants will appear in five or six weeks, and in about two months after will be strong enough to transplant; in doing which, the plants, with all the earth, should be shaken out of the pots very carefully, and separated with their roots entire, and each planted into a single small pot filled with fresh rich earth, and plunged again into a hot-bed of tanners' bark, watering and shading them until they have taken fresh root. If the hot-bed in which these plants are plunged, is from time to time stirred, and a little fresh tan added to it, to renew the heat when it declines, the plants will make good progress, and in three or four months will be near a foot high, and may then be shifted into pots somewhat larger than those they before were in. The chief care they require, is to keep them constantly in a proper degree of heat, and never to put them into too large pots; and in winter they should not have too much water, about twice a-week will be often enough to water them; and in the depth of winter they should not have much at a time. It is said, that they are frequently propagated in the West Indies, by planting their branches; but we have not heard of their being propagated in England by that method. See JACQUINIA and SIDEROXYLON.

CHRYSOPŒ'A, *s.* [from χρυσος, gold, and ποιεω, to make.] Transmutation, or the art of converting the baser metals into gold.

CHRYSOPRA'SE, *s.* [*chrysoprasus*, Lat. χρυσος, Gr. gold, and *prasinus*, green.] A precious stone of a yellow colour, approaching to green.—The ninth a topaz, the tenth a *chrysoprasus*. *Rev.* See MINERALOGY.

CHRYSOSPLE'NIUM, *s.* [from χρυσος, gold, and σπλην, the spleen; on account of the golden colour of the flowers, and the supposed virtue of the plant in diseases of the spleen.] GOLDEN SAXIFRAGE; in botany, a genus of the class decandria, order digynia, natural order of succulentæ. The generic characters are—Calyx: perianthium four or five parted, spreading, coloured, permanent; divisions ovate, the opposite ones narrower. Corolla: none, unless the coloured calyx be called so. Stamina: filaments eight or ten, subulate, erect, very short, placed in an angular receptacle; antheræ simple. Pistillum: germ inferior, ending in two subulate styles, the length of the stamens; stigmas obtuse. Pericarpium: capsule two-beaked, two-parted, one-celled, two-valved, surrounded with the green calyx. Seeds: very many, very small.—*Essential Character.* Calyx, four or five-cleft, coloured; corolla, none; capsule, two-beaked, one-celled, many-seeded.

Species. 1. Chrysosplenium alternifolium, or alternate-leaved golden saxifrage: leaves alternate. This is so much larger in all respects than the second species, that it may easily be distinguished. Several modern botanists affirm, that the terminating flower, as well as the side ones, is generally four-cleft, and has eight stamens: others even insist that it is always so; and accordingly have removed this genus into the class octandria. Grows in moist shady places, and by the sides of rivulets, in Lapland, Sweden, Denmark, Germany, Swisserland, Carniola, Italy, Siberia, Japan; and with us in Britain, with the second species, but not so common: as near Bingley, and about Esholt, eight miles from Leeds, in Yorkshire; Porland-heath, near Norwich; in Worcestershire; and in Scotland. A black boggy soil, by rills in wet woods, is the favourite situation of this plant.

2. Chrysosplenium oppositifolium, or opposite-leaved golden saxifrage: leaves opposite. Linnæus almost doubts whether this be a distinct species. According to late observations, the terminal flower of this species also has rarely more than four divisions of the calyx, and eight stamens; some say never, but others affirm that they have seen five divisions, and ten stamens. Dr. Withering has sometimes observed only six or seven. Mr. Woodward affirms, that both species in Britain are truly octandrous; that in April, 1785, he examined great numbers of both in their native places of growth, and did not find a single primary flower decandrous; that the calyx has four divisions, in which four of the stamens are placed, and the other four in the center of each segment; so that the flower cannot be decandrous, unless the calyx has accidentally five divisions. This is found in like places with the other, in Denmark, Holland, Swisserland, Germany: with us it is much more common; as on Hampstead-heath; in the boggy part of Charlton-wood; Polingland-heath, near Norwich; Selborne, Hants, &c. These flower in April, or early in May, and ripen their seeds in May or June; they are perennial.

Propagation and Culture. If any person has curiosity to cultivate these plants in a garden, they must be planted in very moist shady places, otherwise they will not thrive. They succeed best in pots filled with bog earth, set in a pan of water, and placed under the shade of a wall or hedge.

CHRY'SOSTOM (St.), a celebrated patriarch of Constantinople, and one of the most admired fathers of the Christian church, was born of a noble family at Antioch, about the year 347. He studied rhetoric under Libavius, and philosophy under Andragathus; after which he spent some time in solitude in the mountains near Antioch; but the austerities he endured having impaired his health, he returned to Antioch, where he was ordained deacon by Meletius. Flavian, Meletius's successor, raised him to the office of presbyter five years after; when he distinguished himself so greatly by his eloquence, that he obtained the surname of *Golden Mouth.* Nectarius, patriarch of Constantinople, dying in 397, St. Chrysostom, whose fame was spread throughout the whole empire, was chosen in his room. The emperor Arcadius confirmed his election, and caused him to leave Antioch privately, where the people were very unwilling to part with him. He was ordained bishop in February 398; when he obtained an order from the emperor against the Eunomians and Montanists; reformed the abuses which subsisted amongst his clergy; retrenched a great part of the expences in which his predecessors had lived, in order to enable him to feed the poor and build hospitals, and preached with the utmost zeal against the pride, luxury, and avarice, of the great. But this pious liberty of speech procured him many powerful enemies. He differed with Theophilus of Alexandria, who got him deposed and banished; but he was soon recalled. After this, declaiming against the dedication of a statue erected to the empress, she banished him into Cucusus in Armenia, a most barren unhospitable place; afterwards, as they were removing him from Petyus, the soldiers treated him so roughly, that he died by the way, A. D. 407. The best edition of his works is that published at Paris in 1718, by Montfaucon.

CHRYSUL'CA, *s.* [from χρυσος, gold, and ἑλκω, to draw.] A water with which refiners wash gold off when mixed with other metals; aqua fortis; also a chemical liquor which dissolves gold.

CHTHO'NIA, a surname of Ceres, from a temple built to her by Chthonia, at Hermione. She had a festival there called by the same name, and celebrated every summer. During the celebration, the priests of the goddess march in procession, accompanied by the magistrates, and a crowd of women and boys in white apparel, with garlands of flowers on their heads. Behind is dragged an untamed heifer, just taken from the herd. When they come to the temple, the victim is let loose, and four old women, armed with scythes, sacrifice the heifer, and kill her by cutting her throat. A second, a third, and a fourth, victim, is in a like manner dispatched by the old women; and it is observable, that they all fall on the same side. *Pausanias.*

CHU-LAN, *s.* in botany. See CHLORANTHUS.

CHU-SAN, the first port-town, situated in an island, on the eastern coast of China, approached by the ships of the

the British embassy under the earl of Macartney, in 1793. The English East-India company had formerly a factory at this place; but from which they were interdicted by an order from Pekin. Along the coast contiguous to Chu-san is a groupe of other small islands or rocks, to the amount of upwards of three hundred, extending upwards of sixty miles in regular succession, and called the Chu-san Islands. See the article CHINA, p. 471.

CHUB, *s.* [from *cop*, a great head, *Skinner*.] A river fish. See CYPRINUS.

CHUBB (Thomas), a celebrated polemical writer, born at East Harnham, near Salisbury, in 1679. Being a man of strong natural parts, he employed all his leisure in reading; and, though a stranger to the learned languages, became tolerably versed in geography, mathematics, and other branches of science. His favourite study was divinity; and he formed a little society for the purpose of debating upon religious subjects, about the time that the Trinitarian controversy was so warmly agitated between Clarke and Waterland. This subject, therefore, falling under the cognizance of Chubb's theological assembly, he at their request drew up and arranged his sentiments on it, in a kind of dissertation, which was afterwards published under the title of "The Supremacy of the Father asserted," &c. In this piece Mr. Chubb shewed great talents in reasoning, and acquired so much reputation, that sir Joseph Jekyll, master of the rolls, took him into his family to enjoy his conversation; but, though he is said to have had a genteel allowance, he did not continue with him many years, but chose to return to his friends at Salisbury. He published a quarto volume of tracts, which Mr. Pope informs his friend Gay, he "read through with admiration of the writer, though not always with approbation of his doctrine." He died a single man, in the sixty-eighth year of his age; and left behind him two volumes of posthumous tracts, in which he appears to have had little or no belief in revelation. But, however licentious his way of thinking may be deemed, nothing irregular or immoral has been imputed to him in his life and actions.

CHUB'BED, *adj.* [from *chub*.] Big headed, like a chub.

CHUBDA'RS, [Indian.] Servants attending the governor-general and other persons of high station in India; they are always in waiting, and precede their master upon every excursion, whether of pleasure or business, and are used, in common with hircarrhs, to carry messages, &c.

To CHUCK, *v. n.* [A word probably formed in imitation of the sound that it expresses; or perhaps corrupted from *chick*.] To make a noise like a hen when she calls her chickens.

To CHUCK, *v. a.* To call as a hen calls her young:

Then crowing clapp'd his wings, th' appointed call
To *chuck* his wives together in the hall. *Dryden.*

To give a gentle blow under the chin, so as to make the mouth strike together.—Come, *chuck* the infant under the chin. *Congreve.*

CHUCK, *s.* The voice of a hen.—He made the *chuck* four or five times, that people use to make to chickens when they call them. *Temple.*—A word of endearment, corrupted from chicken or chick.—Come, your promise. What promise, *chuck? Shakespeare.*—A sudden small noise.

CHUCK-FARTHING, *s.* A play, at which the money falls with a chuck into the hole beneath.—He lost his money at *chuck farthing*, shuffle-cap, and all-fours. *Arbuth.*

To CHUCK'LE, *v. n.* [*schaecken*, Dut.] To laugh vehemently; to laugh convulsively:

What tale shall I to my old father tell?
'Twill make him *chuckle* thou 'rt bestow'd so well. *Dryd.*

To CHUCK'LE, *v. a.* To call as a hen.—I am not far from the womens' apartment; and if these birds are within distance, here's that will *chuckle* 'em together. *Dryden.*—To cocker; to fondle.—Your confessor, that parcel of holy guts and garbidge; he must *chuckle* you and moan you. *Dryden.*

CHUD'LEIGH, a market town in Devonshire, 183 miles from London, nine from Exeter, ten from Ashburton, and six from Teignmouth, with good turnpike-roads to each. The principal trade is the woollen manufactory. The market is on Saturdays. It hath three fairs annually, viz. Easter Tuesday, June 21, and October 2.

CHUD'LEIGH, (lady Mary), a philosophic and poetic authoress, born in 1656, was the daughter of Richard Lee, esquire, of Winsloder in Devonshire. She was married to sir George Chudleigh, baronet, by whom she had several children; among the rest Eliza-Maria, who, dying in the bloom of life, caused her mother to pour out her grief in a poem intituled, "A Dialogue between Lucinda and Marissa." She wrote another poem, "The Ladies Defence," occasioned by an angry sermon preached against the fair sex. These, with many others, were collected into a volume, and printed a third time in 1722. She published also a volume of essays upon various subjects in verse and prose in 1710, which have been much admired for delicacy of style. She is said to have written other things, as tragedies, operas, masques, &c. which, though not printed, are preserved in her family. She died in 1710, in her fifty-fifth year. She was a woman of great virtue, as well as understanding; this is evident from her excellent essays upon knowledge, pride, humility, life, death, fear, grief, riches, self-love, justice, anger, calumny, friendship, love, avarice, solitude, &c. in all of which she discovers a noble contempt of those vanities which the generality of both sexes so much regard, and so eagerly pursue.

CHU'ET, *s.* [probably from *to chew*.] An old word for forced meat.—As for *chuets*, which are likewise minced meat, instead of butter and fat, it were good to moisten them partly with cream, or almond or pistachio milk. *Bacon.*

CHUFF, *s.* [a word of uncertain derivation; perhaps corrupted from *chub*, or derived from *kuf*, Welsh, a stock.] A coarse, fat-headed, blunt clown:

Hang ye, gorbellied knaves, are you undone?
No, ye fat *chuffs*, I would your store were here. *Shakes.*

CHUF'FILY, *adv.* Surlily; stomachfully.—John answered *chuffily*. *Clarissa.*

CHUF'FINESS, *s.* Clownishness; surliness.

CHUF'FY, *adj.* Blunt; surly; fat.

CHUGAN'SERAI, a river of Asia, which rises in the Kuttore country, and runs into the Kameh, near Jalalabad, in Cabulistan.

CHUGANSE'RIAI, a town of Asia, in the Cabulistan, on a river of the same name: eighty miles north-east of Cabul. Lat. 34. 55. N. lon. 70. 8. E. Greenwich.

CHUKOTSKI'JA, a province of Siberia, and the most easterly of the dominions of Russia, extending from lat. 63. to 73. 20. N. and from lon. 174. to 207. E. Ferro.

CHULUTEC'A, or XERXES, a town of Mexico, in the province of Guatimala, on the north side of the river Fonseca. Lat. 13. 20. N. lon. 70. 20. W. Ferro.

CHUM, *s.* [*chom*, Armoric, to live together.] A chamber-fellow: a term used in the universities.

CHUMBIVIL'CAS, a jurisdiction subject to the bishop of Cusco, in South America, and empire of Peru, about forty leagues from that city; it produces corn, fruits, large pasture for cattle, and mines of gold and silver.

CHUM'BULL, a river of Hindoostan, in the country of Agra, which runs into the Jumna, twenty miles south-east of Etaya.

CHUM'LEIGH, or CHULMLEIGH, a small town in Devonshire, between Crediton and Barnstaple. Its market is on Fridays; and this is the only market-town in the hundred of Witheridge. There is one fair annually on the 2d of August. It is twenty-two miles from Exeter, eighteen from Tiverton, and eighteen from Barnstaple.

It

It is a deanery in the archdeaconry of Barnstaple; the church was formerly collegiate, and dedicated to St. Mary Magdalen. The tremendous storm of thunder and lightning, which was so universal on Sunday the 30th of July, 1797, commenced at Chumleigh, about one o'clock in the morning. It struck off the south-east pinnacle of the tower, part of which falling on the roof of the church, forced its way through, and did considerable damage. The force of the lightning was so great, that one stone, upwards of two hundred pounds weight, was thrown to the north-east, and carried quite over the tower without touching it. There are four prebends annexed to the rectory, viz. Brokeland, Higherline, Lowerline, and Pennel, in the gift of the duke of Beaufort.

CHUMP, *s.* A thick heavy piece of wood, less than a block.—When one is battered, they can quickly, of a *chump* of wood, accommodate themselves with another. *Moxon.*

CHUN-KING, a city of China, of the first rank, in the province of Se-tchuen: 760 miles south-south-west of Peking. Lat. 30. 50. N. lon. 123. 30. E. Ferro.

CHUN-LIEOU, a town of Asia, in the kingdom of Corea: twenty-five miles east-north-east of Koang-tcheou.

CHUN-NGAN, a town of China, of the third rank, in the province of Tche-kiang: eleven leagues north of Kiu-tcheou.

CHUN-NING, a city of China, of the first rank, in the province of Yun-nan: 420 leagues south-west of Peking. Lat. 24. 37. N. lon. 117. 30. E. Ferro.

CHUN-TCHAN, a town of China, of the third rank, in the province of Fo-kien: twenty miles west-north-west of Yen-ping.

CHUN-TCHUEN, a town of Asia, in the kingdom of Corea: twenty-two miles south-east of Han-tcheou.

CHUN-TE, a city of China, of the first rank, in the province of Pe-tche-li: 200 miles north-north-west of Peking. Lat. 37. 5. N. lon. 132. 5. E. Ferro.

CHUN-TIEN, a town of Asia, in the kingdom of Corea: 27 miles south-south-east of Koang-tcheou.

CHUN-YAN, a town of Asia, in the kingdom of Corea: twenty-five miles south of Han-tcheou.

CAUNAR', a strong garrison town, with a fort, situated on the Ganges, twenty miles above the city of Benares. The fort of Chunar is built on a rock, fortified all round by a wall, and towers at various distances. At that end overlooking the river is situated the citadel, which has formerly been strong. This fort is said to be of the highest antiquity, and originally built by the Hindoos. In the citadel there is an altar, consisting of a plain black marble slab, on which the tutelary deity of the place is traditionally supposed to be seated at all times, except from sunrise till nine in the morning, when he is at Benares; and, during that time, from the superstition of the Hindoos, attacks may be made with a prospect of success. In various parts of the fort there are old sculptures of the Hindoo divinities, now nearly defaced by time; and on the gates some old Persian inscriptions, mentioning in whose reign, and by whom, the fort was repaired and strengthened. This has always been considered as a place of great consequence upon the Ganges, from its insulated situation, projecting forwards to a considerable extent, and being of considerable height. It was besieged by the English, under major Hector Munro, in the war of 1764, against Sujah ul Dowlah, and was gallantly defended by its commandant, an Abyssinian, so that the first attempt of the English was unsuccessful; but, on the fall of Allahabad, the commandant finding that the whole country had submitted to the English, thought it needless to hold out any longer, and on the 7th of February 1765, he surrendered the fort to major (afterwards general) Stibbert. It was restored to the nabob at the peace; and, in 1772, was formerly ceded by him to the English East-India company in exchange for the fort of Allahabad. In the dispute with Cheyt Sing, in 1781, Mr. Hastings, the governor-general, found it necessary to retreat to this place with his suite, in the night of the 21st of August, in the expectation of an immediate attack upon the place (Benares) where he then was, by the rajah Cheyt Sing. He returned to Benares on the 28th of September following, the war being nearly concluded, or at least the danger past. At Chunar is kept the magazine of ammunition and artillery for the brigade of Cawnpore: 13 miles south of Benares. Lat. 25. 10. N. lon. 83. 5. E. Greenwich.

CHUN'AUB, a river of Asia, which rises in the mountains, between Hindoostan and Thibet, and runs into the Indus, twenty miles west from Moultan.

CHUNG, a town of China, of the third rank, in the province of Pe-tche-li: 20 miles north-east of Peking.

CHUPRAH', a town of Hindoostan, in the Candeish country: fifty miles west of Burhampour, and 112 south-south-west of Indore.

CHUPRAH', a town of Hindoostan, in the country of Bahar, on the north coast of the Ganges: twenty-five miles north-west of Patna.

CHURAQUE'R, a town of Armenia: forty-eight miles west of Erivan.

CHURA'SCH, a town of Arabia: forty-four miles south of Saade.

CHURCH, *s.* [*kerch*, Dut. and Low Ger. *kerche*, High Ger. *kyrichia*, Su. *chirich*, Teut. cyric, circe, Sax. of κυριακη, Gr. (scil. οικια, i. e. the Lord's house.] The collective body of Christians, usually termed the catholic church.—The *church*, being a supernatural society, doth differ from natural societies in this; that the persons unto whom we associate ourselves in the one, are men, simply considered as men; but they to whom we be joined in the other, are God, angels, and holy men. *Hooker.*—The body of Christians adhering to one particular opinion, or form of worship.—The *church* is a religious assembly, or the large fair building where they meet; and sometimes the same word means a synod of bishops, or of presbyters; and in some places it is the pope and a general council. *Watts.*—The place which Christians consecrate to the worship of God.—That churches were consecrated unto none but the Lord only, the very general name chiefly doth sufficiently shew: *church* doth signify no other thing than the Lord's house. *Hooker*:

Tho' you untie the winds, and let them fight
Against the *churches*, it were all in vain! *Shakespeare.*

It is used frequently in conjunction with other words; as *church-member*, the member of a church; *church-power*, spiritual or ecclesiastical authority, &c.

To CHURCH, *v. a.* To perform with any one the office of returning thanks in the church after any signal deliverance, as from the danger of childbirth, &c.

The manner of founding churches in ancient times was, after the founders had made their applications to the bishop of the diocese, and had his licence, the bishop or his commissioners set up a cross, and set forth the church-yard where the church was to be built; and then the founders might proceed in the building, and when the church was finished, the bishop was to consecrate it; and then, and not before, the sacraments were to be administered in it. Stillingfleet's Ecclesiastical Cases. But, by the common law and custom of this realm, any person may build a church without licence from the bishop, so as it be not prejudicial to any ancient churches; though the law takes no notice of it as a church, till consecrated by the bishop, which is the reason why church and no church, &c. is to be tried and certified by the bishop. And, in some cases, though a church has been consecrated, it must be consecrated again; as in case any murder, adultery, or fornication, be committed in it, whereby it is defiled; or if the church be destroyed by fire, &c. The ancient ceremonies in consecrating the ground on which the church was intended to be built, and of the church itself after it was built, were thus: when the materials were provided for building, the bishop came in his robes to the place; and, having prayed, he then perfumed the ground with incense,

ceafe, and the people fung a collect in praife of that faint to whom the church was to be dedicated; then the corner ftone was brought to the bifhop, which he croffed, and laid for the foundation: and a great feaft was made on that day, or on the faint's day to which it was dedicated; but the form of confecration was left to the difcretion of the bifhop, as it is at this day.

A church in general confifts of three principal parts, that is, the belfrey or fteeple, the body of the church with the aifles, and the chancel: and not only the freehold of the whole church, but of the church-yard, are in the parfon or rector; and the parfon may have an action of trefpafs againft any one that fhall commit any trefpafs in the church or church-yard; as in the breaking of feats annexed to the church, or the windows, taking away the lead, or any of the materials of the church, cutting the trees in the church-yard, &c. But church-wardens may, by cuftom, have a fee for burying in the church; the church-yard is a common place of burial for all the parifhioners. *Vent.* 274. *Keb.* 504. And it feems that actions for taking away the feats muft be brought in the name of the church-wardens, the parifhioners being at the expence of them. *Raym.* 246. 12 *Co.* 105. If a man erect a pew in a church, or hang up a bell therein, they thereby become church goods, though not exprefsly given to the church; and he may not afterwards remove them, *Shaw. P. L.* 79. The parfon only is to give licence to bury in the church; but, for defacing a monument in a church, the builder or heir of the deceafed may have an action. *Cro. Jac.* 367. And a man may be indicted for digging up the graves of perfons buried, and taking away their burial dreffes, &c. The property whereof remains in the party who was the owner when ufed, and it is faid an offender was found guilty of felony in this cafe, but had his clergy. *Co. Lit.* 113.

Though the parfon hath the freehold of the church and church-yard, he hath not the fee-fimple, which is always in abeyance; but in fome refpects the parfon hath a fee-fimple qualified. *Lit.* 644. The chancel of the church is to be repaired by the parfon, unlefs there be a cuftom to the contrary; and, for thefe repairs, the parfon may cut down trees in the church-yard, but not otherwife. *Stat.* 35 *Ed.* I. ft. 2. The church-wardens are to fee that the body of the church and fteeple are in repair; but not any aifle, chapel, &c. which any perfon claims by prefcription, to him or his houfe: concerning which repairs the canons require every perfon, who hath authority to hold ecclefiaftical vifitation, to view their churches within their jurifdictions once in three years, either in perfon, or caufe it to be done; and they are to certify the defects to the ordinary, and the names of thofe who ought to repair them; and thefe repairs muft be done by the church-wardens, at the charge of the parifhioners. *Can.* 86. 1 *Mod.* 236.

By the common law, parifhioners of every parifh are bound to repair the church; but, by the canon law, the parfon is obliged to do it; and fo it is in foreign countries. 1 *Salk.* 164. In London, the parifhioners repair both the church and the chancel. The fpiritual court may compel the parifhioners to repair the church, and excommunicate every one of them till it be repaired; but thofe that are willing to contribute fhall be abfolved till the greater part agree to a tax, when the excommunication is to be taken off; but the fpiritual court cannot affefs them towards it. 1 *Mod.* 194. 1 *Vent.* 367. For though this court hath power to oblige the parifhioners to repair by ecclefiaftical cenfures, yet they cannot appoint in what fum, or fet a rate, for that muft be fettled by the church-wardens, &c. 2 *Mod.* 8. If a church be down, and the parifh is increafed, the greater part of the parifh may raife a tax for the neceffary enlarging it, as well as the repairing thereof, &c. 1 *Mod* 237. But in fome of the law-books it is faid, that if a church falls down, the parifhioners are not obliged to rebuild it, though they ought to keep it in due repair. 1 *Vent.* 35. On rebuilding of churches, it has been the cuftom to apply for, and obtain briefs, on the petition of the parifhioners, to collect the charitable contributions of well-difpofed Chriftians, to affift them in the expence. For church ornaments, utenfils, &c. the charge is upon the perfonal eftates of the parifhioners; and for this reafon perfons muft be charged for thefe where they live: but though generally lands ought not to be taxed for ornaments, yet by fpecial cuftom, both lands and houfes may be liable to it. 2 *Inft.* 489. *Cro. Eliz.* 843. It has been refolved that no man fhall be charged for his land to contribute to the church reckonings, if he doth not refide in the fame parifh. *Moor* 554.

By ftat. 37 H. VIII. c. 21. churches not above fix pounds a year, in the king's books, by affent of the ordinary, patron, and incumbent, may be united: and, by ftat. 17 Car. II. c. 3. in cities and corporations, &c. churches may be united by the bifhop, patrons, and chief magiftrates, unlefs the income exceeds 100l. per annum; and then the parifhioners are to confent.

For completing of St. Paul's church, and repairing Weftminfter Abbey, a duty of two fhillings per chaldron on coals was granted; and the church-yard is to be inclofed, and no perfons build thereon, except for the ufe of the church. 1 *Ann.* ftat. 2. c. 12. Fifty new churches were alfo to be built in or near London and Weftminfter; for the building whereof a like duty is granted upon coals, and commiffioners appointed to purchafe lands, afcertain bounds, &c. The rectors of which churches were to be appointed by the crown, and the firft church-wardens and veftrymen, &c. to be elected by the commiffioners. *Stat.* 9 *Ann.* c. 22. 10 *Ann.* c. 11. A duty is alfo granted on coals imported into London, to be appropriated for maintaining of minifters for the fifty new churches. *Stat.* 1 *Geo.* I. c. 23.

No man fhall cover his head in the church in time of divine fervice, except he have fome infirmity, and then with a cap; and all perfons are to kneel and ftand, as directed by the Common Prayer-Book, during fervice. *Can.* 18. No ill language is to be ufed, or noife made, in churches or church-yards; and perfons ftriking, or laying violent hands on others there, are to be excommunicated; and ftriking with a weapon, or drawing a weapon with intent to ftrike, fhall lofe one of their ears: and a man may not lawfully return blows in his own defence in thefe cafes. *Stat.* 5 & 6 *Ed.* VI. c. 4. No fairs or markets fhall be kept in church-yards. *Stat.* 13 *E.* I. Any perfon may be indicted for indecent or irreverent behaviour in the church; and thofe that offend againft the acts of uniformity, are punifhable either by indictment upon the ftatute, or by the ordinary.

The firft church publicly built by the Chriftians, fome authors maintain to be that of St. Saviour at Rome, founded by Conftantine; but others contend, that feveral churches, called by the name of *St. Peter Vivus*, were built in honour of that apoftle during his life-time, and confequently much earlier than the former. When Chriftians came to be divided into fects, or to adopt different ceremonies or forms of worfhip, their tenets firft began to be diftinguifhed by the name of their church; as the Romifh or Latin church; the Greek or eaftern church; the proteftant church; the church of England, &c.

The Latin, or Romifh church, extends its difcipline all over Italy and France, (until the revolution); Spain, part of Africa, the north of Europe, and all other countries, whither the Romans carried their language and influence. But Great Britain, part of the Netherlands, almoft all Germany, and feveral of the northern powers, have feparated from the church of Rome ever fince the reformation, in the reign of Henry VIII. and conftitute what is termed the *reformed church*, and what the Romanifts call the *weftern fchifm*.

The Greek church extends over confiderable part of Greece, the Grecian ifles, Wallachia, Moldavia, Egypt, Abyffinia, Nubia, Lybia, Arabia, Mefopotamia, Syria, Cilicia, and Paleftine, and are all under the jurifdiction of the patriarchs of Conftantinople, Alexandria, Antioch, and

and Jerusalem. If to these we add the whole of the Russian empire in Europe, great part of Siberia in Asia, Astracan, Casan, and Georgia, it will be evident that the Greek church has a wider extent of territory than the Latin, with all the branches which have sprung from it; and that it is with great impropriety that the church of Rome is called by her members the *catholic* or universal church. That, in these widely distant countries, the professors of Christianity are agreed in every minute article of belief, it would be rash to assert; but there is certainly such an agreement among them with respect both to faith and to discipline, that they mutually hold communion with each other, and are in fact but one church.

Under the present republican government of France, the Roman catholic mode of worship has been abolished, the gold and silver images have been melted down to support the exigencies of the war, and the churches have been new modelled and new named, upon the following principle: The church of St. Philip has been consecrated to Concord, in allusion to the walks and gardens with which this section abounds; as the Thuilleries and Champs Elysées, which are scenes of social meetings and festive assemblage; the church of St. Roch has been consecrated to Genius, in allusion to Corneille, who is buried there; St. Eustace, which is near the corn-hall, has been consecrated to agriculture; St. Germain, to Gratitude, the national palace of the arts and sciences being in this section; St. Lawrence, to Old Age, the old man's hospital being near; St. Nicolas, to Hymen, it is, like Stepney church, a very wife-market; St. Mery, to Commerce, it is near the tribunal of commerce; St. Margaret, to Liberty and Equality, it stands in the fauxbourg Saint-Antoine, the grand nest of the revolutionists; St. Gervais, to youth; Notre Dame is dedicated to the Supreme Being; St. Thomas, to Peace, because it is near to St. Sulpice, which belongs to victory; St. James becomes a temple of Beneficence, because it is near to many charitable institutions; St. Medard, to Labour, because the industrious classes live thereabout; and St. Stephen, to Filial Piety. It is very probable that ere long all these churches may be re-baptized, and once more receive Christian names: for it is positively asserted, that Bonaparte is now in treaty with pope Pius VII. to restore the catholic religion in France; no doubt it must be established on a very different plan from what it was formerly; priests can never expect to be in number and power as they have been; and Bonaparte will in all probability be head of this new church as well as of the state. (May 1801.)

"The nearer the *church*, the farther from God." Fr. *Près de l'église, loin de Dieu.* Spoken to those who neglect an advantage when they might easily have it. The Italians say likewise, *Vicino alla chiesa, lontana da Dio.* It is likewise applied to those, who living near the church, or having every opportunity of frequenting divine service, do yet neglect it.

CHURCH-ALE, *s.* A wake, or feast, commemoratory of the dedication of the church.—For the *church-ale*, two young men of the parish are yearly chosen to be wardens, who make collection among the parishioners of what provision it pleaseth them to bestow. *Carew.*

CHURCH-ATTI'RE, *s.* The habit in which men officiate at divine service.—These and such like were their discourses, touching that *church-attire*, which with us, for the most part, is used in public prayer. *Hooker.*

CHURCH-AUTHO'RITY, *s.* Ecclesiastical power; spiritual jurisdiction.—In this point of *church-authority*, I have sifted all the little scraps alleged. *Atterbury.*

CHURCH-BAY, a bay on the south-west coast of the island of Rathlin, near the north-east extremity of Ireland.

CHURCH-BU'RIAL, *s.* Burial according to the rites of the church.—The bishop has the care of seeing that all Christians, after their deaths, be not denied *church-burial*, according to the usage and custom of the place. *Ayliffe.*

CHURCH-CREEK, a town of the American States, in Dorchester county, Maryland, lies at the head of Church-creek, a branch of Hudson river: seven miles south westerly from Cambridge.

CHURCH-FOUN'DER, *s.* He that builds or endows a church.—Whether emperors or bishops in those days were *church-founders*, the solemn dedication of churches they thought not to be a work in itself either vain or superstitious. *Hooker.*

CHURCH-MAN, *s.* An ecclesiastic; a clergyman; one that ministers in sacred things. An adherent to the church of England:

Patience in want, and poverty of mind,
These marks of church and *church-men* he design'd,
And living taught, and dying left behind. *Dryden.*

CHURCH-MU'SIC, *s.* The solemn music used in cathedrals, and some other churches, in the performance of divine service. For its history and origin, see the article MUSIC.

CHURCH-ROCK, a rock in the bay of Bengal, near the coast of Ava. Lat. 17. 32. N. lon. 94. 14. E. Greenwich.

CHURCH-SCOTT, *s.* Customary oblations paid to the parish-priest; from which duties the religious sometimes purchased an exemption for themselves and their tenants.

CHURCH-STRET'TON, a small market-town in Shropshire, situated in the most hilly part of the country, on the turnpike-road leading from Shrewsbury to Ludlow, thirteen miles south of Shrewsbury, twelve miles west of Wenlock, and sixteen miles north of Ludlow. On the hills, which nearly surround the town, an immense number of sheep are fed, which produce large quantities of good wool, sold mostly to the dealers in Yorkshire. The malting business is carried on here very extensively. The poor of the town are employed in making a coarse linen cloth, which is generally sold for the purpose of packing hops and wool. Within two miles of the town is the hill called Cair Caradock, or Caractacus's Mount, on the top of which the old British camp is still visible, with its double entrenchments. The prospect from this hill is delightful, and so extensive that several counties in England and Wales may be seen.

CHURCH-WAR'DENS, *s.* Anciently styled *church-reeves* or *ecclesiæ guardiani*; officers instituted to protect the edifice of the church; to superintend the ceremonies of public worship; to promote the observance of religious duties; to form and execute parochial regulations; and to become, as occasion may require, the legal representatives of the body of the parish. The office was originally confined to such matters only as concerned the church, considered materially as an edifice, building, or place of public worship; and the duty of suppressing profaneness and immorality was entrusted to two persons annually chosen by the parishioners, as assistants to the church-wardens, who, from their power of enquiring into offences detrimental to the interests of religion, and of presenting the offenders to the next provincial council, or episcopal synod, were called *quest-men* or *synods-men*, which last appellation has been converted into the name of *sides-men*. But great part of the duty of these *testes synodales*, or ancillary officers, is now devolved upon the church-wardens; the sphere of whose duty has, since the establishment of the overseers of the poor, been considerably enlarged; and is also diverted into various channels by many modern acts of parliament.

Church-wardens are generally chosen by the joint consent of the parishioners and ministers; but, by custom, (on which the right of choosing these officers mostly depends. 2 *Atk.* 650. 2 *Stra.* 1246.) the minister may choose one, and the parishioners another; or the parishioners alone may elect both. 1 *Vent.* 267. But where the custom of a parish does not take place, the election shall be according to the directions of the canons of the church, *Can.* 89, 90. which direct that all church-wardens or quest-men in every parish, shall be chosen by the joint consent of the minister and the parishioners, if it may be; but if they cannot agree-

agree upon such a choice, then the minister shall choose one, and the parishioners another; and without such a joint or several choice, none shall take upon them to be church-wardens. *Gibs. Cod.* 241, 2. If the parson or vicar, who has, by custom, a right to choose one church-warden, be under sentence of deprivation, the right of choosing both results to the parishioners. *Carth.* 118. The parson cannot intermeddle in the choice of that church-warden which it is the right of the parishioners by custom to elect. Under the word parson the curate is included. 2 *Stra.* 1246. In most of the parishes in London, the parishioners choose both church-wardens by custom; but in all parishes erected under 9 An. c. 22. the canon shall take place (unless the act, in virtue of which any church was erected, shall have specially provided that the parishioners shall choose both); inasmuch as no custom can be pleaded in such new parishes. *Gibs.* 215. *Co Lit.* 113.

In the election of church-wardens by the parishioners, the majority of those who meet at the vestry, upon a *written* notice given for that purpose, shall bind the rest of the parish. *Lane* 21. By custom, also, the choice of church-wardens may be in a select vestry, or a particular number of the parishioners, and not in the body of the parishioners at large. See the article VESTRY.

In some cases the lord of the manor prescribeth for the appointment of church-wardens; and this shall not be tried in the ecclesiastical court, although it be a prescription of what appertains to a spiritual thing. 2 *Inst.* 653. The *validity* of the custom of choosing church-wardens is to be decided, like all other customs of the realm, by the courts of common law, and not by the spiritual court. *Ld. Raym.* 1008. *Bac. Abr.* 371. So also the legality of the votes given on the election is to be determined by the common law. *Burr.* 1420. But the spiritual court may become the means of trying the validity of the election by a return of 'not elected,' 'not duly elected,' or any other return that answers the writ, and affords an opportunity of trying the right in an action for a false return. *Ld. Raym.* 138. *Salk.* 433. The parishioners are also sole judges of what description of persons they think proper to choose as church-wardens; the spiritual court therefore cannot in any case controul or examine into the propriety of the election. 1 *Salk.* 166. And the parishioners may, for misbehaviour, remove them. 13 *Co.* 701. An indictment also lies against them for corruption and extortion in their office. 1 *Sid.* 307.

The court of King's-Bench will not grant a mandamus to the church-wardens, to call a vestry to elect their successors. *Stra.* 686. Nor will the court grant a *quo warranto* to try the validity of an election to the office. 4 *Term Rep.* 382. They are sworn into their offices by the archdeacon or ordinary of the diocese; and, if he refuse, a mandamus shall issue to compel him; and without fee. 1 *Salk.* 330. But the oath must be general, 'to execute their duty truly and faithfully;' stats. 4 *Jac.* I. c. 5. 1 *Jac.* I. c. 9. and 21 *Jac.* I. c. 7. and to execute the laws against drunkenness. If a church-warden, properly appointed, refuse to take the oath, he may be excommunicated; *Gibs. Cod.* 961. and he must not execute the office till he is sworn. *Shaw. P. L.* 70.

All peers of the realm, by reason of their dignity, are exempted from serving this office. *Gibs.* 215. So are all clergymen, by reason of their order. *Raym.* 265. Members of parliament, by reason of their privilege. *Gibs. Cod.* 205. Practising barristers, attornies, clerks in court, physicians, surgeons, apothecaries, aldermen, dissenters, dissenting teachers, prosecutors of felons, militia-men, &c. No person living out of the parish, although he occupies lands within the parish, may be chosen church-warden; because he cannot take notice of absences from church, nor disorders in it, for the due presenting of them. *Gibs.* 215.

Church-wardens are a corporation by custom, to sue and be sued for the goods of the church; and they may purchase goods, but not lands, except it be in London, by custom. 4 *Vin.* 525. *Co. Lit.* 3. In the city of London, by special custom, the church-wardens, with the minister, make a corporation for lands as well as goods; and may, as such, hold, purchase, and take, lands for the use of the church, &c. And there is also a custom in London, that the minister is there excused from repairing the chancel of the church. 2 *Cro.* 325. 1 *Rol. Abr.* 330. Church-wardens may have appeal of robbery for stealing the goods of the church. And they may also purchase goods for the use of the parish. 3 *Bulst.* 264. *Yelv.* 173. They may also take money or things (by legacy, gift, &c.) for the benefit of the church. And they may dispose of the goods of the church, with the consent of the parishioners. 4 *Vin.* 526. But the church-wardens (except in London) have no right to, or interest in, the freehold and inheritance of the church, which alone belongs to the parson or incumbent. *Comp. Incumb.* 381. 1 *Bac. Abr.* 372. If they waste the goods of the church, the new church-wardens may have action against them, or call them to account; though the parishioners cannot have an action against them for wasting the church goods, for they must make new church-wardens, who must prosecute the former, &c. 1 *Danv. Abr.* 788. 2 *Cro.* 145. They have a certain special property in the organ, bells, parish-books, bible, chalice, surplice, &c. belonging to the church; of which they have the custody on behalf of the parish, whose property they really are; for the taking away, or for any damage done any of these, the church-wardens may bring an action at law, and therefore the parson cannot sue for them in the spiritual court. 1 *Bac. Abr.* 372. *Cro. Eliz.* 179. But they have not, *virtute officii*, the custody of the title deeds of the advowson, though they are kept in a chest in the church. 4 *Term Rep.* 351.

Church-wardens have power and authority throughout the parish, though it extends into different hundreds and counties; being, though temporal officers, employed in ecclesiastical affairs, and must therefore follow the ecclesiastical division of the kingdom. *Shaw. P. L.* 86. They have, with the consent of the minister, the placing the parishioners in the seats of the body of the church, appointing gallery-keepers, &c. reserving to the ordinary a power to correct the same; and in London, the church-wardens have this authority in themselves. Particular persons may prescribe to have a seat, as belonging to them by reason of their estates, as being an ancient messuage, &c. and the seats having been constantly repaired by them; also one may prescribe to any aisle in the church, to sit, and to bury there, always repairing the same. 3 *Inst.* 202. If the ordinary displaces a person claiming a seat in a church by prescription, a prohibition shall be granted. 12 *Rep.* 106. The parson impropriate has a right to the chief seat in the chancel; but, by prescription, another parishioner may have it. *Noy's Rep.*

Besides their ordinary power, the church-wardens have the care of the benefice during its vacancy; and, as soon as there is any avoidance, they are to apply to the chancellor of the diocese for a sequestration; which being granted, they are to manage all the profits and expences of the benefice for him that succeeds, plough and sow his glebes, gather in tithes, thrash out and sell corn, repair houses, &c. and they must see that the church be duly served by a curate approved by the bishop, whom they are to pay out of the profits of the benefice. Stat. 13 & 14 *Car.* II. c. 12.

The church-wardens have not originally power to make any rate themselves, exclusive of the parishioners, their duty being only to summon the parishioners, to a vestry, who are to meet for that purpose; and, when they are assembled, a rate made by the majority present shall bind the whole parish, although the church-wardens voted against it. 1 *Bac. Abr.* 373. 3 *Term Rep.* 592. But if the church-wardens, give the parishioners due notice, that they intend to meet for the purpose of making a rate to repair the church, and the parishioners refuse to come, or, being assembled, refuse to make any rate, they may make one without their concurrence; for they are liable

to be punished in the ecclesiastical courts for not repairing the church. 1 *Vent.* 367. A taxation by a pound-rate is the most equitable way, which, if refused to be paid, should be proceeded for in the ecclesiastical court; and quakers are subject to such church rate, recoverable as their tithes. *Wood's Inst.* c. 7. *Gibs.* 219.

Their duty is very extensive and various; they are bound to provide for bastards, for whose sustenance the parish have made no provision; and this without an order of justices. *Hays* v. *Bryant*, *Trin.* 29 *Geo.* III. in *C. P.* Church-wardens are to keep the keys of the belfry, and take care the bells are not rung without proper cause. *Can.* 88. Church-wardens are, by stat. 4 An. c. 14. to collect the charity-money upon briefs; which are letters-patent issuing out of chancery, to re-build churches, restore loss by fire, &c. which are to be read in churches; and the sums collected are to be indorsed on the briefs in words at length, and signed by the minister and church-wardens; after which they shall be delivered, with the money collected, to the persons undertaking them, in a certain time, under the penalty of twenty pounds. A register is to be kept of all money collected, &c. Also the undertakers, in two months after the receipts of the money, and notice to sufferers, are to account before a master in chancery, appointed by the lord chancellor.

The consent of the church-wardens must be had for burying a person in a different parish from that in which he dies. It is their duty not to suffer suicides, or excommunicated persons, to be buried in the church or church-yard, without licence from the bishop. By stat. 30 Car. II. c. 3. they are to apply to the magistrates to convict offenders for not burying in woollen. The penalties under stat. 13 and 14 Car. II. c. 26. for reforming abuses in butter and cheese, are payable to the church-wardens of the parish where the offences is committed.

Church-wardens or quest-men are to take care that the church be well aired, the windows glazed, the floors well paved, &c. If church-wardens erect or add a new gallery, they must have the consent of the parishioners, and a licence of the ordinary, but not for occasional repairs. 2 *Inst.* 489. They must also take care to have in the church a large bible, a book of common prayer, a book of homilies, a font of stone, a decent communion table; with bread and wine for the communion, a table-cloth, carpet, and flagon, plate, and bowl of silver, gold, or pewter. *Can.* 20. 8 *H.* V. p. 4. Church-wardens also are to sign certificates of persons taking the sacrament, to qualify for offices. They are to see that the ten commandments are set up at the east end of the church, and other chosen sentences upon the walls, with a reading-desk and a pulpit, and a chest for alms, all at the charge of the parish. It is also the duty of church-wardens to prevent any irreverence or indecency from being committed in the church; and therefore they may pull off a person's hat in the church, or even turn him out if he attempts to disturb the congregation. The church being under the care of the church-wardens, they may refuse to open it at the instance of any person, except the parson, or any one acting under him. 1 *Saud.* 13. 3 *Salk.* 37. They are not to suffer any stranger to preach, unless he appears qualified, by producing a licence; and such preacher is to register his name, and the day when he preached, in a book. The pulpit is exclusively the right of the parson of the parish, and the church-wardens are punishable if they shut the door against him; and his consent is necessary to a stranger's preaching. 3 *Salk.* 87.

By the canons of the church it is ordained, that the church-wardens, or quest-men, shall take care that the church-yards be well and sufficiently repaired, found, and maintained with walls, rails, or pales, as have been in each place accustomed, at their charges, unto whom the same, by law, appertaineth; they are also to see that the church be well kept and repaired; and, by a constitution of archbishop Winchelsea, this charge is to be at the expence of the parishioners. 2 *Inst.* 489. (But one who has had land adjoining to the church-yard may, by custom, be bound to keep the fences in repair.) Church-wardens shall suffer no plays, feasts, banquets, suppers, church-ales, drinkings, temporal courts or leets, lay-juries, musters, or any profane usage, to be kept in the church or church-yard. Nor shall they suffer any idle persons to abide either in the church-yard or the church-porch during the time of divine service or preaching, but shall cause them to come in or to depart. So also, by the common law, church-wardens may justify the removal of tumultuous persons from the church-yard, to prevent them from disturbing the congregation whilst the minister is performing the rites of burial. 1 *Mod.* 168. and by the canon law may prevent an excommunicated person from even entering into the church-yard at any time, or on any pretence.

Church-wardens are to levy the penalties by warrant of a justice, under stat. 22 Car. II. c. 1. for drunkenness; for profaning the Lord's day; on hawkers and pedlars who travel without a licence; and one shilling on persons not coming to church each Sunday, under statute 1 Eliz. c. 2. Church-wardens are to observe that the parson reads the thirty-nine articles twice a-year, and the canons once in the year, preaches every Sunday good doctrine, reads the common prayer, celebrates the sacraments, preaches in his gown, visits the sick, catechises the children, marries according to law, &c. They are likewise to see that the parishioners come to church, and duly attend the worship of God; also whether baptism be neglected; women not churched; persons marrying in prohibited degrees, or without banns or licence; alms-houses or schools abused; legacies given to pious uses; &c. *Cro. Car.* 291. 1 *Vent.* 114. Church-wardens are to act in conjunction with the overseers concerning the poor; every church-warden being an overseer, but not *è contrà.* See the article OVERSEER.

Church-wardens, by their oath, are to present, or certify to the bishop or his officers, all things presentable by the ecclesiastical law, which relate to the church, to the minister, and to the parishioners. The articles which are delivered to church-wardens for their guidance in this respect, are, for the most part, founded on the book of canons, and on rubrics of the common prayer. They are also bound by stat. 4 Jac. I. c. 5. to present tippling or drunkenness; and, by 3 Jac. I. c. 4. recusants. They need not take a fresh oath upon each presentment they make, nor are they obliged to make presentments oftener than once a-year; but they may do it as often as they please, except there is a custom in the parish to the contrary; and, upon default or neglect in the church-wardens, the minister may present; but such presentment ought to be upon oath. *Can.* 117. 1 *Saund.* 13. 1 *Sid.* 463.

Church-wardens shall also provide a box wherein to keep the parish register, with three locks and three keys; two of the keys to be kept by them, and one by the minister: and every Sunday they shall see that the minister enter therein all the christenings, weddings, and burials, that have happened the week before; and at the bottom of every page, they shall, with the minister, subscribe their names; and they shall, within a month after the twenty fifth day of March, yearly, transmit to the bishop a copy thereof for the year before, subscribed as above. By stat. 23 Geo. III. c. 67. upon the entry of any burial, marriage, birth, or christening, in the register of any parish, precinct, or place, a stamp duty of three-pence shall be paid; and therefore the church-wardens and overseers, or one of them, are directed to provide a book for this purpose, with proper stamps for each entry, and to pay for the same, and for the stamps contained therein, out of the rates under their management; and to receive back the monies which shall be so paid from the persons authorised to demand and receive the said duties.

At the end of the year, the church-wardens are to yield just accounts to the minister and parishioners, and deliver what remains in their hands to the parishioners, or to new church-wardens; in case they refuse, they may be presented

sented at the next visitation, or the new officers may, by process, call them to account before the ordinary, or sue them by writ of account at common law. *Shaw. P. L.* 76. 12 *Mod.* 9. But in laying out their money, they are punishable for fraud only, not indiscretion. *Gibs.* 196. If their receipts fall short of their disbursements, the succeeding church-wardens may pay them the balance, and place it to their account. 1 *Rol. Abr.* 121. And the court of chancery, on application, will make an order for the purpose. 2 *Eq. Abr.* 203.

By the stat. 3 & 4 W. & M. c. 11. in all actions to be brought in the courts of Westminster, or at the assizes, for money misspent by church-wardens, the evidence of the parishioners, other than such as receive alms, shall be taken and admitted. The spiritual court can only order the church-wardens' accounts to be audited, but cannot make a rate to reimburse them, because they are not obliged to lay out money before they receive it. *Hardw.* 381. But a custom that the church-wardens shall, before the end of their year, give notice to the parishioners to audit their accounts, and that a general rate shall be made, for the purpose of re-imbursing them all money advanced, is good. 2 *Andr.* 32. If there be a select committee or vestry elected by custom, and the church-wardens exhibit their accounts to such committee, who allow the same, this shall discharge them from being proceeded against in the spiritual court. 2 *Lutw.* 1027. So of allowance at a vestry in general. *Raym.* 418. And, if the spiritual court take any step whatever after the accounts are delivered in, it is an excess of jurisdiction for which a prohibition will be granted, even after sentence. 3 *Term Rep.* 3. Justices of peace have no jurisdiction over church-wardens with respect to their accounts as churchwardens. 1 *Keb.* 574.

CHURCH-YARD, *s.* The ground adjoining to the church, in which the dead are buried; a cemetery.—In *church yards* where they bury much, the earth will consume the corpse in far shorter time than other earth will. *Bacon.*

No place so sacred from such fops is barr'd;
Nor is Paul's church more safe than Paul's *church-yard.*
Pope.

CHURCH'ESSET, or CHURCHSET, *s.* A Saxon word used in Domesday, which is interpreted *quasi semen ecclesiæ*, corn paid to the church. Fleta says it signifies a certain measure of wheat, which in times past every man on St. Martin's day gave to holy church, as well in the times of the Britons as of the English; yet many great persons, after coming of the Romans, gave that contribution according to the ancient law of Moses, in the name of first fruits; as in the writ of king Canutus sent to the pope is particularly contained, in which they call it *chircbsed.* Selden's Hist. Tithes, p. 216.

CHUR'CHILL (sir Winston), father of the great duke of Marlborough, was descended from an ancient and honourable family in Dorsetshire. He was born at Wotton Glanville in that county, in 1610; and educated at St. John's college, Oxford. He engaged in the cause of his unfortunate sovereign Charles I. for which he suffered severely in his fortune; and having married, while young, Elizabeth, the daughter of sir John Drake, of Ashe in Devonshire, she was forced to seek a refuge in her father's house, when Mr. Churchill's misfortunes left him none that he could call his own; and there most of his children were born. After the restoration, he was elected a burgess to serve in parliament for the borough of Weymouth; and, in 1669, his majesty was pleased to confer on him the honour of knighthood. The next year he was made one of the commissioners of claims in Ireland; and, upon his return from thence, was constituted one of the clerks comptrollers of the green-cloth; but writing a kind of political essay upon the History of England, which gave offence to the parliament, he was, in 1678, dismissed from his post. He was, however, soon restored to it again by the king; and he lived to see his eldest surviving son raised to the peerage, and the rest of his children in a way to promotion. He died in 1688.

CHUR'CHILL (John), duke of Marlborough, and prince of the holy Roman empire, was eldest son of sir Winston Churchill, and born at Ashe in Devonshire, on Midsummer-day, 1650. A clergyman in the neighbourhood instructed him in the first principles of literature; but his father, having other views than what a learned education afforded, carried him early to court, where he was particularly favoured by James duke of York, when he was no more than twelve years of age. He had a pair of colours given him in the guards, during the first Dutch war, about 1666; and afterwards obtained leave to go over to Tangier, then in our hands, and besieged by the Moors, where he resided for some time, and cultivated attentively the science of military tactics. Upon his return to England, he attended constantly at court, and was greatly respected by both the king and the duke. In 1672, the duke of Monmouth commanding a body of English auxiliaries in the service of France, Churchill attended him, and was soon made a captain of grenadiers in his grace's own regiment. He had a share in all the actions of that famous campaign against the Dutch; and at the siege of Nimeguen, distinguished himself so much, that he was particularly noticed by the celebrated marshal Turenne, who bestowed on him the name of the handsome Englishman. He shone out also with so much eclat at the reduction of Maestricht, that the French king thanked him for his behaviour at the head of the line, and assured him that he would acquaint his sovereign with it, which he did; and the duke of Monmouth, on his return to England, told the king his father how much he had been indebted to the bravery of captain Churchill.

The laurels he brought from France were sure to gain him preferment at home: accordingly the king made him a lieutenant-colonel, and the duke made him gentleman of his bed-chamber, and master of the robes. The second Dutch war being over, colonel Churchill was again obliged to pass his days at court, where he behaved with great prudence and circumspection in the troublesome times that ensued. In 1679, when the duke of York was constrained to retire from England into the Low-countries, colonel Churchill attended him; as he did through all his peregrinations, till he was suffered to reside again in London. While he waited upon the duke in Scotland, he had a regiment of dragoons given him; and thinking it now time to take a consort, he made his addresses to Sarah Jennings, who waited on the princess Anne, afterwards queen of Great Britain. This young lady, then about twenty-one years of age, and universally admired both for her person and wit, he married in 1681, and thereby strengthened the interest he had already at court. In 1682 the duke of York returned to London; and, having obtained leave to quit Scotland, resolved to fetch his family from thence by sea. For this purpose he embarked in May, but unluckily ran upon the Lemon Oar, a dangerous sand, that lies about sixteen leagues from the mouth of the Humber, where his ship was lost, with some men of quality, and upwards of one hundred and twenty persons on-board her. He was particularly careful of colonel Churchill's safety, and took him into the boat in which he himself escaped. The first use made by his royal highness of his interest, after he returned to court, was to obtain a title for his favourite; who, by letters patent, bearing date December 1, 1682, was created baron of Eymouth in Scotland, and also appointed colonel of the third troop of guards. He was continued in all his posts upon the coming of James II. to the crown, who sent him as his ambassador to France to notify his accession. On his return, he assisted at the coronation in April 1685; and May following was created a peer of England, by the title of baron Churchill of Sandridge in the county of Hertford.

In June, being then lieutenant-general of his majesty's forces, he was ordered into the west to suppress Monmouth's

CHURCHILL DUKE of MARLBOROUGH

mouth's rebellion; which he did in a month's time, with an inconsiderable body of horse, and took the duke prisoner. He was extremely well received by the king at his return from this victory; but soon discerned, as it is said, the bad effects it produced, by confirming the king in an opinion that, by virtue of a standing army, the religion and government of England might easily be changed. How far lord Churchill concurred with or opposed the king, while he was forming this project, is hardly known. He does not appear to have been guilty of any mean compliances, or to have had any concern in advising or executing the violent proceedings of that unhappy reign: on the contrary, bishop Burnet tells us, that "he very prudently declined meddling much in business, spoke little except when his advice was asked, and then always recommended moderate measures." It is said he declared very early to lord Galway, that if his master attempted to overturn the established religion, he would leave him; and that he signed the memorial transmitted to the prince and princess of Orange, by which they were invited to rescue this nation from popery and slavery. Be this as it will, it is certain that he remained with the king, and was entrusted by him, after the prince of Orange was landed in 1688. He attended king James when he marched with his forces to oppose the prince, and had the command of 5000 men; yet the earl of Feversham, suspecting his inclinations, advised the king to seize him. The king's affection to him was so great, that he could not be prevailed upon to do it; and this left him at liberty to go over to the prince, which accordingly he did, but without betraying any post or carrying off any troops. Whoever considers the great obligations lord Churchill lay under to king James, must naturally conclude, that he could not take the resolution of leaving him, and withdrawing to the prince of Orange, but with infinite concern and regret; and that this was really the case, appears from a letter, which he left for the king, to shew the reasons of his conduct, and to express his grief for the step he was obliged to take.

Lord Churchill was graciously received by the prince of Orange; and it is supposed to have been in consequence of his lordship's solicitation, that prince George of Denmark took the same step, as his consort the princess Anne did also soon after, by the advice of lady Churchill. He was entrusted in that critical conjuncture by the prince of Orange, first to re-assemble his troop of guards at London, and afterwards to reduce some lately raised regiments, and to new model the army, for which purpose he was invested with the rank and title of lieutenant-general. The prince and princess of Orange being declared king and queen of England, February 6, 1689, lord Churchill was on the 14th sworn of their privy council, and one of the gentlemen of the bed-chamber to the king; and on the 9th of April following raised to the dignity of earl of Marlborough in the county of Wilts. He assisted at the coronation of their majesties, and was soon after made commander in chief of the English forces sent over to Holland. He presided at the battle of Walcourt, April 15, 1689, and gave such extraordinary proofs of his skill, that prince Waldeck, speaking in his commendation to king William, declared, that "he saw more into the art of war in a day, than some generals in many years." It is to be observed, that king William commanded this year in Ireland, which was the reason of the earl of Marlborough's being at the head of the English troops in Holland; where he laid the foundation of that fame among foreigners, which he afterwards extended all over Europe. He next did great services for king William in Ireland, by reducing Cork, and some other places of much importance; in all which he shewed such uncommon abilities, that, on his first appearance at court after his return, the king was pleased to say, that "he knew no man so fit for a general, who had seen so few campaigns." All these services, notwithstanding, did not prevent his being disgraced in a very sudden manner: for, being in waiting at court as lord of the bed-chamber, and having introduced to his majesty lord George Hamilton, he was soon followed to his own house by the same lord, with this short and surprising message, "That the king had no farther occasion for his services;" the more surprising, as his majesty just before had not discovered the least coldness or displeasure towards him. The cause of this disgrace is not even at present known; but only suspected to have proceeded from his too close attachment to the interest of the princess Anne. This strange and unexpected blow was followed by one much stranger, for soon after he was committed to the Tower for high treason; but was released, and acquitted, upon the whole being discovered to be nothing more than the effects of a vile conspiracy against him.

After the queen's death, when the interests of the two courts were brought to a better agreement, king William thought fit to recal the earl of Marlborough to his privy council; and in June 1698, appointed him governor to the duke of Gloucester, with this extraordinary compliment, "My lord, make him but what you are, and my nephew will be all I wish to see him." He continued in favour to the king's death, as appears from his having been three times appointed one of the lords justices during his absence; namely, July 16, 1698; May 31, 1699; and June 27, 1700. As soon as it was discerned, that the death of Charles II. of Spain would become the occasion of another general war, the king sent a body of troops over to Holland, and made lord Marlborough commander in chief of them. He appointed him also ambassador extraordinary and minister plenipotentiary to their high mightinesses. Upon which he went immediately to Holland. The king following, and taking a view of the forces, dined with him at his quarters in September 1700; and this was one of the last favours he received from king William, who died the 8th of March following, unless we reckon his recommendation of him to the princess of Denmark, a little before his death, as the fittest person to be trusted with the command of the army, which was to protect the liberties of Europe. About a week after the king's death, he was elected, by queen Anne, knight of the garter, and captain-general of all her majesty's forces, upon which he was immediately sent over to the Hague with the same character that he had filled the year before. His stay in Holland was very short; just long enough to give the states general the necessary assurances of his mistress's sincere intention to pursue the plan that had formerly been settled. The states concurred with him in all that he proposed, and made him captain-general of their forces, appointing him 100,000 florins per annum.

On his return to England, he found the queen's council greatly divided; some being for carrying on the war as auxiliaries only, others for openly declaring against France and Spain immediately. The earl of Marlborough joined with the latter; and these carrying their point, war was declared May 4, 1702. The earl took the command June 20; and discerning that the states were made uneasy by the places which the enemy held on their frontiers, he began with attacking and reducing them. Accordingly, in this single campaign, he made himself master of the castles of Gravenbroeck and Waerts, the towns of Venlo, Ruremond, and Stevenswaert, together with the city and citadel of Liege. These advantages were considerable, and acknowledged as such by the states; but they had like to have been of a very short date: for, the army separating in the neighbourhood of Liege, November 3, the earl was stopped next day in his passage by water, by a small party of thirty men from the garrison at Gueldres; but it being towards night, and the earl insisting upon an old pass given to his brother, and now out of date, was suffered to proceed, and arrived at the Hague, when they were in the utmost consternation at the accident which had befallen him. The winter approaching, he embarked for England, and arrived in London November 28. The queen had been complimented some time before, by both houses of parliament, on the success

success of her arms in Flanders; in consequence of which, there had been a public thanksgiving November 4, when her majesty went in great state to St. Paul's. Soon after a committee of the house of commons waited upon him with the thanks of the house; and December 2, her majesty declared her intention in council of creating him a duke: which she then did, by the title of marquis of Blandford, and duke of Marlborough. She likewise added a pension of 5000l. per ann. out of the post-office, during her own life, and sent a message to the house of commons, signifying her desire that it might attend the honour she had lately conferred; but with this the house would not comply, contenting themselves, in their address to the queen, with applauding her manner of rewarding public service, but declaring their inability to make such a precedent for alienating the revenue of the crown.

He was on the point of returning to Holland, when, February 8, 1703, his only son the marquis of Blandford died at Cambridge, at the age of eighteen. This very afflicting accident did not however long retard him; but he passed over to Holland, and arrived at the Hague March 6. We cannot here relate all the military acts in which the duke of Marlborough was engaged, particularly as they are detailed under the article ENGLAND: it is sufficient to say, that they were all successful. The French had a great army at this time in Flanders, in the Low-countries, and in that part of Germany which the elector of Cologn had put into their hands; and prodigious preparations were made under the most experienced commanders: but the vigilance and activity of the duke baffled them all. When the campaign was over, his grace went to Dusseldorp to meet the emperor Charles III. king of Spain, who made him a present of a rich sword from his side, with very high compliments; and then returning to the Hague, his grace after a very short stay, came over to England. He arrived October 13, 1703; and soon after king Charles, whom he had accompanied to the Hague, came likewise to England, and arrived at Spithead the day after Christmas-day: upon which the dukes of Somerset and Marlborough were sent to receive and conduct him to Windsor. In January the states desired leave of the queen for the duke to come to the Hague; which being granted, he embarked on the 15th, and passed over to Rotterdam. He went immediately to the Hague, where he communicated to the pensionary his sense of the necessity there was of attempting something the next campaign for the relief of the emperor; whose affairs at this time were in the utmost distress, having the Bavarians on one side, and the Hungarian malcontents on the other, making incursions to the very gates of Vienna, while his whole force scarce enabled him to maintain a defensive war. This scheme being approved of, and the plan of it adjusted, the duke returned to England February 14.

When measures were properly settled at home, April 8, 1704, he embarked for Holland; where staying about a month to adjust the necessary steps, he began his march towards the interior of Germany; and after a conference held with prince Eugene of Savoy and Lewis of Baden, he arrived before the strong entrenchments of the enemy at Schellenburg, very unexpectedly, on June 21; whom, after an obstinate and bloody dispute, he entirely routed. It was on this occasion that the emperor wrote the duke a letter with his own hand, acknowledging his great services, and offering him the title of a prince of the empire, which he modestly declined, till the queen afterwards commanded him to accept of it. He prosecuted this success, and the battle of Hochstet was fought by him and prince Eugene, on August 2; when the French and Bavarians were the greatest part of them killed and taken, and their commander marshal Tallard made a prisoner. After this glorious action, by which the empire was saved, and the whole electorate of Bavaria conquered, the duke continued his pursuit till he forced the French to repass the Rhine. Then prince Lewis of Baden laid siege to Landau, while the duke and prince Eugene covered it; but it was not taken before the 12th of November. He made a tour also to Berlin; and by a short negociation, suspended the disputes between the king of Prussia and the Dutch, by which he gained the good-will of both parties. When the campaign was over, he returned to Holland, and December 14, arrived in England. He brought over with him marshal Tallard, and twenty-six other officers of distinction, 121 standards, and 179 colours, which by her majesty's order were put up in Westminster-hall. He was received by the queen with the highest marks of esteem, and had the solemn thanks of both houses of parliament. Besides this, the commons addressed her majesty to perpetuate the memory of this victory, which she did, by granting Woodstock, with the hundred of Wotton, to him and his heirs for ever. This was confirmed by an act of parliament, which passed on the 14th of March following, with this remarkable clause, that they should be held by tendering to the queen, her heirs and successors, on August 2, every year for ever, at the castle of Windsor, a standard with three fleurs de lys painted thereon. January 6, the duke was feasted by the city; and February 8, the commons addressed the queen, to testify their thanks for the wise treaty which the duke had concluded with the court of Berlin, by which a large body of Prussian troops were sent to the assistance of the duke of Savoy.

The next year, 1705, he went over to Holland in March, with a design to execute some great schemes, which he had been projecting in the winter. The campaign was attended with some successes, which would have made a considerable figure in a campaign under any other general, but are scarcely worth mentioning where the duke of Marlborough commanded. He could not carry into execution his main project, on account of the impediments he met with from the allies, and in this respect was greatly disappointed. The season for action being over, he made a tour to the courts of Vienna, Berlin, and Hanover. At the first of these he acquired the entire confidence of the new emperor Joseph, who presented him with the principality of Mindelheim: at the second he renewed the contract for the Prussian forces: and at the third, he restored a perfect harmony, and adjusted every thing to the elector's satisfaction. After this, he returned to the Hague, and towards the close of the year, embarked for, and arrived safe in, England. January 7, the house of commons came to a resolution, to thank his grace, as well for his prudent negotiations, as for his great services: but notwithstanding this, it very soon appeared that there was a strong party formed against the war, and steps were taken to censure and disgrace the conduct of the duke.

Things however being concerted for rendering the next year's campaign more successful than the former, the duke of Marlborough, in the beginning of April 1706, embarked for Holland. This year the famous battle of Ramilies was fought, and won upon May 12, being Whitsunday. The duke was twice here in the utmost danger, once by a fall from his horse, and a second time by a cannon-shot, which took off the head of colonel Bingfield, as he was holding the stirrup for him to remount. The advantages gained by this victory, were so far improved by the vigilance and wisdom of the duke, that Louvain, Brussels, Mechlin, and even Ghent and Bruges, immediately submitted; and Oudenard surrendered upon the first summons. The city of Antwerp followed this example; and thus, in the short space of a fortnight, the duke reduced all Brabant. He afterwards took the towns of Ostend, Menin, Dendermonde, and Aeth. The forces of the allies, after this glorious campaign, being about to separate, his grace went to the Hague October 16, where the proposals, which France had made for a peace, contained in a letter from the elector of Bavaria to the duke of Marlborough, were communicated to the ministers of the allies, after which he embarked for England, Nov. 15.

He arrived in London, November 18, 1706; and though at this time there was a party formed against him at court, yet

yet the great services he had done the nation, and the personal esteem the queen always had for him, procured him an universal good reception. The house of commons, in their address to the queen, spoke of the success of the campaign in general, and of the duke of Marlborough's share in particular, in the strongest terms possible; and the day after unanimously voted him their thanks, as did the lords. They went still farther; for, December 17, they addressed the queen for leave to bring in a bill to settle the duke's honours upon the male and female issue of his daughters. This was granted; and Blenheim-house, with the manor of Woodstock, was, after the decease of the dutchess, upon whom they were settled in jointure, entailed in the same manner with the honours. Two days after this, the standards and colours taken at Ramilies being carried in state through the city to be hung up in the Guildhall, the duke was invited to dine with the lord-mayor, which he did. The last day of the year was appointed for a general thanksgiving, and her majesty went in state to St. Paul's; in which there was this singularity observed, that it was the second thanksgiving within the year. January 17, the house of commons presented an address to the queen, in which they signified, that as her majesty had built the house of Blenheim to perpetuate the memory of the duke of Marlborough's services, and as the house of lords had ordered a bill for continuing his honours, so they were desirous to make some provision for the more honourable support of his dignity. In consequence of this, and of the queen's answer, the pension of 5000l. per annum, from the post-office was settled in the manner the queen had formerly desired.

These points adjusted, the duke made haste to return to his charge, it being thought especially necessary he should acquaint the foreign ministers at the Hague, that the queen of Great Britain would hearken to no proposals for a peace, but what would firmly secure the general tranquillity of Europe. The campaign of the year 1707 proved the most barren one he ever made, which was chiefly owing to a failure on the part of the allies, who began to flag in supporting the common cause. Nor did things go on more to his mind at home; for upon his return to England, after the campaign was over, he found that the fire, which he suspected the year before, had broke out in his absence; that the queen had a female favourite, who was in a fair way of supplanting the duchess; and that she listened to the insinuations of a statesman who was no friend to him. He is said to have borne all this with firmness and patience, though he easily saw whither it tended; and went to Holland as usual, early in the spring of 1708, arriving at the Hague March 19. The ensuing campaign was carried on by the duke, in conjunction with prince Eugene, with such prodigious success, that the French king thought fit, in the beginning of 1709, to set on foot a negotiation for peace. The house of commons this year gave an uncommon testimony of their respect for the duke of Marlborough; for, besides addressing the queen, they, January 22, 1709, unanimously voted him thanks, and ordered them to be transmitted to him abroad by the speaker. He returned to England February 25, and on his first appearance in the house of lords, received the thanks of that august assembly. His stay was so very short, that we need not dwell upon what passed in the winter. It is sufficient to say, that they who feared the dangerous effects of those artful proposals France had been making for the conclusion of a general peace, were also of opinion, that nobody was so capable of setting their danger in a true light in Holland as his grace of Marlborough. This induced the queen to send him thither, at the end of March, with the character of her plenipotentiary, which contributed not a little to the enemy's disappointment, by defeating all their projects.

Marshal Villars commanded the French army in the campaign of 1709; and Louis XIV. expressed no small hopes of him, in saying that "Villars was never beat." However the siege of Tournay, and the battle of Malpaquet, convinced the monarch, that Villars was not invincible. Upon the news of the glorious victory, gained August 1, 1709, the city of London renewed their congratulatory addresses to the queen; and her majesty in council, October 3, ordered a proclamation for a general thanksgiving. The duke of Marlborough came to St. James's November 10, and soon after received the thanks of both houses: and the queen, as if desirous of any occasion to shew her kindness to him, appointed him lord lieutenant and custos rotulorum of the county of Oxford. But amidst these honours, preferments, and favours, he was really chagrined to the last degree. He perceived, that the French intrigues began to prevail both in England and Holland: the affair of Dr. Sacheverell had thrown the nation into a ferment; and the queen was not only estranged from the duchess of Marlborough, but had taken such a dislike to her, that she seldom appeared at court.

In the beginning of 1710, the French set on foot a new negociation for a peace, which was commonly called the treaty of Gertruydenburg. The states upon this having shewn an inclination to enter into conferences with the French plenipotentiaries, the house of commons immediately framed an address to the queen, that she would be pleased to send the duke of Marlborough over to the Hague. She did so; and towards the end of February he went to the Hague, where he met with prince Eugene, and soon after set out with him for the army, which was assembled in the neighbourhood of Tournay. This campaign was very successful, many towns being taken and fortresses reduced: notwithstanding which, when the duke came over to England, as he did about the middle of December, he found his interest declining, and his services set at nought. The negociations for peace were carried on during a great part of the summer, but ended at last in nothing. In the midst of the summer, the queen began the great change in her ministry, by removing the earl of Sunderland from being secretary of state; and, on August 8, the lord treasurer Godolphin was likewise removed. Upon the meeting of the parliament, no notice was taken in the addresses of the duke of Marlborough's success: an attempt indeed was made to procure him the thanks of the house of peers, but it was eagerly opposed by the duke of Argyle. His grace was kindly received by the queen, who seemed desirous to have him live upon good terms with her new ministry: but this was thought impracticable, and it was every day expected that he would lay down his commission. He did not do this; but he carried the golden key, the ensign of the duchess of Marlborough's office, January 19, 1711, to the queen, and resigned all her employments with great duty and submission. With the same firmness and composure he consulted the necessary measures for the next campaign, with those whom he knew to be no friends of his: and treated all parties with candour and respect. There is no doubt that the duke felt some inward disquiet, though he shewed no outward concern, at least for himself; but when the earl of Galway was very indecently treated in the house of lords, the duke of Marlborough could not help saying, "it was somewhat strange, that generals, who had acted according to the best of their understandings, and had lost their limbs in the service, should be examined like offenders about insignificant things."

An exterior civility being established with the new ministry, the duke went over to the Hague, to prepare for the next campaign, which at the same time he knew would be his last. He exerted himself in an uncommon manner, and was attended with the same success as usual. There was in this campaign a continued trial of skill between the duke of Marlborough and marshal Villars; and, as great a general as the latter was, he was obliged at length to submit to the former. He embarked for England when the campaign was over, and came to London

don November 8. He shewed some caution in his manner of coming; for happening to land the very night of queen Elizabeth's inauguration, when great rejoicings were intended by the populace, he continued very prudently at Greenwich, and the next day waited on the queen at Hampton-court, who received him graciously. He was visited by the ministers, and visited them; but he did not go to council, because a negociation of peace was then on the carpet, upon a basis which he by no means approved. He acquainted her majesty in the audience he had at his arrival, that as he could not concur in the measures of those who directed her councils, so he would not distract them by a fruitless opposition. Yet finding himself attacked in the house of lords, and loaded with the imputation of having protracted the war, he vindicated his conduct and character with great dignity and spirit; and in a most pathetic speech appealed to the queen his mistress, who was there incognito, for the falsehood of that imputation; declaring, that he was as much for peace as any man, provided it was such peace as might be expected from a war undertaken on such just motives, and carried on with uninterrupted success. This had a powerful effect upon the house, and perhaps made some impression on the queen; but at the same time it gave such an edge to the resentment of his enemies, who were then in power, that they resolved at all adventures to remove him. Those who were thus resolved to divest him of his commission, found themselves under a necessity to engage the queen to take it from him. This necessity arose chiefly from prince Eugene's being expected to come over with a commission from the emperor; and to give some colour to it, an enquiry was promoted in the house of commons, to fix a very high imputation upon the duke, as if he had put very large sums of public money into his own pocket. When a question to this purpose had been carried, the queen, by a letter, conceived in very obscure terms, acquainted him with her having no farther occasion for his service, and dismissed him from all his employments.

The noble duke of Marlborough was from this time exposed to a most painful persecution. On the one hand, he was attacked by the clamours of the populace, and on the other hand, a prosecution was commenced against him by the attorney-general, for applying public money to his private use; and the workmen employed in building Blenheim-house, though set at work by the crown, were encouraged to sue him for the money that was due to them. All his meritorious actions were likewise shamefully misrepresented. These unkindnesses joined to his grief for the death of the earl of Godolphin, induced him to gratify his enemies, by going into a voluntary exile. Accordingly, he embarked at Dover, November 14, 1712; and landing at Ostend, went to Antwerp, and then to Aix la Chapelle, being every where received with the honours due to his rank and merit. The duchess also attended her lord in all his journies, and particularly in his visit to the principality of Mindelheim, which was given him by the emperor, and exchanged for another at the peace, which was made while the duke was abroad. The conclusion of that peace was so far from restoring harmony among the several parties in Great Britain, that it widened their differences exceedingly: insomuch that the chiefs despairing of safety in the way they were in, are said to have secretly invited the duke back to England. Be that as it will, it is very certain that he took a resolution of returning, a little before the queen's death; and landing at Dover, came to London, August 4, 1714. He was received with all demonstrations of joy, by those who upon the demise of the queen, which had happened upon the 1st, were entrusted with the government; and upon the arrival of George I. he was particularly distinguished by acts of royal favour: for he was again declared captain-general and commander in chief of all his majesty's land forces, colonel of the first regiment of guards, and master of the ordnance.

His advice was of great use in concerting those measures by which the rebellion in 1715 was crushed; and his advice on this occasion was the last effort he made in respect to public affairs: for his infirmities increasing with his years, he retired from business, and spent the greatest part of his time, during the remainder of his life, at one or other of his country seats. His death happened June 16, 1722, in his seventy-third year, at Windsor-lodge; and his corpse, on August 9, was interred with the highest solemnity in Westminster-abbey. Besides the marquis of Blandford, whom we have already mentioned, he had four daughters, who married into the best families of the kingdom.

The noble pile near Woodstock, which bears the name of Blenheim-house, may be justly styled his monument: but without pretending to the gift of prophecy, one may venture to foretel, that his glory will long survive that structure; and that so long as our histories remain, or indeed the histories of Europe, his memory will live and be the boast of Britain, which by his labours was raised to be the first of nations, as during the age in which he lived he was deservedly esteemed the first of men. If he had foibles, as these are inseparable from human nature, they were so hidden by the glare of his virtues as to be scarcely perceived, or were willingly forgotten.

Various characters have been drawn of the duke of Marlborough, most of which appear to have been made up either as it suited the regard of his friends, or the malice of his enemies, who never lost sight of his greatest infirmity, avarice! There are however, two testimonies to the honour of the duke's memory, by two celebrated noble writers, which cannot be passed over. One is by lord Bolingbroke, in his letters on the Study and use of History. Speaking of the consternation raised among the allies of the grand confederacy by the death of king William, and of the great joy which that event gave to the French, his lordship observes, that "a short time shewed how vain the fears of some and the hopes of others were. By his death, the duke of Marlborough was raised to the head of the army, and indeed of the confederacy: where he, a new, a private man, a subject, acquired, by merit and by management, a more deciding influence than high birth, confirmed authority, and even the crown of Great Britain, had given to king William. Not only all the parts of that vast machine, the grand alliance, were kept more compact and entire, but a more rapid and vigorous motion was given to the whole: and instead of languishing out disastrous campaigns, we saw every scene of the war full of action. All those wherein he appeared, and many of those wherein he was not then an actor, but abettor only of their action, were crowned with the most triumphant success. I take, with pleasure, this opportunity of doing justice to that great man, whose faults I knew, whose virtues I admired; and whose memory, as the greatest general, and as the greatest minister, that our country, or perhaps any other, has produced, I honour."

The other testimony to the duke's accomplishments is by the earl of Chesterfield in his Letters to his Son. "Of all the men (says his lordship) that ever I knew in my life, the late duke of Marlborough possessed the graces in the highest degree, not to say engrossed them: and indeed he got the most by them; for I will venture (contrary to the custom of profound historians, who always assign deep causes for great events) to ascribe the better half of the duke of Marlborough's greatness and riches to those graces. He was eminently illiterate; wrote bad English, and spelt it still worse. He had no share of what is commonly called *parts*; that is, he had no brightness, nothing shining in his genius. He had, most undoubtedly, an excellent good plain understanding, with sound judgment. But these alone would probably have raised him but something higher than they found him, which was page to James II's queen. There the graces protected and promoted him: for while he was an ensign of the guards, the duchess of Cleveland, then favourite mistress to

to Charles II. struck by those very graces, gave him 5000l. with which he immediately bought an annuity for his life of 500l. a year, of my grandfather Halifax; which was the foundation of his subsequent fortune. His figure was beautiful; but his manner was irresistible, by either man or woman. It was by this engaging graceful manner that he was enabled, during all his war, to connect the various and jarring powers of the grand alliance, and to carry them on to the main object of the war, notwithstanding their private and separate views, jealousies, and wrongheadednesses. Whatever court he went to (and he was often obliged to go himself to some testy and refractory ones), he as constantly prevailed, and brought them into his measures. The pensionary Heinsius, a venerable old minister, grown grey in business, and who had governed the republic of the United Provinces for more than forty years, was absolutely governed by the duke of Marlborough, as that republic feels to this day. He was always cool; and nobody ever observed the least variation in his countenance: he could refuse more gracefully than other people could grant; and those who went away from him the most dissatisfied as to the substance of their business, were yet personally charmed with him, and in some degree comforted by his manner. With all his gentleness and gracefulness, no man living was more conscious of his situation, nor maintained his dignity better."

A perusal of the above passage will convince us of the superficial turn of the earl of Chesterfield's mind. His lordship, in his zeal to exalt the duke of Marlborough's external accomplishments, either forgets or depreciates the far greater talents of which he was possessed. There is an observation upon the subject in the British Biography, with which we entirely concur. "That the duke of Marlborough (says the writer) was eminently distinguished by the gracefulness of his manners, cannot be questioned: but the earl of Chesterfield appears to have attributed too much to their influence, when he ascribes —the better half of the duke of Marlborough's greatness and riches to those graces. That the gracefulness of his manners facilitated his advancement, and contributed to the success of his negociations, may readily be admitted; but surely it must have been to much higher qualities that he owed the esteem of king William and of prince Eugene, his reputation throughout all Europe, and his many victories and conquests. It was not by a polite exterior that he obtained his laurels at Schellenberg, at Oudenarde, at Ramillies, and at Blenheim."

The duke of Marlborough's Scots title of baron Eymouth, being to heirs-male, died with himself; but his English title going to his daughters and their heirs-male, went into the Spencer family, who retain their own surname of Spencer.—See the article HERALDRY.

CHUR'CHILL (Charles), an elegant poet and celebrated satyrist, was son of the Rev. Charles Churchill, curate and lecturer of St. John's Westminster; and born in 1731. He was educated at Westminster school, where his capacity was deemed greater than his application; so that he had the character of one of those who could do something if he would. It is easy to conceive, that a strong imgination and violent spirits, such as he possessed, could not tamely pace on in the trammels of a school-education. When sent to Oxford, he was refused admittance, for want of skill in the learned languages: it is said, that he could have passed the examination if he would, but that he so despised the trifling questions put to him, as even to ridicule the gentleman who examined him. Upon returning from Oxford, he applied again to his studies at Westminster; and there, at the age of seventeen, contracted an intimacy with a lady, whom he married. At the usual age of going into orders, he was ordained by the bishop of London, though he had taken no degree, nor studied in either university; and the first employment he had, was a curacy in Wales of 30l. a year. In order to eke out his scanty finances, he entered into a branch of trade; which was no other than keeping a cider cellar, and dealing in this liquor through that part of the country: but this did not answer, and a sort of rural bankruptcy was the consequence of his attempt.

Upon leaving Wales, he came to London, and his father dying soon after, he stept into the church where he had officiated. To improve his income, he was employed in a boarding-school, where he behaved with the most exact decorum. His revenue, however, not sufficing for his style of living, several debts were contracted; and a gaol seemed ready to complete his misfortunes. Mr. Lloyd, the father of the poet of that name, and who was second master of Westminster school, relieved him from this distress, by paying his debts, or at least satisfying his creditors; and Mr. Lloyd, the son, soon after publishing his much-applauded poem, intituled, the Actor, Churchill followed his example, and undertook the Rosciad. It first came out without the name of the author; but the justness of its remarks, and particularly the severity of the satire, greatly excited the public curiosity. Though he never disowned this piece, but even openly gloried in it; yet the public seemed unwilling to give him credit for it, and ascribed it to a combination of wits, such as Lloyd, Colman, Thornton, &c. but to rectify this mistake, he set his name to the second edition. His next performance was an Apology to the Critical Reviewers: a performance much applauded also, and equally satirical with the former.

But what fame he got by these productions, which was indeed very great and deserved, he lost by his morals; and, while his writings amused the town, his actions disgusted it. Intoxicated with success, he now quitted his wife; and resigning his gown, with all clerical functions, he commenced a man of the town, and indulged in all the gaieties and vices of it. His next poem was entituled, Night: and after that he published the Ghost. Dr. Johnson, had, it seems, spoken lightly of Churchill's productions: in this poem he has described Johnson under the character of Pomposo, and the description as allowed to have merit. The poems, Night and the Ghost, had not the rapid sale expected by the author; but the Prophecy of Famine, which succeeded, produced him again in all his lustre. It had all the circumstances of time, place, and party, to recommend it; and Mr. Wilkes said, before its publication, "that he was sure it must take, because it was at once personal, poetical, and political." He afterwards published his Epistle to Hogarth, Gotham, Independance, the Times, &c. in all which there are things great and shining: but, upon the whole, they seem written by a man who desired to avail himself of the public curiosity in his favour, and whose principal aim herein was at the pockets of his readers. In October 1764 he went to Boulogne, on a visit to Mr. Wilkes; and was there attacked by a fever, which suddenly carried him off on the 5th of November. After his death, his poems were collected and printed together in two vols. 8vo.

CHURCH'YARD (Thomas), a poet who flourished in the reigns of Henry VIII. Edward VI. queen Mary, and queen Elizabeth. He was born at Shrewsbury, and inherited a fortune, which he soon exhausted in a fruitless attendance on the court, by which he only gained the favour of being retained a domestic in the family of lord Surrey; when, by his lordship's encouragement, he commenced poet. Upon his patron's death, he betook himself to arms; was in many engagements, was frequently wounded, and twice made prisoner. He published twelve pieces, which he afterwards printed together in one volume, under the title of Churchyard's Chips; and also the tragedy of Thomas Moubray duke of Norfolk. He died in 1570.

CHUR'CO, a town of Asiatic Turkey, on the coast of Caramania, about forty-six miles from the isle of Cyprus.

CHURL, *s.* [ceorl, Sax. *carl*, in German, is strong, rustic

rustics being generally strong bodied.] A rustic; a countryman; a labourer:

From this light cause th' infernal maid prepares
The country *churls* to mischief, hate, and wars. *Dryden.*

A rude, surly, ill-bred, man.—A *churl's* courtesy rarely comes, but either for gain or falsehood. *Sidney.*—A miser; a niggard; a selfish or greedy wretch:

Poison, I see, hath been his timeless end!
O *churl*, drink all, and leave no friendly drop
To help me after! *Shakespeare.*

CHURLE, Ceorl, or Carl, *s.* in the Saxon times, signified a tenant at will, who held of the thanes on condition of rent and service. They were of two sorts: one rented the estate like our farmers; the other tilled and manured the demesnes, and were called ploughmen. See Ceorles.

CHURL'ISH, *adj.* Rude; brutal; harsh; austere; sour; merciless; unkind; uncivil.—A lion in love with a lass, desired her father's consent. The answer was *churlish* enough: He'd never marry his daughter to a brute. *L'Estrange.*—Selfish; avaricious.—The man was *churlish* and evil in his doings. 1 *Samuel.*—[Of things.] Unpliant; cross-grained; unmanageable; harsh; not yielding.—The Cornish were become, like metal often fired and quenched, *churlish*, and that would sooner break than bow. *Bacon.*—In the hundreds of Essex they have a very *churlish* blue clay. *Mortimer.*—Vexatious; obstructive:

Will you again unknit
This *churlish* knot of all abhorred war? *Shakespeare.*

CHURL'ISHLY, *adv.* Rudely; brutally.—To the oak, now regnant, the olive did *churlishly* put over the son for a reward of the service of his sire. *Howell.*

CHURLISHNESS, *s.* [ċynliſcneſſe, Sax.] Brutality; ruggedness of manner.—In the *churlishness* of fortune, a poor honest man suffers in this world. *L'Estrange.*

CHURME, *s.* [more properly *chirm*, from the Saxon ċynme, a clamour or noise; as to *chirre* is to coo as a turtle.] A confused sound; a noise.—He was conveyed to the Tower, with the *churme* of a thousand taunts and reproaches. *Bacon.*

CHURN, *s.* [properly *chern*, from *kern*, Dut. ceſene, Sax.] The vessel in which the butter is, by long and violent agitation, coagulated and separated from the serous part of the milk. See the article Butter, vol. iii. p. 552, &c.

To CHURN, *v. a.* [*kernen*, Dutch.] To agitate or shake any thing by a violent motion.—The mechanism of nature, in converting our aliment, consists in mixing with it animal juices, and in the action of the solid parts, *churning* them together. *Arbuthnot.*—To make butter by agitating the milk.—You may try the force of imagination, upon staying the coming of butter after the *churning*. *Bacon.*

CHURN, a river of England, which runs into the Thames, at Cricklade.

CHUR'NET, a river of England, which runs into the Dare, in Staffordshire.

CHURR'WORM, *s.* [from ċyſſan, Sax.] An insect that turns about nimbly; called also a fancricket. *Skinner.*

CHURSAN', a town of Arabia: thirty-two miles north-east of Chamir.

CHUS, or Chusch. It is a tradition of an ancient standing, that the *Chus* of the Scriptures denotes Ethiopia, and *Chuschi* an Ethiopian: the Septuagint and Vulgate constantly translate it so; and in this they are followed by most interpreters, and by Josephus and Jerome. And yet what Bochart argues to the contrary is of no inconsiderable weight, from Ezekiel xxix. 10. in which the two opposite extremes of Egypt are designed; and therefore *Chus*, which is opposite to Syrene, must be Arabia: but this is more strongly pointed out by Xenophon, by whom Ethiopia is said to be the south boundary of Cyrus's empire; and Herodotus distinguishes between the Ethiopians of Asia and Africa, conjoining the former with the Arabians.

To CHUSE. See *To* Choose.

CHUSISTAN', or Kusistan, a province of Persia, bounded on the north by the Irak Agemi, on the east by Farsistan, on the south by the gulf of Persia, and on the west by the Tigris, which separates it from the Arabian Irak. The country is extensive, but thinly inhabited. It produces corn, rice, cotton, sugar, tobacco, and dates. The northern part is mountainous, but the southern flat and marshy. This country was called by the Greeks *Susiana*, from Susa, the capital.

CHUS'KA, a town of Asia, in the country of Thibet: twenty-five miles west-south-west of Tankia.

CHU'TA-NAGPOUR, a town of Hindoostan, in the country of Bahar: 150 miles south of Patna, and 190 west of Calcutta.

CHUTE, a river of England, which runs into the Avon, near Bath.

CHURWAL'DEN, a country of Swisserland, in the league of the Ten Jurisdictions, purchased of the house of Austria, in 1649. The catholic inhabitants yet use the old calendar.

CHUWA'SCH, a town of Persia, in the province of Segestan: seventy miles south-east of Zareng.

CHWAS'TOW, a town of Poland, in the palatinate of Kiov: forty miles south-south-west of Kiov.

CHYLA'CEOUS, *adj.* Belonging to chyle; consisting of chyle.—When the spirits of the chyle have half fermented the *chylaceous* mass, it has the state of drink not ripened by fermentation. *Floyer.*

CHYLE, *s.* [*chylus*, Lat. from χυω, to pour out.] The white juice formed in the stomach by digestion of the aliment, and afterwards changed into blood. See Anatomy, vol. i. p. 632.

This powerful ferment, mingling with the parts,
The leaven'd mass to milky *chyle* converts. *Blackmore.*

CHYLIFAC'TION, *s.* The act or process of making chyle in the body.—Drinking excessively during the time of *chylifaction*, stops perspiration. *Arbuthnot.*

CHYLIFAC'TIVE, *adj.* [from *chylus*, and *facio*, Lat. to make.] Having the power of making chyle.

CHYLOPOE'TIC, *adj.* [from χυλος, chyle, and ποιεω, to make.] Having the power, or the office, of forming chyle.—According to the force of the *chylopoetic* organs, more or less chyle may be extracted from the same food. *Arbuthnot.*

CHY'LOUS, *adj.* Consisting of chyle; partaking of chyle.—Milk is the *chylous* part of an animal, already prepared. *Arbuthnot.*

CHYME, *s.* [*chymus*, Lat. from χυω, Gr. to pour out, perhaps from כימוס *chimus*, Arab.] Humour. Any kind of juice or humour which is incrassated by concoction. Any morbid secretion of the fluids.

CHYME'RE, *s.* A kind of jacket; also a herald's coat of arms.

CHYMIA'TRIA, *s.* [χυμια, chemistry, and ιαομαι, to heal.] The art of curing diseases by the application of chemistry to the uses of medicine.

CHY'MISTRY. See Chemistry.

CHYMO'LOGI, *s.* An appellation among botanists, given to such as have employed their time in investigating the properties of plants from their taste and smell.

CHYTRACU'LIA. See Calyptranthes.

CHY'TRIUM, a place in Ionia, in which formerly stood Clazomene; the Clazomenians, through fear of the Persians, removing from the continent to an adjacent island. Alexander reduced the island, by a mole or causeway, to a peninsula.

CIACCO'NIUS (Petrus), a learned critic of Spain, born at Toledo in 1525, and died at Rome in 1581 He was

was employed with others, by pope Gregory XIII. in correcting the calendar. There are learned notes by him upon Arnobius, Tertullian, Cassian, Pompeius, Justus, Cæsar, Pliny, Terence, &c. He was the author likewise of some separate treatises; one particularly, de Triclinio Romano; which, with those of Fulvius Ursinus and Mercurialis upon the same subject, has been published at Amsterdam, in 1664, in 12mo, with figures to illustrate the descriptions.

CIACI'ÇA, a jurisdiction in South America, in Peru, subject to the archbishop of Plata, and ninety leagues distant from that city; abounding in cocoa, cattle, and some silver mines.

CIACO'NIUS, or CHACON (Alphonsus), of Baëça, in Andalusia, died at Rome in 1599, at the age of fifty-nine, with the title of patriarch of Alexandria. He wrote, 1. Vitæ & Gesta Romanorum Pontificum & Cardinalium, reprinted at Rome, 1676, 4 vols. fol. with a continuation. 2. Historia utriusque belli Dacici. 3. Bibliotheca Scriptorum ad Ann. 1583; published by Camusat, at Paris, 1731, and at Amsterdam, 1743, folio. 4. An Explication of Trajan's Pillar, 1576, folio, with plates.

CIAIS', a town of Mingrelia, near the Black Sea.

CI'ALIS, a country of Independent Tartary, with a capital of the same name; bounded on the north by Eluth, on the east by sandy deserts, on the south by Grand Thibet, and on the west by Turkestan.

CIAMPI'NI (John Justin), born at Rome, in 1633. He quitted the study of the civil law for the practice of the apostolical chancery. This, however, did not prevent him from applying to the sciences and polite literature. It was by his care and activity that the academy of ecclesiastical history was instituted at Rome in 1671. In 1677 he established, under the auspices of the famous Christina, an academy of mathematics and natural history, which, by the name of its patron, and the merit of its members, soon became known throughout Europe. This literary man died in 1698, aged sixty-five. His writings are, 1. Conjecturæ de perpetua azymorum usu in ecclesia Latini, quarto, 1688. 2. Vetera monumenta, in quibus præcipua musiva opera, sacrarum profanarumque ædium structura, dissertationibus iconibusque illustrantur 1690, 1699, 2 vols. folio. It is upon the origin of the most curious remains of the buildings of ancient Rome, with explanations and plates of those monuments. 3. De sacris ædificiis à Constantino Magno constructis, folio, 1693. 4. An Examination of the Lives of the Popes, said to be written by Anastasius the librarian.

CIA'NO, a town of Piedmont, in the Canavese: twelve miles south-east of Ivrea.

CI'BALÆ, or CIBALIS, in ancient geography, a town of Pannonia Inferior, on an eminence, near the lake Hiulka, to the north-west of Sirmium; the country of the emperor Gratian, where he was brought up to rope-making; a place rendered famous for the surprisal and defeat of Licinius by Constantine.

CIBA'O, a mountain, near the center of the island of St. Domingo, which abounds in mines of gold, silver, and copper.

CIBA'RIOUS, *adj.* [*cibarius*, Lat. from *cibus*, food.] Relating to food; useful for food; edible.

CIB'BER (Colley), a celebrated comedian, dramatic writer, and poet-laureat, born at London in 1671. His father, Caius Gabriel Cibber, was a native of Holstein, and a skilful statuary, who executed the basso relievo on the pedestal of the monument, and the two admired figures of lunatics over the piers of the gate to Bethlem-hospital, in London. Colley, who derived his Christian name from the surname of his mother's family, was intended for the church; but he preferred the stage, for which he conceived an early inclination.

To this player we are indebted for the reformation of the stage. The first comedy, acted since the restoration, in which were preferred purity of style and decency of manners, with a due respect to the honour of the marriage-bed, was Cibber's Love's last Shift, or the Fool in Fashion. The success of this piece exceeded the author's expectation; but, so little was expected from Cibber's genius, that the critics reproached him with stealing his play. Indeed in the progress of his authorship it was his fate to have his best comedies attributed to any body but himself: his Careless Husband was for a long time given to the duke of Argyle and other noblemen. Nothing could put an end to such ungenerous suggestions but his scenes of high life in the Provoked Husband, which he proved to be his own, by printing the unfinished manuscript of sir John Vanburgh's play, called a Journey to London. Some comic characters of this writer were severely treated by the audience, because supposed to be written by Cibber. Besides the honour of reforming the moral of the stage, Cibber was the first who introduced men and women of high quality on the stage, and gave them language and manners suited to their rank.

Cibber was determined to be an actor, though he had small pretensions, and little interest. He was a constant attendant upon Downs, the prompter of Drury-lane, in expectation of employment. For some years he remained without a salary, and was known only as a hanger-on by the name of Master Colley. The following incident gave rise to his becoming a hired actor. By good fortune, he was so far noticed by Downs as to be appointed to carry a message on the stage in some play to Betterton. Whatever was the cause, he was so terrified, that he quite disconcerted the scene. Betterton, when he came off, asked in some anger who had committed the blunder, and spoiled a scene. Downs replied, "Master Colley."—"Master Colley! then forfeit him."—"Why, sir," says the prompter, "he has no salary."—"No!" says the good old man; "then put him down ten shillings a-week, and forfeit him five." To this good-natured adjustment of reward and punishment, Cibber owed the first money he took in the treasurer's office. By degrees he came to excel in a variety of comic characters; but his perfection of acting was in the coxcomb of quality, especially his own Lord Foppington in the Careless Husband. He was as unsuccessful in acting tragedy as in writing it; yet he obstinately persisted in both.

When he became a manager, and was entrusted with the inspection of new plays, operas, &c. and of receiving applications from dramatic writers, Cibber's character does not appear to much advantage. To use his own expression, he was "fond of choking singing-birds;" for so he termed young writers. Complaints were continually circulated in the public prints of his pride and impertinence to authors who brought their plays for his perusal; but his callous temper rendered all attacks from the press ineffectual. His treatment of actors has been generally condemned as unfriendly, if not tyrannical. As a member of society, little can be said in his praise. Soon after he had sold his share in the patent for a very large sum, to Mr. Highmore, he endeavoured to render the purchase of no value to that gentleman, by applying to the duke of Grafton for a new patent in favour of his son Theophilus; but the duke saw the injustice of the act, and refused to gratify his old acquaintance. His love of gaming rendered him a neglectful father, and unkind to his family and relations; yet, though a gamester, he was never charged with being a cheat; he was on the contrary a dupe to his own passions, and probably to the fraudulent practices of others.

Cibber must have gained considerable sums by his works. Besides the money he raised by dedications, benefits, and the sale of his plays singly, his dramatic works in quarto, by subscription, in 1721, produced a large sum; and it is computed that he gained no less than 1500l. by the excellent Apology for his Life. George I. gave him 100l. for his dedication of the Nonjuror; and he was made poet-laureat in 1730, in consequence of his having written that play. Pope made Cibber the hero of his Dunciad, after his attack upon Three Weeks after Marriage, in which

which farce Pope had a share. Colley Cibber died in 1758, in the 85th year of his age. In person he was of the middle size; and, though strait, not well-shaped.

His son *Theophilus*, also a comic actor after him, was born during a great storm in 1703; and, after passing a life of extravagance, distress, and perplexity, perished in another storm in 1758, in the passage between Dublin and England. Theophilus married the sister of Thomas Augustine Arne, the famous musical composer, who became a celebrated tragic actress, and whose honour was sacrificed to her husband's extravagance.

CI'BOL, *s.* [*ciboule*, Fr.] A small sort of onion used in sallads. This word is common in the Scotch dialect, but the *l* is not pronounced.—*Ciboules*, or scallions, are a kind of degenerate onions. *Mortimer*.

CIBO'LA, or CIVOLA, the name of a town in, and also the ancient name of, New Granada, in Terra Firma, South America. The country here, though not mountainous, is very cool; and the Indians are said to be the whitest, wittiest, most sincere and orderly of all the aboriginal Americans. When the country was discovered, they had each but one wife, and were excessively jealous. They worshipped water, and an old woman that was a magician; and believed she lay hid under one of their lakes.

CIBO'RIUM, *s.* in ecclesiastical writers, the covering for the altar. This covering is supported by four high columns, and forms a kind of tent for the eucharist, in the Romish churches. Some authors call it *turris gestatoria*, and others *pyxis*; but the pyxis is properly the box in which the eucharist is preserved.

CIBU'LON, a town of Asia, in the country of Thibet: eight miles north-east of Zuenga.

CICACO'LE, a town of Hindoostan, in the circar to which it gives name: 150 miles north-east of Rajahmundry, and 308 east of Hydrabad. Lat. 18. 16. N. lon. 84. 8. E. Greenwich.

CICACO'LE, a circar of Hindoostan, on the north-west coast of the bay of Bengal: 150 miles in length, and from fifteen to thirty in breadth.

CICA'DA, *s.* in entomology, the FROG-HOPPER or FLEA-LOCUST, a genus of insects belonging to the order of hemiptera. The beak is inflected; the antennæ are setaceous; the four wings are membranaceous and deflected; and the feet, in most of the species, are of the jumping kind. The species at present known are two hundred and thirty-two. The larvæ of several of this genus evacuate great quantities of a frothy matter upon the branches and leaves of plants, in the midst of which they constantly reside, probably for shelter against the search of other animals, to which it would become a prey. Nature has afforded this kind of defence to insects whose naked and soft bodies might otherwise very easily be injured; perhaps also the moisture of this foam may serve to screen it from the sultry beams of the sun. On removing the foam, we discover the larva concealed underneath; but it does not long remain uncovered. It soon emits fresh foam, that hides it from the eye of observation. It is in the midst of this foamy substance the larva goes through its metamorphosis into a chrysalis and perfect insect. Other larvæ, whose bodies are not so soft, run over plants without any manner of defence, and escape from insects that may hurt them, by the nimbleness of their running, but especially of their leaping.

The chrysalids, and all the larvæ that produce them, differ little from each other, only that the former have the rudiments of wings, a kind of knob at the place where the wings will afterwards be in the perfect insect. As to other respects, the chrysalids walk, leap, and run over plants and trees; as do the larva and the frog-hopper which they are to produce. At length they throw off their teguments of chrysalids, slip their last slough, and then the insect appears in its utmost state of perfection. The male alone is then endowed with the faculty of singing, which it exercises not with its throat, but with an organ situated under the abdomen. Behind the legs of the male are observed two valvulæ, which raised up, discover several cavities, separated by various membranes. The middle contains a scaly triangle. Two vigorous muscles give motion to another membrane, which alternately becomes concave and convex. The air, agitated by this membrane, is modified within the other cavities; and by the help of this sonorous instrument, he amorously solicits his female. By pulling the muscles of a frog-hopper lately dead, it may be made to sing. This insect begins its song early in the morning, and continues it during the heat of the noontide sun. Its lively and animated music is, to the country people, a presage of a fine summer, a plentiful harvest, and the sure return of spring. The cicadæ have a head almost triangular, an oblong body, their wings fastigiated, or in form of a roof, and six legs, with which they walk and leap briskly. In the females, at the extremity of the abdomen, are two large laminæ, between which is inclosed, as in a sheath, a spine, or lamina, somewhat serrated, which serves them for the purpose of depositing their eggs, and probably to sink them into the substance of those plants which the young larvæ are destined to feed upon.

The frog-hopper, or flea-locust, is by no means an elegant insect; yet we have, in the preceding engraving, given several delineations of it, by which the English and the foreign species may be contrasted; they are as follow: Fig. 19. Cicada maculata; the head is black, the eyes brown, and projecting; between them are two small yellow spots: the thorax is black, with four orange-coloured spots in a row, and behind them two others: the abdomen is black, consisting of seven annuli or rings; the anus, in the female, is furnished with a seta or bristle, through which she discharges her eggs, and introduces them into whatever she considers a proper nidus. The wings in both sexes are black, reticulated, and spotted with yellow: it is a large species, and inhabits China and Syria. 20. Cicada stridula; the head is blunt, thick, and of a yellowish brown, with a black stripe down the middle; the abdomen is of a dark chocolate-colour; the wings are membranaceous, and of a light brown, with dark chocolate-coloured bands spotted with white, and terminated all round with a white border: found at the Cape of Good Hope. 21. Cicada lanata; the head is of a dull brown, with a moveable horn like a bristle, which the insect can raise at pleasure; the wings are reddish brown, and transparent, at the extremities; but from thence to the abdomen they are of a fine mazarine blue, spotted with white; the abdomen, corslet, and thorax, partake of the same blue colour: it is found in North America, and the West Indies. 22. Cicada cruenta; the head, the eyes, and thorax, are yellowish brown; the abdomen is black, and annulated; the superior wings are red, tipped with yellow; the inferior are dull brown; all the under-side of the insect is ash-colour: it inhabits Jamaica. The four following are natives of England: 23. Cicada cornuto, of a dark brown colour; on the thorax are two sharp horns, terminating in long spines on the sides: on the middle of the thorax rises a crest, which being elongated into a sinuous crooked horn, terminates in a sharp point: under this horn lies the escutcheon; the superior wings are dark and veined; the inferior are transparent, and much lighter: this dwells on the stems and leaves of fern and swallow-wort; leaps nimbly, and is not easy to catch. 24. Cicada spumaria, which is the most curious species found in this country. It is of a brown colour, often inclining to green; the head, thorax, and elytra, are finely dotted; on these last are seen two white spots, oblong and transverse, arising from the outer edge of the elytra, the one higher, the other lower, but not quite reaching to the inner edge, so that the bands by them formed across the elytra, or superior wings, are interrupted in the middle: the under parts are of a light brown. Before the insect has undergone its metamorphose, the larva from which it is to be produced dwells upon plants, but is not perceived, unless a person knows the

the ſpot it occupies. This is the ſpecies that emits from every part of its body foamy bubbles, which are productive of a froth reſembling ſpittle, and in which the larva covers itſelf, and prepares for its perfect or matured ſtate. 25. Cicada ſanguinolenta; of a gloſſy black both above and beneath. The elytra, or ſuperior wings, have each three large ſpots of a beautiful crimſon colour, viz. one at the baſe, cloſe to the eſcutcheon, which is ſemi-circular; another round one, ſituate lower down, near the outward edge, and a third placed at a ſmall diſtance from the extremity of the elytra, and forming a kind of half-moon, the points of which are turned to the upper part. The laſt ſpot coincides with its correſponding one on the other elytrum. Both the elytra are black at their extremities; and the inferior wings are duſky, tinged with a little red at their baſe. 26. Cicada viridis; of a deep green, but moſtly tranſparent: the thorax and eſcutcheon are green; the head is yellow, with two black dots ſtrongly marked upon the upper part, and a few ſmall ones on the ſides. There are likewiſe two black puncta diſcernible on the eſcutcheon.

CICATRI'CULA, *ſ.* [dim. of *cicatrix*.] A little ſpeck in the yolk of an egg, where the firſt changes in the formation of a chicken begin.

CI'CATRICE, or CICATRIX, *ſ.* [*cicatrix*, Lat.] The ſcar remaining after a wound.—One captain Spurio, with his *cicatrice*, an emblem of war, here on his ſiniſter cheek. *Shakeſpeare.*—A mark; an impreſſion; ſo uſed by Shakeſpeare leſs properly:

> Lean but upon a ruſh,
> The *cicatrice* and capable impreſſure
> Thy palm ſome moments keeps. *Shakeſpeare.*

CICATRI'SANT, *ſ.* [from *cicatrico*, to ſkin over.] Epulotic medicines, or ſuch as diſpoſe wounds and ulcers to dry up and heal, and to be covered with a ſkin.

CICATRI'SIVE, *adj.* Having the qualities proper to induce a cicatrice.

CICATRIZA'TION, *ſ.* The act of healing the wound.—A vein burſted, or corroded in the lungs, is looked upon to be for the moſt part incurable, becauſe of the motion and coughing of the lungs tearing the gap wider, and hindering the conglutination and *cicatrization* of the vein. *Harvey.*—The ſtate of being healed, or ſkinned over.—The firſt ſtage of healing, or the diſcharge of matter, is called digeſtion; the ſecond, or the filling up with fleſh, incarnation; and the laſt, or ſkinning over, *cicatrization*. *Sharp.*

To CI'CATRIZE, *v. a.* To apply ſuch medicines to wounds, or ulcers, as heal and ſkin them over. *Quincy.*—To heal and induce the ſkin over a ſore.—We incarned, and in a few days *cicatrized* it with a ſmooth cicatrix. *Wiſeman.*

CIC'CA, *ſ.* in botany, a genus of the claſs monoecia, order tetrandria. The generic characters are—I. Male flowers ſcattered. Calyx: perianthium four-leaved; leaflets roundiſh, concave. Corolla: none. Stamina: filaments four, ſetaceous; antheræ ſubglobular, the length of the calyx. II. Female flowers ſcattered on the ſame plant. Calyx: as in the males. Corolla: none. Piſtillum: germ roundiſh; ſtyles four two parted, ſubulate, the length of the germ; ſtigmas acute, permanent. Pericarpium: capſule ſubglobular, tetracoccous, elaſtic. Seeds: ſolitary. This genus bears an affinity to phyllanthus.—*Eſſential Character.* Male; calyx four-leaved. Female; calyx three-leaved; ſtyles four; capſule tetracoccous.

There is but one ſpecies, called cicca diſticha, and deſcribed in Linnæus's Supplement as a tree, with long ſimple branches; leaves alternate, diſtich; the lower rounded-ovate, ſmaller; the upper ovate-lanceolate, acuminate, entire, very ſmooth; flowers proceeding from the loweſt part of the branches, after the falling of the leaves, and occupying their places; aggregate in ſeſſile heads, male and female on the ſame tree, but on different branches. It ſeems, however, to be a true ſpecies of phyllanthus, except in the number of parts, and having a berry for the fruit; it remains a doubt, therefore, whether this genus of cicca ſhould remain.

Loureiro deſcribes his cicca racemoſa as a middle-ſized tree with aſcending branches, the leaves ovate ſubacuminate quite entire, ſmooth alternate petioled diſtich, the flowers in compound ſhort ſubterminating racemes, the males and females on different branches; neither have any calyx, the corolla is bell-ſhaped, four-parted, the ſegments ovate, ſpreading, red, dotted with white; filaments ſhorter than the corolla, antheræ two-celled; the fruit is a roundiſh berry, half an inch in diameter, pale, ſmooth, acid, eatable, containing four ovate-ſeeds. Loureiro obſerves, that what Linnæus calls the calyx is rather the corolla, on account of its colour and tenuity. It is frequent in the kingdom of Champava; and is cultivated, but rarely, in the metropolis of Cochinchina.

CI'CELEY, a proper name of women.

CI'CELY, *ſ.* in botany. See CHÆROPHYLLUM.

CI'CER, *ſ.* [of uncertain origin, unleſs it be from the Greek κικυς, ſtrength. The *Cicerones* had their name from this pulſe, as the Piſones had from the *piſum* or pea, and the Lentuli from the *lens* or lentil.] In botany, a genus of the claſs diadelphia, order decandria, natural order of papilionaceæ or leguminoſæ. The generic characters are—Calyx: perianthium five-parted, length of the corolla; ſegments four, incumbent on the banner; the two middle converging longitudinally; the lower under the keel. Corolla: papilionaceous; banner flat, roundiſh, larger, bent in on the ſides; wings obtuſe, half the length of the banner; keel ſhorter than the wings, ſharpiſh. Stamina: filaments diadelphous (one and nine) riſing; antheræ ſimple. Piſtillum: germ ovate; ſtyle ſimple, riſing; ſtigma obtuſe. Pericarpium: legume rhomboid, turgid, inflated. Seeds: two, roundiſh, gibbous, with knots on the ſides, crooked, and bent in at the top.—*Eſſential Character.* Calyx five-parted, length of the corolla; the four upper ſegments incumbent on the banner; legume rhombed, turgid, two-ſeeded.

There is but one ſpecies, the cicer arietinum, or chichpea: leaflets ſerrate. It is annual. Stem from a foot to eighteen inches in height, erect, leafy, branched. Native of the ſouth of Europe, the Levant, and Africa; where it is frequently eaten both raw and boiled. Cultivated 1551, at Kew, by William Turner, M. D. Gerarde ſays, it is ſown in our London gardens, but not common; and is named in Engliſh *common cich* or *ciches, red cich* or *ſheeps' ciche, peaſe* or *peaſon*. Parkinſon adds the names of *cicers* and *rammes ciches*.

Propagation and Culture. The ſeeds of this plant may be ſown in the ſpring, in the ſame manner as peaſe, making drills with a hoe, about an inch and a half deep, in which the ſeeds ſhould be ſown at about two inches aſunder, then with a rake draw the earth into the drill to cover the ſeeds. The drills ſhould be made at three feet diſtance from each other, that there may be room for their branches to ſpread, when the plants are fully grown, as alſo to hoe the ground between them, to keep it clean from weeds, which is all the culture theſe plants require. This plant flowers in June, and the ſeeds ripen in Auguſt; but, unleſs the ſeaſon proves warm and dry, the plants decay in this country before the ſeeds are ripe. See ASTRAGALUS, ERVUM, GALEGA, and ONONIS.

CI'CERA, *ſ.* in botany. See LATHYRUS.

CI'CERO (Marcus Tullius), the celebrated Roman orator, born at Arpinum in the year of Rome 647, about 107 years before the Chriſtian era. He was ſon of a Roman knight, and lineally deſcended from the ancient kings of the Sabines. His mother's name was Helvia. After diſplaying many abilities at ſchool, he was taught philoſophy by Philo, and law by Mutius Scævola. He acquired and perfected a taſte for military knowledge under Sylla, in the Marſian war, and retired from Rome, which was divided into factions, to indulge his philoſophic propenſities.

penfities. He was naturally of a weak and delicate conftitution, and he vifited Greece on account of his health; but, perhaps, the true caufe of his abfence from Rome might be attributed to his fear of Sylla. His friends, who were well acquainted with his fuperior abilities, were anxious for his return; and when at laft he obeyed their folicitations, he applied himfelf with uncommon diligence to oratory, and was foon diftinguifhed above all the fpeakers of his age in the Roman forum. When he went to Sicily as quæftor, he behaved with great juftice and moderation; and the Sicilians remembered with gratitude the eloquence of Cicero, their common patron, who had delivered them from the tyranny and avarice of Verres. After he had paffed through the offices of edile and prætor, he ftood a candidate for the confulfhip in the year of Rome 689; and the patricians and plebeians were equally anxious to raife him to that dignity, againft the efforts and bribery of Catiline. His new fituation was critical, and required circumfpection. Catiline, with many diffolute and defperate Romans, had confpired againft their country, and combined to murder Cicero himfelf. In this dilemma, Cicero, in full fenate, accufed Catiline of treafon againft the ftate; but, as his evidence was not fufficiently clear, his efforts were unavailing. He, however, ftood upon his guard, and, by the information of his friends, and the difcovery of Fulvia, his life was faved from the dagger of Marcius and Cethegus, whom Catiline had fent to affaffinate him. After this, Cicero commanded Catiline, in the fenate, to leave the city; and this defperate confpirator marched out in triumph to meet the 20,000 men who were affembled in readinefs to fupport his caufe. The lieutenant of C. Antony, the other conful, defeated them in Gaul; and Cicero, at Rome, punifhed the reft of the confpirators with death. This capital punifhment, though inveighed againft by Julius Cæfar as too fevere, was fupported by the opinion of Lutatius Catulus, and Cato, and confirmed by the whole fenate. After this memorable deliverance, Cicero received the thanks of all the people, and was ftyled *The father of his country, and a fecond founder of Rome*. The vehemence with which he had attacked Clodius, proved injurious to him; and, when his enemy was made tribune, Cicero was banifhed from Rome, though 20,000 young men were fupporters of his innocence. He was not, however, deferted in his banifhment. Wherever he went he was received with uncommon favour; and, when the faction had fubfided at Rome, all the fenate and people were unanimous for his return. After fixteen months abfence, he entered Rome with univerfal fatisfaction; and, when he was fent, with the power of proconful, to Cilicia, his integrity and prudence made him fuccefsful againft the enemy; and, at his return, he was honoured with a triumph, which the factions prevented him from celebrating in form. After much hefitation, during the civil commotions between Cæfar and Pompey, he joined himfelf to the latter, and followed him to Greece. When victory had declared in favour of Cæfar, at the battle of Pharfalia, Cicero went to Brundufium, and was reconciled to the conqueror, who treated him with great humanity. From this time Cicero retired into the country, and feldom vifited Rome. When Cæfar had been ftabbed in the fenate, Cicero recommended a general amnefty, and was the moft earneft to decree the provinces to Brutus and Caffius. But, when he faw the intereft of Cæfar's murderers decreafed, and Antony come into power, he retired to Athens. He foon after returned, but lived in perpetual fear of affaffination. Auguftus courted the approbation of Cicero, and expreffed his wifh to be his colleague in the confulfhip. But his wifh was not fincere; he foon rejected him; and, when the two confuls had been killed at Mutina, Auguftus joined his intereft to that of Antony, and the famous triumvirate was foon after formed. The great enmity which Cicero bore to Antony, was fatal to him; and Auguftus, Antony, and Lepidus, the triumvirs, to deftroy all caufe of quarrel, and each to difpatch his enemies, produced each their lift of profcription. About two hundred were doomed to death, and Cicero was among them, upon the lift of Antony. Auguftus yielded a man to whom he partly owed his greatnefs, and Cicero was purfued by the emiffaries of Antony, among whom was Popilius, whom he had defended upon an accufation of parricide. He had fled in a litter towards the fea of Caieta; and, when the affaffins came up to him, he put his head out of the litter, and it was fevered from the body by Herennius. This memorable event happened in December, 43 before Chrift, after the enjoyment of life for fixty-three years, eleven months, and five days. The head and right hand were carried to Rome, and hung up in the forum; and fo inveterate was Antony's hatred againft the unfortunate man, that even Fulvia, the triumvir's wife, wreaked her vengeance upon his head, and drew the tongue out of his mouth, and bored it through repeatedly with a gold bodkin, verifying, in this act of inhumanity, what Cicero had once obferved, that "no animal is more revengeful than a woman."

Cicero has acquired more real fame by his literary compofitions, than by his fpirited exertions as a Roman fenator. The learning and the abilities which he poffeffed, have been the admiration of every age and country, and his ftyle has always been accounted as the true ftandard of pure latinity. The words *nafcitur poeta* have been verified in his attempts to write poetry; and the fatire of Martial, *carmina quod fcribit mufis et Apolline nullo*, though fevere, is true. When he travelled into Afia, he was attended by moft of the learned men of his age; and his ftay at Rhodes, in the fchool of the famous Molo, conduced not a little to perfect his judgment. Like his countrymen, he was not deftitute of ambition; and the high expectations with which he returned from his quæftorfhip in Sicily, are well known. In his private character, however, Cicero was of an amiable difpofition; and the affability of his manners conciliated the good graces of all. He married Terentia, whom he afterwards divorced, and by whom he had a fon and daughter. He afterwards married a young woman, to whom he was guardian; and, becaufe fhe feemed elated at the death of his daughter Tullia, he repudiated her.

The works of this celebrated man, of which, according to fome, the tenth part is fcarcely extant, have been edited by the beft fcholars in every country. From his earlieft years, he applied himfelf with unremitting affiduity to the cultivation of literature; and, whilft yet a boy, he wrote a poem, called Glaucus Pontius, which was extant in Plutarch's time. Amongft his juvenile productions was a tranflation into Latin verfe, of Aratus on the Phænomena of the Heavens; of which many fragments are ftill extant. He alfo publifhed a poem of the heroic kind, in honour of his countryman C. Marius, who was born at Arpinum, the birth-place of Cicero. This production was greatly admired by Atticus; and old Scævola was fo much pleafed with it, that, in an epigram written on the fubject, he declares that it would live as long as the Roman name and learning fubfifted. From a little fpecimen which remains of it, defcribing a memorable omen given to Marius from an oak of Arpinum, there is reafon to believe that his poetical genius was fcarcely inferior to his oratorial, had it been cultivated with equal induftry. He publifhed another poem called Limon, of which Donatus has preferved four lines in the Life of Terence, in praife of the elegance and purity of that poet's ftyle. He compofed, in the Greek language, and in the ftyle and manner of Ifocrates, a Commentary, or Memoirs of the Tranfactions of his Confulfhip. This he fent to Atticus, with a defire, if he approved it, to publifh it in Athens and the cities of Greece. He fent a copy of it likewife to Pofidonius of Rhodes, and requefted of him to undertake the fame fubject in a more elegant and mafterly manner. But the latter returned for anfwer, that, inftead of being encouraged to write by the perufal of his tract, he was quite deterred from attempting it. Upon the plan of thofe memoirs, he afterwards compofed a Latin poem in three books,

books, in which he carried down the hiſtory to the end of his exile, but did not publiſh it for ſeveral years from motives of delicacy. The three books were ſeverally inſcribed to three of the Muſes; but of this work there now remains only a few fragments, ſcattered in different parts of his other writings. He publiſhed, about the ſame time, a collection of the principal ſpeeches which he had made in his conſulſhip, under the title of his Conſular Orations. They conſiſted originally of twelve; but four are entirely loſt, and ſome of the reſt are imperfect. He now publiſhed alſo in Latin verſe a tranſlation of the Prognoſtics of Aratus, of which work no more than two or three ſmall fragments remain. A few years after, he put the laſt hand to his Dialogues upon the Character and Idea of the perfect Orator. This admirable work remains entire, a monument both of the aſtoniſhing induſtry and tranſcendent abilities of its author. At his Cuman villa, he next began a Treatiſe on Politics, or on the beſt State of a City, and the Duties of a Citizen. He calls it a great and laborious work, yet worthy of his pains, if he could ſucceed in it. This likewiſe was written in the form of a dialogue, in which the Speakers were Scipio, Lælius, Philus, Manilius, and other great perſons in the former times of the republic. It was compriſed in ſix books, and ſurvived him for ſeveral ages, though now unfortunately loſt. From the fragments which remain, it appears to have been a maſterly production, in which all the important queſtions in politics and morality were diſcuſſed with elegance and accuracy.

Amidſt all the anxiety for the intereſts of the republic, which occupied the thoughts of this celebrated perſonage, he yet found leiſure to write ſeveral philoſophical tracts, which ſtill ſubſiſt to the gratification of the literary world. He compoſed a treatiſe on the Nature of the Gods, in three books, containing a comprehenſive view of religion, faith, oaths, ceremonies, &c. In elucidating this important ſubject, he not only delivers the opinions of all the philoſophers who had written any thing concerning it, but weighs and compares attentively all the arguments with each other; forming upon the whole ſuch a rational and perfect ſyſtem of natural religion, as never before was preſented to the conſideration of mankind. He now likewiſe compoſed, in two books, a Diſcourſe on Divination, in which he diſcuſſes at large all the arguments that may be advanced for and againſt the actual exiſtence of ſuch a ſpecies of knowledge. Like the preceding works, it is written in the form of dialogue, and called Cato from the principal ſpeaker. The ſame period gave birth to his treatiſe on Old Age, called Cato Major; and to that on Friendſhip, written alſo in dialogue, and in which the chief ſpeaker is Lælius. This book, conſidered merely as an eſſay, is one of the moſt entertaining productions of ancient times; but, beheld as a picture drawn from life, exhibiting the real characters and ſentiments of men of the firſt diſtinction for virtue and wiſdom in the Roman republic, it becomes doubly intereſting to every reader of obſervation and taſte. Cicero now alſo wrote his Diſcourſe on Fate, which was the ſubject of a converſation with Hirtius, in his villa near Puteoli; and he executed about the ſame time a tranſlation of Plato's celebrated dialogue, called Timæus, on the nature and origin of the univerſe. He was employing himſelf alſo on a hiſtory of his own times, or rather of his own conduct; full of free and ſevere reflections on thoſe who had abuſed their power to the oppreſſion of the republic. Dion Caſſius ſays, that he delivered this book ſealed up to his ſon, with ſtrict orders not to read or publiſh it till after his death; but from this time he never ſaw his ſon, and it is probable that he left the work unfiniſhed. Afterwards, however, ſome copies of it were circulated; from which his commentator Aſconius has quoted ſeveral particulars. During a voyage which he undertook to Sicily, he wrote his treatiſe on Topics, or the art of finding Arguments on any Queſtion. This was an abſtract from Ariſtotle's treatiſe on the ſame ſubject; and though he had neither Ariſtotle, nor any other book to aſſiſt him, he drew it up from his memory, and finiſhed it as he failed along the coaſt of Calabria. The laſt work compoſed by Cicero appears to have been his Offices, written for the uſe of his ſon, to whom it is addreſſed. This treatiſe contains a ſyſtem of moral conduct, founded upon the nobleſt principles of human action, and recommended by arguments drawn from the pureſt ſources of philoſophy.

Such are the literary productions of this extraordinary man, whoſe comprehenſive underſtanding enabled him to conduct with ſuperior ability the moſt abſtruſe diſquiſitions into moral and metaphyſical ſcience. Born in an age poſterior to Socrates and Plato, he could not anticipate the principles inculcated by thoſe divine philoſophers, but he is juſtly entitled to the praiſe, not only of having proſecuted with unerring judgment the ſteps which they trod before him, but of carrying his reſearches to greater extent into the moſt difficult regions of philoſophy. This, too, he had the merit to perform, neither in the ſtation of a private citizen, nor in the leiſure of academic retirement, but in the buſtle of public life, amidſt the almoſt conſtant exertions of the bar, the employment of the magiſtrate, the duties of the ſenator, and the inceſſant cares of the ſtateſman; through a period likewiſe chequered with domeſtic afflictions, and fatal commotions in the republic. As a philoſopher, his mind appears to have been clear, capacious, penetrating, and inſatiable of knowledge. As a writer, he was endowed with every talent that could captivate either the judgment or taſte. His reſearches were continually employed on ſubjects of the greateſt utility to mankind, and thoſe often ſuch as extended beyond the narrow bounds of temporal exiſtence. The being of a God, the immortality of the ſoul, a future ſtate of rewards and puniſhments, and the eternal diſtinction of good and ill; theſe were in general the great objects of his philoſophical enquiries, and he has placed them in a more convincing point of view than they ever were before exhibited to the pagan world. The variety and force of the arguments which he advances, the ſplendour of his diction, and the zeal with which he endeavours to excite the love and admiration of virtue; all conſpire to place his character, as a philoſophical writer, including likewiſe his incomparable eloquence, on the ſummit of human celebrity.

The form of dialogue, ſo much uſed by Cicero, he doubtleſs adopted in imitation of Plato, who probably took the hint of it from the colloquial method of inſtruction practiſed by Socrates. In the early ſtage of philoſophical enquiry, this mode of compoſition was well adapted, if not to the diſcovery, at leaſt to the confirmation of moral truth; eſpecially as the practice was then not uncommon, for ſpeculative men to converſe together on important ſubjects, for mutual information. In treating of any ſubject reſpecting which the different ſects of philoſophers differed from each other in point of ſentiment, no kind of compoſition could be more happily ſuited than dialogue, as it gave alternately full ſcope to the arguments of the various diſputants. It required, however, that the writer ſhould exert his underſtanding with equal impartiality and acuteneſs on the different ſides of the queſtion; as otherwiſe he might betray a cauſe under the appearance of defending it. In all the dialogues of Cicero, he manages the arguments of the ſeveral diſputants, in a manner not only the moſt fair and intereſting, but alſo ſuch as leads to the moſt probable and rational concluſion.

After enumerating the various tracts compoſed and publiſhed by Cicero, we have now to mention his Letters, which, though not written for publication, deſerve to be ranked among the moſt intereſting remains of Roman literature. The number of ſuch as are addreſſed to different correſpondents is conſiderable; but thoſe to Atticus alone, his confidential friend, amount to upwards of four hundred, among which are many of great length. They are all written in the genuine ſpirit of the moſt

approved

approved epistolary composition; uniting familiarity with elevation, and ease with elegance. They display in a beautiful light the author's character in the social relations of life; as a warm friend, a zealous patron, a tender husband, an affectionate brother, an indulgent father, and a kind master. Beholding them in a more extensive view, they exhibit an ardent love of liberty and the constitution of his country; they discover a mind strongly actuated with the principles of virtue and reason; and, while they abound in sentiments the most judicious and philosophical, they are occasionally blended with the charms of wit, and agreeable effusions of pleasantry. What is likewise no small addition to their merit, they contain much interesting description of private life, with a variety of information relative to public transactions and characters of that age. It appears from Cicero's correspondence, that there was at that time such a number of illustrious Romans, as never before existed in any one period of the republic. If ever, therefore, the authority of men the most respectable for virtue, rank, and abilities, could have availed to overawe the first attempts at a violation of public liberty, it must have been at this period; for the dignity of the Roman senate was now in the zenith of its splendour.

Cicero has been accused of excessive vanity, and of arrogating to himself an invidious superiority from his extraordinary talents; but whoever peruses his letters to Atticus, must readily acknowledge that this imputation appears to be destitute of truth. In those excellent productions, though he adduces the strongest arguments for and against any object of consideration, that the most penetrating understanding can suggest, weighs them with each other, and draws from them the most rational conclusions, he yet discovers such a diffidence in his own opinion, that he resigns himself implicitly to the judgment and direction of his friend; a modesty not very compatible with the disposition of the arrogant, who are commonly tenacious of their own opinion, particularly in what relates to any decision of the understanding. It is difficult to say, whether Cicero appears in his letters more great or amiable; but that he was regarded by his contemporaries in both these lights, and that too in the highest degree, is sufficiently evident. We may thence infer, that the great poets in the subsequent age must have done violence to their own liberality and discernment, when, in compliment to Augustus, whose sensibility would have been wounded by the praises of Cicero, and even by the mention of his name, they have so industriously avoided the subject, as not to afford the most distant intimation that this immortal orator and philosopher had ever existed. Livy, however, there is reason to think, did some justice to his memory; but it was not until the race of the Cæsars had become extinct, that he received the free and unanimous applause of impartial posterity. Such was the admiration which Quintilian entertained of his writings, that he considered the circumstance of being delighted with them, as an indubitable proof of judgment and taste in literature. *Ille se profecisse sciat, cui Cicero valde placebit.*

The most valuable editions of the works of Cicero, which now remain, are as follow: that of Verburgius, 2 vols. fol. Amst. 1724; that of Olivet, 9 vols. 4to. Geneva, 1758; the Oxford edition in 10 vols. 4to. 1782; and that of Lallemand, 12mo. 14 vols. Paris apud Barbou, 1768.

Marcus, the son of Cicero, was taken by Augustus as his colleague in the consulship. He revenged his father's death, by throwing public dishonour on the memory of Antony. He disgraced his father's virtues, and was so fond of drinking, that Pliny observes, he wished to deprive Antony of the honour of being the greatest drunkard in the Roman empire. *Quintus*, the brother of the orator, was Cæsar's lieutenant in Gaul, and proconsul of Asia, for three years. He was proscribed with his son at the same time as his brother Tully.

CI'CERO, a military township of the American States, in New York district, on the south-west side of Oneida lake, and between it the Salt lake, and the Salt springs.

CICHORA'CEOUS, *adj.* [from *cichorium*, Lat.] Having the qualities of succory.—Diuretics evacuate the salt serum; as all acid diuretics, and the testaceous and bitter *cichoraceous* plants. *Floyer.*

CICHO'RIUM, *s.* [originally, according to Pliny, an Egyptian name, and adopted by the Greeks. It is written sometimes κιχορεια, sometimes κιχεριον or κιχωριον. It is supposed to have this name, παρα το δια των χωριων κιειν, from its creeping through the fields. Others derive it from κιχειν, *invenio*, on account of its being so readily found, or so common.] SUCCORY; in botany, a genus of the class syngenesia, order polygamia æqualis, natural order compositæ semiflosculosæ. The generic characters are—Calyx: common calycled cylindric; scales eight, narrow-lanceolate, equal, forming a cylinder; and five others incumbent and shorter. Corolla: compound flat, uniform; corollules hermaphrodite twenty, in a ring; proper monopetalous, ligulate, truncate, deeply five-toothed. Stamina: filaments five, capillary, very short; anther cylindric-pentagon, tubulous. Pistillum: germ oblong; style filiform, the length of the stamens; stigmas two revolute. Pericarpium: none; calyx cylindric, converging at top. Seeds: solitary, compressed, with sharp angles; pappus obscurely hairy, slightly five-toothed. Receptaculum: somewhat chaffy.—*Essential Character.* Calyx calycled: pappus slightly five-toothed, obscurely hairy; receptaculum somewhat chaffy.

Species. 1. Cichorium intybus, or garden and wild succory: flowers twin sessile, leaves runcinate. Root perennial, yellow on the outside, tapering, branched, the thickness of the finger, from a span to a foot in length, milky; stem from one to three feet in height, upright, rigid, crooked, angular, roughish to the touch, and generally very much branched; leaves radical, numerous, roughish; those of the stem smoother, alternate, half-stem-clasping, lanceolate, toothed towards the base, fringed with bristly hairs terminating in globules, the teeth and ends finishing in a sharp stiff awn; flowers generally in pairs, sessile, in the bosom of the upper leaves; seeds irregularly five-cornered, obovate, flatted a little, obscurely striated, smooth, straw-coloured. The fine blue colour of the florets is convertible into a brilliant red by the acid of ants. The flowers open at eight, and close at four. Common on the borders of corn-fields, flowering from July to September, and increasing itself much by seed. This plant has generally been regarded in the light of a noxious weed; it has, however, for several years past been cultivated in France as food for cattle. Monsieur Cretté is said to have been the first who introduced it there, at least to any extent, for field culture; and he published a memoir on the subject. For its introduction into England for the same purpose we are indebted to Arthur Young, esquire, who first brought the seed from France in the year 1788, and has since cultivated it to a considerable extent with great success. In Lombardy it is sown mixed with other herbs of pasture, and cut three or four feet high. It is reputed there to increase both the milk and flesh of cattle, and to be very nutritious when made into hay. Horses eat it greedily; and it is an important object for summer-soiling both them and cattle. It is also freely eaten by sheep.

Succory, or *chicory*, as the agriculturists affect to call it from the French name *chicorée*, defies drought, being of early growth, and the first large and spreading leaves covering the ground so as to retain the moisture. The stalks are so thick and stiff as to support themselves against winds and the heaviest rains. The most severe cold does not injure it. The quickness of growth renders it very valuable, because it furnishes abundance of salutary fodder at a season when green food is scarce. It has been found to grow seven inches in three weeks, whilst saintfoin and burnet grew only four inches. Two cuttings may be made of it the first year, and three or four according to the

the ſeaſon every year after, in April, June, Auguſt, and October, or in May, July, and October, never letting it ſtand till it becomes hard and ſticky; or it may be cut continually, by beginning again when the whole piece is gone over, and thus yield a conſtant ſupply of freſh food during ſeven or eight months. The produce is ſaid to be ſuperior upon the whole to that of lucerne in the proportion of three to one. A piece of ground ſown with ſuccory was found to yield by the acre the year of ſowing at two cuttings, July the 24th, and October the 17th, nineteen tons four hundred weight; the ſecond year, at three cuttings, May 21ſt, July 24th, and December 3d, thirty-eight tons nine hundred weight; and the whole average produce of four years was near thirty tons. The quantity of ſeed produced on an acre has been, the firſt year, 200 and a half, the ſecond 200 weight, and the third, from 300 and an half to 400 and an half. Upon the whole, allowing for the partiality with which novelties are commonly viewed, as far as our preſent experience has extended, ſuccory ſeems to be a valuable object of culture, as freſh feed for horſes, kine, and ſheep. The leaves blanched are eaten early in the ſpring in ſalads; and the roots, gathered before the ſtem ſhoots up, are eatable, and when dried may be made into bread. Dried and pulverized, they are uſed in Germany to mix with coffee, one part of ſuccory roots to two parts of coffee, which it is ſaid to increaſe in ſtrength, taſte, and ſalubrity. Succory is a uſeful detergent, aperient, and attenuating medicine; acting without much irritation, tending rather to cool than heat the body, and at the ſame time corroborating the tone of the inteſtines. The juice taken in large quantities, ſo as to keep up a diarrhœa, and continued for ſome weeks, has been found to produce excellent effects in ſcorbutic and other chronical diſorders.

2. Cichorium endivia, or broad-leaved ſuccory: flowers ſolitary, peduncled; leaves entire, crenate. Stem herbaceous, annual, two feet high, upright, round, thick, branched; root-leaves many, large, ſubcuneiform, ſinuate-toothed, ſmooth on both ſides; the uppermoſt lanceolate, ſmall; flowers pale blue, ſolitary, peduncled. This differs from the firſt ſort in its duration, being at moſt biennial; and, if the ſeeds be ſown in the ſpring, the plants will flower and produce ſeeds the ſame year, and periſh in the autumn; the leaves alſo are broader, rounder at the top, and not laciniated on the ſides; the branches are more horizontal, and the ſtalks never riſe ſo high. Native of China and Japan: cultivated 1562.

3. Cichorium ſpinoſum, or prickly ſuccory: ſtem dichotomous, ſpiny; flowers axillary, ſeſſile. The third ſort grows naturally on the ſea-coaſts in Sicily, and the iſlands of the Archipelago. This ſends out from the root many long leaves, which are indented on their edges, ſpreading flat on the ground; from between theſe ariſe the ſtalks, which have very few leaves, and thoſe ſmall and entire; the ſtalks are divided in forks upward, from between theſe come out the flowers, which are of a pale blue, and are ſucceeded by ſeeds ſhaped like thoſe of the common ſort; the ends of the ſmaller branches are terminated by ſtar-like ſpines, which are very ſharp. The plant is biennial with us in England, and in cold winters is frequently killed. It flowers and ſeeds about the ſame time with the firſt ſort, and may be treated in the ſame way as the endive. It was cultivated here in 1633.

Propagation and Culture. The common ſuccory, or rather a highly-improved variety of it (for in its ordinary wild ſtate it is dry, hard, and juiceleſs), is now introduced into field culture to great advantage. The proper quantity of ſeed to be ſown on an acre, either alone or with ſpring corn, is twelve pounds; but, if it be ſown with various other ſeeds, the quantity of ſuccory or chicory ſeed muſt be leſs, in proportion to the quantity of ſuch ſeeds. When ſown with barley or oats, with either of which it ſucceeds very well; it muſt be ſown of courſe at the uſual time of ſowing theſe grains; but alone it may ſafely be put into the ground at any time from March to September. It ſhould not be mixed with clover, unleſs the latter is expected to fail. Chicory does not ſtool, tiller, or thicken, on the ground. It flouriſhes beſt where it has moſt room and air; it ſhould ſeem, therefore, that the drill huſbandry would be moſt ſuitable to it. Thus cultivated, after the firſt year, it may be mown four times a-year. If ſown for ſeed only, it ſhould be drilled alone, or at leaſt drilled acroſs corn before it is up; but it is better ſown by itſelf.

The plain broad-leaved endive is not much cultivated in the Engliſh gardens; for the curled endive being more tender, and not ſo bitter, is generally preferred to it: but it is ſtill cultivated in Italy. The curled endive is now much cultivated in the Engliſh gardens, being one of the principal ingredients in autumn and winter ſalads. The firſt ſeaſon for ſowing the ſeeds is in May, for thoſe which are ſown earlier generally run up to ſeed before they have arrived to a proper ſize for blanching; and it frequently happens that the ſeeds ſown in May, in the rich ground near London, will run to ſeed the ſame autumn; but, in ſituations which are colder, they are not ſo apt to run up; therefore there ſhould be ſome ſeeds ſown about the middle or end of the month. The next ſowing ſhould be about the middle of June; and the laſt in the middle of July. From theſe three crops there will be a ſupply for the table during the whole ſeaſon; for there will be plants of each ſowing, very different in their growth, ſo that there will be three different crops from the ſame beds. When the plants come up they muſt be kept clean from weeds, and in dry weather duly watered, to keep them growing till they are fit to tranſplant, when there ſhould be an open ſpot of rich ground prepared to receive the plants, in ſize proportionable to the quantity intended. When the ground is well dug and levelled, if it ſhould be very dry, it muſt be well watered to prepare it to receive the plants; then the plants ſhould be drawn up from the ſeed-bed carefully, ſo as not to break their roots, drawing out all the largeſt plants, leaving the ſmall ones to get more ſtrength; which, when they have room to grow, by taking away the large ones, they will ſoon do. As the plants are drawn up, they ſhould be placed with their roots even, all the ſame way, and every handful, as they are drawn, ſhould have the tops of their leaves ſhortened, to make them of equal length; this will render the planting of them much eaſier, than when the plants are promiſcuouſly mixed, heads and tails; then the ground ſhould be marked out in rows at one foot aſunder, and the plants ſet at ten inches diſtance in the rows, cloſing the earth well to their roots, and let them be well watered; and repeat this every other evening, till the plants have taken good root, after which they muſt be kept clean from weeds. When the plants of the ſeed-bed have been thus thinned, they ſhould be well cleaned from weeds and watered, which will encourage the growth of the remaining plants, ſo that in ten days or a fortnight after, there may be another thinning made of the plants, which ſhould be tranſplanted in the ſame manner: and, at about the ſame diſtance of time, the third and laſt drawing of plants may be tranſplanted.

Thoſe plants which were the firſt tranſplanted, will be fit to blanch by the latter end of July at fartheſt; and, if they are properly managed, in three weeks or a month they will be ſufficiently blanched for uſe, which will be as ſoon as theſe ſalads are commonly required; for, during the continuance of good cos lettuce, few perſons care for endive in their ſalads; nor, indeed, is it ſo proper for warm weather. If any of the plants ſhould put out flower-ſtems, they ſhould be immediately pulled up and carried away, being good for nothing. As the quantity of roots neceſſary for the ſupply of a middling family is not very great, there ſhould not be too many plants tied up to blanch at the ſame time, therefore the largeſt ſhould be firſt tied, and in a week after thoſe of the next ſize; ſo that there may be three different times of blanching the plants on the ſame ſpot of ground. But, as in ſome large families

families there is a great consumption of this herb for soups, the quantity of plants should be proportionably greater at each time of planting and blanching.

Blanching Endive. In order to this you should provide a parcel of small osier twigs (or bass mat) to tie up some of the largest heads, which should be done in a dry afternoon, when there is neither dew nor rain to moisten the leaves in the middle of the plants, which would occasion their rotting soon after their being tied up. The manner of doing it is as follows: You must first gather up all the inner leaves of the plant in a regular order, into one hand, and then take up those on the outside that are found, pulling off and throwing away all the rotten and decayed leaves which lie next the ground, observing to place the outside leaves all round the middle ones, as near as possible to the natural order of their growth, so as not to cross each other; then, having got the whole plant close up in your hand, tie it up with the twig, bass, &c. at about two inches below the top, very close; and about a week after go over the plants again, and give them another tie about the middle of the plant, to prevent the heart leaves from bursting out on one side; which they are subject to do, as the plants grow, if not prevented this way. In doing this, you need only tie up the largest plants first, and so go over the piece once a-week, as the plants increase in their growth; by which means you will continue the crop longer, than if they were all tied up at one time; for when they are quite blanched, which will be in three weeks or a month after tying, they will not hold found and good above ten days or a fortnight, especially if the season proves wet; therefore it is advisable to sow at three or four different seasons, that you may have a supply as long as the weather will permit. But, in order to this, you must transplant all the plants of the last sowing under warm walls, pales, or hedges, to screen the plants from frost; and, if the winter should prove very sharp, you should cover them with some pease haulm, or such other light covering, which should be constantly taken off in mild weather; these borders should also be as dry as possible, for these plants are very subject to rot, if planted in a moist soil in winter.

Although we directed the tying up of the plants to blanch them, yet this is only to be understood for the two first sowings; for, after October, when the nights begin to be frosty, those plants which are so far above ground will be liable to be much prejudiced thereby, especially if they are not covered in frosty weather; therefore the best method is, to take up your plants of the latter sowings in a very dry day, and with a large flat-pointed dibble, plant them into the sides of trenches of earth, which should be laid very upright, planting them sideways, on the south side of the trenches, towards the sun, with the tops of the plants only out of the ground; so that the hasty rains may run off, and the plants be kept dry, and secured from frosts.

The plants thus planted, will be blanched fit for use in about a month or five weeks time, after which they will not keep good more than three weeks, before they will decay; you should therefore continue planting some fresh ones into trenches every fortnight or three weeks, that you may have a supply for the table; and those which were last transplanted out of the seed beds, should be preserved till February, before they are planted to blanch; so that from this you may be supplied until the beginning of April, or later: for at this last planting into the trenches, it will keep longer than in winter, the days growing longer; and the sun, advancing with more strength, dries up the moisture much sooner than in winter, which will prevent the rotting of these plants; but, if the weather should prove frosty, these latter plantations of endive should be covered with mats and straw to preserve them, otherwise the frost will destroy them, but the coverings must always be taken off when the weather is favourable. When your endive is blanched enough for use, dig it up with a spade; and, after having cleared it from the outside green and decayed leaves, wash it well in two or three different waters to clear it the better from slugs, and other vermin, which commonly shelter themselves amongst the leaves.

But, in order to have a supply of good seeds for the next season, you must look over those borders where the last crop was transplanted, before you put them into the trenches to blanch; and make choice of some of the largest, soundest, and most curled, plants, in number according to the quantity of seeds required: for a small family, a dozen of good plants will produce seeds enough; and for a large, two dozen or thirty plants. These should be taken up and transplanted under a hedge or pale, at about eighteen inches distance, in one row about ten inches from the hedge, &c. This work should be done in the beginning of March, if the season is mild, otherwise it may be deferred a fortnight longer. When the flower-stems begin to advance, they should be supported with a packthread, which should be fastened to nails driven into the pale, or to the stakes of the hedge, and run along before the stems, to draw them upright close to the hedge or pale, otherwise they will be liable to break with the strong winds. Observe also to keep them clear from weeds, and about the beginning of July the seeds will begin to ripen; as soon as you find the seeds are quite ripe, cut off the stalks, and expose them to the sun upon a coarse cloth to dry; and then beat out the seeds, which must be dried, and put up in bags of paper, and preserved for use in some dry place.

CICIN'DELA, the SPARKLER *s.* in entomology, a genus of insects belonging to the order of coleoptera. The antennæ are setaceous; the jaws are prominent, and furnished with teeth; the eyes are a little prominent; and the breast is roundish and marginated. There are forty-nine species at present known. The campestris, or field sparkler, is one of the most beautiful. The upper part of its body is of a fine green colour, rough, and rather bluish. The under side, as also the legs and antennæ, are of shot colour, gold and red, of a copperish cast. The eyes are very prominent, and give the head a broad appearance. The thorax is angular, and narrower than the head; which constitutes the character of the cicindela. It is rough, and of a green colour tinged with gold, as well as the head. The elytra are delicately and irregularly dotted. Each of them has six white spots, viz. one on the top of the elytrum, at its outward angle: three more along the outward edge, of which the middlemost forms a kind of lunula: a fifth on the middle of the elytra, opposite the lunula; and that one is broader, and tolerably round: lastly, a sixth at the extremity of the elytra. There is also sometimes seen a black spot on the middle of each elytrum, opposite to the second white spot. The upper lip is also white, as is the upper side of the jaws, which are very prominent and sharp. This insect runs with great swiftness, and flies easily. It is found in dry sandy places, especially in the beginning of spring. In the same places its larva is met with, which resembles a long, soft, whitish worm, armed with six legs, and a brown scaly head. It makes a perpendicular round hole in the ground, and keeps its head at the entrance of the hole to catch the insects that fall into it; a spot of ground is sometimes entirely perforated in this manner. The insects belonging to this genus are in general very beautiful, and merit the attention of the curious in their microscopic observations; some are minute, though not inferior in splendor, therefore best suited for that amusement. Living objects are ever preferable to dead ones. The larvæ of all this genus live under ground; and are, as well as the perfect insects, tigers in their nature, attacking and destroying all they can overcome.

Fig. 27, in the preceeding engraving, represents the cicindela campestris, above described. 28 Cicindela riparia, wholly of a chesnut brown. 29. Cicindela flavipes, a very small species, of a yellowish brown. 30. Cicindela aquatica, likewise very small, and almost black, found in moist and watery places.

CICISBE'O, *s.* [Ital.] An attendant upon, or dangler after,

after, married women. It is said to be originally from the Hebrew, *scbus chis beiim*, "a companion of the bride," or what we call brideman: among the Jews, the character and practice continued only during the fews days of the marriage ceremony. In Italy it is an old and prevailing fashion, said to be derived from the ages of chivalry and gallantry. Mr. Baretti speaks of it as a very reproachful and indecent practice, leading perpetually to the dishonour of the marriage bed: but this imputation is perhaps without sufficient ground. We learn from the "Letters on France," written by a lady, and published in 1797, by J. Gifford, esquire, that a set of females in that intriguing country had acquired a similar title and designation: the passage is as follows: "I have been reading lord Orrery's definition of the male Cicisbeo, and it reminds me that I have not yet noticed to you a very important class of females in France, who may not improperly be denominated female Cicisbeos. Under the old system, when the rank of a woman of fashion had enabled her to preserve a degree of reputation and influence in spite of the gallantries of her youth and the decline of her charms, she adopted the equivocal character I here allude to, and, relinquishing the adoration claimed by beauty, and the respect due to age, charitably devoted herself to the instruction and advancement of some young man of personal qualifications and uncertain fortune. She presented him to the world, panegyrised him into fashion, and insured his consequence with one set of females, by hinting his successes with another. By her exertions he was promoted in the army or distinguished at the levee, and a career begun under such auspices often terminated in a brilliant establishment. In the less elevated circle, a female Cicisbeo is usually of a certain age, of an active disposition, and great volubility, and her functions are more numerous and less dignified. Here the grand objects are not to besiege ministers, nor give a *ton* to the *protégé* at a fashionable *ruelle*, but to obtain for him the solid advantages of what she calls "*un bon parti*." To this end she frequents the houses of widows and heiresses, vaunts the docility of his temper, and the greatness of his expectations, enlarges on the solitude of widowhood, or the dependence and insignificance of a spinster; and these prefatory encomiums usually end in the concerted introduction of the Platonic "*ami*."

CI'CLA, *s.* in botany. See Beta.

CI'CLUT, a fortress of Dalmatia, situated in an island formed by the river Narenta, taken from the Turks by the Venetians, in 1694: five miles south-west of Narenta, and forty north of Ragusa.

CICO'GNA (Pasquali), doge of Venice from 1585 to 1595. After his death he was counted a saint, and an altar was erected to his memory in the church of the Jesuits at Venice. His sanctity was founded on the following supposed miracle: it is said, that, being one day hearing mass, the host or consecrated wafer quitted the hand of the priest, and lighted on the hand of Cicogna; in memory of which there is inscribed on one side of his tomb, *Velut alter Simeon, manibus Christum excepit*, "Like another Simeon, he received Christ in his arms." During the government of this prince, the state enjoyed a profound peace; and he ornamented the city with many noble edifices, particularly that stupendous and magnificent bridge called the Rialto, which was begun in 1587 and finished in 1591.

CI'COLI, a town of Italy, in the kingdom of Naples, and province Abruzzo Ultra: thirteen miles south-west of Celano.

CICO'NES, a people of Thrace near the Hebrus. Ulysses at his return from Troy conquered them, and plundered their chief city Ismarus. They tore to pieces Orpheus for his obscene indulgencies. *Mela.*

To CI'CURATE, *v. a.* [*cicuro*, Lat.] To tame; to reclaim from wildness; to make tame and tractable.—Poisons may yet retain some portion of their natures; yet are so refracted, *cicurated*, and subdued, as not to make good their destructive malignities. *Brown.*

CICURA'TION. *s.* The act of taming or reclaiming from wildness.—This holds not only in domestic and mansuete birds, for then it might be the effect of *cicuration* or institution; but in the wild. *Ray.*

CICU'TA, *s.* [signifies the internode or space between two joints of a reed; the hollow stem of any plant, which the shepherds used for making their rural pipes; such stems in our old and rural language we call *kecksies*.] In botany, a genus of the class pentandria, order digynia, natural order umbellatæ, or umbelliferæ. The generic characters are—Calyx: umbel universal roundish; rays very many equal; partial roundish, with very many, equal, setaceous rays; involucre universal, none; partial many-leaved; leaflets bristly, short; perianthium proper scarcely visible. Corolla: universal uniform; floscules all fertile; proper of five ovate, inflected, nearly equal petals. Stamina: filaments five, capillary, longer than the corolla; antheræ simple. Pistillum: germ inferior; styles two, filiform, longer than the corolla, permanent; stigmas headed. Perianthium; none; fruit subovate, furrowed, bipartile. Seeds: two, subovate, convex, and striated on one side; flat on the other—*Essential Character*. Fruit subovate, furrowed.

Species. 1. Cicuta virosa, or long-leaved water hemlock: umbels opposite-leaved, petioles margined, obtuse. Stem round, hollow; two, three, and even four, feet high, striated, smooth, reddish towards the bottom, dichotomous; leaves sheathing, a foot and half long, and near a foot broad; the lower on long hollow petioles, the upper almost sessile; bipinnate; some of the pinnas simple, others bifid or trifid; the serratures sometimes brown; the end leaf cut into three to the bottom; all smooth. This plan generally grows near the sides of large stagnant waters, or in shallow slow rivers. Towards the end of autumn, the root for the succeeding summer is formed out of the lower part of the stalk: this is divided transversely into many large unequal cells; so that it becomes specifically lighter than water, and in winter, when the rivers or pools swell, is buoyed up. The old root then rots, floats all the winter, and in rivers is frequently carried to great distances. In the spring the old root is washed away, and the new one, on coming near the soil, sends out many slender fibres, by which it is again fixed, grows, and flowers. It is an inhabitant of the northern part of Europe, from Lapland to Germany and Switzerland. In Britain it is not very common; but it is found at Isleworth, in the Coln near Colnbrook and Uxbridge, on Hownslow-heath, in the isle of Ely, Lovingland in Suffolk, near Norwich and Yarmouth, Hatton in Shropshire, Brereton-mere in Cheshire, near Northwich, in Nottingham-park, in the Trent near Abbot's Bromley, near Stafford, and in Scotland, and Wales: flowering in July and August.

This plant is one of the rankest of our vegetable poisons. Numerous instances are recorded of its fatality to the human species, by Wepfar, Haller, &c. and in the Philosophical Transactions, by Dr. Watson. Linnæus (in Flor. Suec.) relates its fatal effects on kine: and Dr. Withering observes, that early in the spring, cows often eat of it, and are killed by it; but that, as the summer advances, and its scent becomes stronger, they carefully avoid it: that goats however devour it greedily with impunity, and that horses and sheep eat it with safety. Strong emetics are the most approved remedy to this poison.

2. Cicuta bulbifera: branches bulbiferous. The leaves are divided into very minute capillary segments. The flowers are white, with the smell of cumin flowers. Native of Virginia and Canada, in watery places.

3. Cicuta maculata, or spotted water hemlock: serratures of the leaves mucronate, petioles membranaceous two-lobed at the end; stem thick, spotted with purple, three feet high and more; Leaves black, shining, triply pinnate, the last pinnules somewhat bluntly toothed; Flowers white; Fruit middle-sized, ovate-gobular, thick, gibbous, distantly ribbed; seeds ovate, narrower upwards, very gibbous, end-

ing in a ſhort conical tubercle bearing the ſtyle, and the waved rudiment of calyx; ribs five, three dorſal and two lateral, white, ſubflexuoſe, much raiſed, and compreſſed ſo as to be almoſt membranaceous; interſtices ſmooth, bay-rufeſcent; ventral parts flat. Native of Virginia, Swiſſerland, &c. in watery places.

Propagation and Culture. The firſt ſort will not grow well, unleſs there be a conſiderable depth of water for it to root in. The ſecond and third ſorts may be propagated by ſeeds, which ſhould be ſown in autumn on a ſhady border: the plants will come up in the ſpring, and require no other care but to keep them clean. See ÆTHUSA, CHÆROPHYLLUM, and CONIUM.

CICUTA'RIA, *ſ.* See ÆTHUSA, CHÆROPHYLLUM, CICUTA, CONIUM, LIGUSTICUM, and PHELLANDRIUM.

CIDA'GER, or CIDAIA, a town of the iſland of Java.

CI'DARIS, *ſ.* in antiquity, the mitre uſed by the jewiſh high-prieſts.

CI'DER, *ſ.* [*cidre*, Fr. *ſidra*, Ital. *ſicera*, Lat. σικερα, Gr. שכר.] All kind of ſtrong liquors, except wine. This is now wholly obſolete. Liquor made of the juice of fruits preſſed.—We had alſo drink, wholeſome and good wine of the grape, a kind of *cider* made of a fruit of that country; a wonderful pleaſing and refreſhing drink. *Bacon.* —The juice of apples expreſſed and fermented: this is now the only ſenſe:

To the utmoſt bounds of this
Wide univerſe Silurian *cider* born,
Shall pleaſe all taſtes, and triumph o'er the vine. *Phillips.*

In making cider, it was formerly the cuſtom to boil it, and ſometimes to add ſpices to it. The object of this proceſs was to make it ſtronger; and accordingly it was boiled, as ſoon as preſſed, and kept ſcummed continually till its colour was conſiderably heightened. This cuſtom has long been diſuſed in Herefordſhire; and is continued only in ſome parts of Devonſhire, where the fruit happens to be of an inferior kind. In a late publication of the Bath agriculture ſociety, there is an account of a method of boiling cider, to make cider-wine; in which it is mentioned, that a great quantity of cider has been boiled down into wine in the county of Somerſet. From the ſpecimens however produced before the ſociety, and the inveſtigation of the proceſs, it appears to be neither a pleaſant nor a wholeſome liquor. It ſeems indeed, that cider, which by any proceſs could be made ſtronger than the natural juice of the apple, would loſe more, in flavour and richneſs, than it could poſſibly acquire in point of ſtrength. The natural ſtrength of cider of the beſt kinds, when properly made, and ground in horſe-mills, is ſo conſiderable, that there have been inſtances of its keeping twenty or thirty years, or even a longer time, in the greateſt perfection.

It may not be improper in this place, to give a ſhort account of the common *Herefordſhire method of making cider*. The fruit is gathered when quite ripe; which is known by its beginning to fall. The apples when got together, are laid in the open air, in heaps of about a foot and a half or two feet deep; but not more, leſt they ſhould heat. When they begin to decay they are fit for grinding; thoſe that are black-rotten being firſt thrown away. The fruit is then ground, till the rind and kernals are well bruiſed, which is ſuppoſed to add much to the flavor and ſtrength of the liquor. It is not preſſed as ſoon as ground, but is put to ſtand for a day, or ſomewhat more, in a large open veſſel. It is then preſſed between ſeveral layers of hair-cloths, in the preſs, and the liquor is received in a vat, from which it is removed into caſks, which ſtand in any cool place, or even in the open air, with their bung-holes open. Theſe caſks are watched with great care, till the cider (in the provincial language) drops fine, when it is immediately racked off from the lees, into other caſks in the cellar. This firſt racking is of the greateſt conſequence, as cider which is ſuffered to become foul again, by miſſing the firſt opportunity of racking it when fine, will never make a prime liquor. After what is clear has been racked off, there remains a quantity of lees, which being filtered through coarſe linen bags, in the form of jelly-bags, yield a very bright and and ſtrong liquor, but extremely flat, which is added to the cider already racked, and, by its ſtrength and flatneſs, contributes to prevent or check fermentation. The great object, at this time, is to prevent fermentation, an exceſs of which is ſure to make cider thin and acid. The caſks are therefore not filled quite full, neither are they ſtopped quite cloſe; and when the cider inclines to ferment, it is again racked; which it ſometimes requires two or three times. It muſt not however be racked, unleſs when it is abſolutely neceſſary for the purpoſe already mentioned; as every racking is ſuppoſed to weaken it. This therefore muſt depend upon the practical ſkill of the farmer, and ſeems to be that critical part of the management for which no adequate rules can be preſcribed. When all probability of fermentation is over, the caſks ſhould be filled up with cider of the beſt quality, and the bung be cloſed in firm with roſin.

CI'DERIST, *ſ.* A maker of cider.—When the *cideriſts* have taken care for the beſt fruit, and ordered them after the beſt manner they could, yet hath their cider generally proved pale, ſharp, and ill taſted. *Mortimer.*

CI'DERKIN, *ſ.* A low word uſed for the liquor made of the murk, or groſs matter of apples, after the cider is preſſed out, and a convenient quantity of boiled water added to it; the whole infuſing for about forty-eight hours. *Phillips.*—*Ciderkin* is made for common drinking, and ſupplies the place of ſmall beer. *Mortimer.*

CIECIEREF', a river which riſes in Poland, and runs into the Dnieper, twenty-eight miles weſt of Kiov.

CIEKANOW', a town of Poland, in the palatinate of of Maſovia: forty miles north of Warſaw.

CIE'LING, *ſ.* See CEILING.

CIER'GE, *ſ.* [French.] A candle carried in proceſſions; a taper; a lamp.

CIEUX, a town in France, in the department of the Upper Vienne, and chief place of a canton, in the diſtrict of Bellac, containing about 1200 inhabitants: thirteen miles north-weſt of Limoges.

CIFUEN'TES, a town of Spain, in New Caſtile: twenty-two ſouth of miles Siguença.

CIGLIA'NO, a town of Italy, in the Orvietan: four miles north of Orvieto.

CIGNA'NI (Carlo), an Italian painter, born at Bologna in 1628, was the diſciple of Albani. He was eſteemed by pope Clement XI. who nominated him prince of the academy of Bologna, and loaded him with favours. Cignani died at Forli in 1719. The cupola of la Madona del Fuoco at Forli, in which he repreſented Paradiſe, is an admirable work. His principal pictures are at Rome, Bologna, and Forli.

CIGO'LI, or CIVOLI, the painter. See CIVOLI.

CI'LIA, *ſ.* the eye-laſhes. See ANATOMY, vol. i. p. 597.

CI'LIATED LEAF, in botany, one ſurrounded with parallel filaments, ſomewhat like the hairs of the eye-lids.

CILI'CIA, anciently a kingdom of Aſia, lying between the 36th and 40th degree of north latitude: bounded on the eaſt by Syria, or rather by Mount Amanus, which ſeparates it from that kingdom; by Pamphylia on the weſt; Iſauria, Cappadocia, and Armenia Minor, on the north; and the Mediterranean on the ſouth. It was divided by the ancients into Cilicia Aſpera, and Cicilia Campeſtris; the former called by the Greeks *Trachea*, or Stony, from its abounding with ſtones: and at this day the province is called by the Turks, *Tas Wileieth*, or the Stony Province. According to Joſephus, Cilicia was firſt peopled by Tarſhiſh the ſon of Javan, and his deſcendants, whence the country was named *Tarſus*. The ancient inhabitants were driven out by a colony of Phœnicians, who, under the conduct of Cilix, firſt ſettled in the iſland of Cyprus, and from thence paſſed into the country which, from their leader, they called *Cilicia*. Afterwards, ſeveral other colonies from different nations ſettled here, particularly from Syria and Greece; whence the Cilicians in ſome places uſe the Greek tongue, in others the

the Syriac; but the former was greatly corrupted by the Persian, the predominant language of the country being a dialect of that tongue. We find no mention of the kings of Cilicia after their settlement in that country, till the time of Cyrus, to whom they voluntarily submitted, continuing subject to the Persians till the overthrow of that empire; but governed to the time of Artaxerxes Mnemon, by kings of their own nation. After the downfall of the Persian empire, Cilicia became a province of that of Macedon; and, on the death of Alexander, fell to the share of Seleucus, and continued under his descendants till it was reduced to a Roman province by Pompey. As a proconsular province, it was first governed by Appius Claudius Pulcher: and after him by the famous orator Cicero, who reduced several strong holds on Mount Amanus, in which some Cilicians had fortified themselves, and held out against his predecessor. It was on this occasion that the division, formerly mentioned, into Trachæa, and Campestris, took place. The latter became a Roman province; but the former was governed by kings appointed by the Romans, till the reign of Vespasian, when the family of Tracondementus being extinct, this part also made a province of the empire, and the whole divided into Cilicia Prima, Cilicia Secunda, and Isauria; the first took in all Cilicia Campestris, the second the coast of Cilicia Trachæa, and the last the inland parts of the same division. It is now a province of Asiatic Turky; and is called *Caramania*, having been the last province of the Caramanian kingdom which held out against the Ottoman race.

CILI'CIOUS, *adj.* [from *cilicium*, Lat. hair-cloth.] Made of hair.—A garment of camel's hair, that is, made of some texture of that hair; a coarse garment, a *cilicious* or sackcloth habit, suitable to the austerity of his life. *Brown.*

CIL'LEY, a town of Germany, in the duchy of Stiria, on the river Saan, and capital of a district, which extends as far as Pettaw. The inhabitants of the town speak German and Sclavonian, but those in the villages only the latter: some authors are of opinion that they were brought hither by the dukes of Bavaria, to oppose the Romans; others that they established themselves. Cilley is said once to have belonged to the Romans, after that to have been entirely destroyed, till given by Louis, the old king, and duke of Bavaria, to Hezillon, duke of Moravia, who rebuilt it. The district, or comté, was once an independent principality, and governed by counts of its own. It is 130 miles south-south-west of Vienna. Lat. 46. 21. N. lon. 33. 2. E. Ferro.

CILLO'SIS, *f.* [from *cilium*, Lat. the eye-lid.] A spasmodic trembling of the eye-lids.

CI'LO, *f.* [from *cilium*, Lat. the eye-lid, which in such a person is particularly prominent.] One whose forehead is prominent, and temples compressed; vulgarly called *beetle-browed.*

CILO'CA, a town of South America, in the country of Peru, on the coast of the Pacific Ocean: forty miles west of Arequipa.

CI'MA, or SIMA, *f.* in architecture, a member, or moulding, called also ogee, and cimatium.

CIMABU'E (Giovanni), a renowned painter, born at Florence in 1240, and the first who revived the art of painting in Italy, after its extinction by the irruption of the Goths. He painted, according to the custom of those times, in fresco and in distemper, colours in oil not being then known. He excelled in architecture as well as in painting; and was concerned in erecting the fabric of Sancta Maria del Fior at Florence; during which employment he died at the age of sixty, and left many disciples.

CIMA'R. See SIMAR.

CIM'BRI, *f.* An ancient Celtic nation, inhabiting the northern parts of Germany. They are said to have been descended from the Asiatic Cimmerians, and to have taken the name of *Cimbri*, when they changed their old habitations. When they first became remarkable, they inhabited chiefly the peninsula of Denmark now called *Jutland*, and by the ancients *Cimbrica Chersonesus*. About 113 years before Christ, they left their peninsula with their wives and children; and joining the Teutones, a neighbouring nation, they journeyed southward in quest of a better country. They first fell upon the Boii, a Gaulish nation situated near the Hercynian forest. Here they were repulsed, and driven nearer the Roman provinces. That republic being alarmed at the approach of such multitudes of barbarians, sent an army against them under the consul Papirius Carbo. On the approach of the Roman army, the Cimbri made proposals of peace. The consul pretended to be satisfied therewith; but, having thrown them into a disadvantageous situation, treacherously attacked their camp. The Cimbri ran to arms, and not only repulsed the Romans, but attacking them in their turn utterly defeated them, and obliged the shattered remains of their forces to conceal themselves in the neighbouring forests. After this victory the Cimbri entered Transalpine Gaul, which they filled with slaughter and desolation. Here they continued five or six years, when another Roman army, under the consul Silanus, marched against them. This general met with no better success; his army was routed, and all Narbonne Gaul was exposed to the ravages of the enemy.

About 105 years before Christ, the Cimbri began to threaten the whole Roman empire with destruction. The Gauls marched from all parts with a design to join them, and to invade Italy. The Roman army was commanded by the proconsul Cæpio, and the consul Mallius; but as these two commanders could not agree, they were advised to separate, and divide their forces. This advice proved their ruin. The Cimbri fell upon a strong detachment of the consular army, commanded by M. Aurelius Scaurus, which they cut off to a man, and made Scaurus prisoner. Mallius being intimidated by this defeat, desired a reconciliation with Cæpio, but was haughtily refused. He moved nearer the consul, however, with his army, that the enemy might not be defeated without his having a share in the action. The Cimbri now attacked the camp of Cæpio, and the Gauls that of Mallius. Both were forced, and the Romans slaughtered without mercy. Eighty thousand citizens and allies of Rome, with forty thousand servants and sutlers, perished on that day. The conquerors destroyed all the spoil, pursuant to a vow they had made before the battle. The gold and silver they threw into the Rhone, drowned the horses they had taken, and put to death all the prisoners. So courageous, or rather desperate, were the Cimbri, that they fastened together the front ranks of their army with cords, to prevent their being broken, as well as to keep every soldier in his place.

The Romans were thrown into great consternation; they saw themselves threatened with a deluge of Cimbri and Gauls, numerous enough to over-run the whole country. They did not, however, despair; a new army was raised, and Marius, who was in high reputation on account of his victories in Africa, was chosen commander, and waited for the Cimbri in Transalpine Gaul; but the enemy had resolved to enter Italy by two different ways: the Cimbri over the eastern, and the Teutones and other allies over the western, Alps. The Roman general therefore marched to oppose the latter, and defeated the Ambrones and Teutones with great slaughter. The Cimbri, in the mean time, entered Italy, and struck the whole country with terror. Catullus and Sylla attempted to oppose them; but their soldiers were so intimidated by the fierce appearance of these barbarians, that nothing could prevent their flying before them. The city of Rome was now left defenceless; so that had the Cimbri marched briskly forwards, they would probably have become masters of it; but they waited in expectation of being joined by their allies, not having heard of their defeat by Marius, till the senate had time to recal him to the defence of his country. He now joined his army to that of Catullus

tullus and Sylla, and was declared commander in chief. The Roman army consisted of 52,300 men. The cavalry of the Cimbri were no more than 15,000, but their foot seemed innumerable; for, being drawn up in a square, they are said to have covered thirty furlongs. The Cimbri attacked the Romans with the utmost fury, but were in the end totally defeated. An hundred and twenty thousand were killed on the field of battle, and sixty thousand taken prisoners. The victorious Romans then marched to the enemy's camp, where they had a new battle to fight with the women, whom they found more fierce than even their husbands had been. From their carts and waggons, which formed a kind of fortification, they discharged showers of darts and arrows on friends and foes without distinction. They then suffocated their children in their arms, and put an end to their own lives; the greatest part hanged themselves on trees. Many of the men, for want of trees and stakes, tied strings in running knots about their necks, and fastened them to the tails of their horses, and the horns and feet of their oxen, in order to strangle themselves; and thus the whole multitude was destroyed.

The country of the Cimbri, which after this catastrophe was left a mere desert, was again peopled by the Scythians; who, being driven by Pompey out of that vast space between the Euxine and the Caspian sea, marched towards the north and west of Europe, subduing all the nations they met with in their way. They conquered Russia, Saxony, and Westphalia, and other countries as far as Finland, Norway, and Sweden. It is pretended that Wodin their leader traversed so many countries, and endeavoured to subdue them, only with a view to excite the people against the Romans; and that the spirit of animosity which he had excited, operated so powerfully after his death, that the northern nations combined to attack it, and never ceased their incursions till it was totally subverted.

CIMBRISHA'MN, or Cimbrishaven, a sea-port of Sweden, in West Gothland, and province of Schonen: twenty-four miles south of Christianstadt.

CIME'GES, a town of France, in the department of the Dordogne, and chief place of a canton, in the district of Bergerac: seven miles south-west of Bergerac.

CIME'LIARCH, *s.* [from κειμηλιαρχης, Gr.] The chief keeper of plate, vestments, and things of value, belonging to a church; a church-warden.

CI'METER, *s.* [*cimitarra*, Span. and Port. from *chimetair*, Turkish. *Bluteau's Portuguese Dictionary.*] A sword used by the Turks, short, heavy, and recurvated, or bent backward. This word is sometimes erroneously spelt *scimitar*, and *scymiter*; as in the following examples:

> By this *scimitar*,
> That slew the sophy and a Persian prince,
> That won three fields of sultan Solyman. *Shakespeare.*

> Our armours now may rust, our idle *scymiters*
> Hang by our sides for ornament, not use. *Dryden.*

CI'MEX, *s.* [from κειμαι, to inhabit.] The Bug; in entomology, a genus of insects belonging to the order of hemiptera. The rostrum is inflected; the antennæ are longer than the thorax; the wings are folded together crosswise; the upper ones are coriaceous from their base towards their middle; the back is flat; the thorax margined; the feet are formed for running. This genus is divided into different sections, as follow: 1. Those without wings. 2. Those in which the escutcheon is extended so far as to cover the abdomen and the wings. 3. The coleoptrati, whose elytra are wholly coriaceous. 4. Those whose elytra are membranaceous; these are very much depressed like a leaf. 5. In which the thorax is armed on each side with a spine. 6. Those which are of an oval form, without spines on the thorax. 7. In which the antennæ become setaceous towards their point. 8. Those of an oblong form. 9. Those whose antennæ are setaceous, and as long as the body. 10. Those which have their thighs armed with spines. 11. Those whose bodies are long and narrow. Of this prolific and abundant genus, Dr. Gmelin enumerates no less than six hundred and eighty-eight species, in his last edition of the Systema Naturæ of Linnæus. A very peculiar species was discovered by Dr. Sparman at the Cape, which he has named *cimex paradoxus*. He observed it as at noon-tide he sought for shelter among the branches of a shrub from the intolerable heat of the sun. "Though the air," says he, "was extremely still and calm, so as hardly to have shaken an aspen leaf, yet I thought I saw a little withered, pale, crumpled, leaf, eaten as it were by caterpillars, flittering from the tree. This appeared to me so very extraordinary, that I thought it worth my while suddenly to quit my verdant bower in order to examine it: and I could scarcely believe my eyes, when I saw a live insect, in shape and colour resembling the fragment of a withered leaf, with the edges turned up and eaten away, as it were, by caterpillars, and at the same time all over beset with prickles. Nature, by this peculiar form, has certainly well defended and concealed, as it were in a mask, this insect from birds and its other foes; in all probability with a view to preserve it, and employ it for some important office in the system of her economy."

The larvæ of bugs only differ from the perfect insect by the want of wings; they run over plants, grow and change to chrysalids, without appearing to undergo any material difference. They have only rudiments of wings, which the last transformation unfolds, and the insect is then perfect. In the two first stages they are unable to propagate their species. In their perfect state, the female, fecundated, lays a great number of eggs, which are often found upon plants, placed one by the side of another; many of which, viewed through a magnifier, present singular varieties of configuration. Some are crowned with a row of small hairs, others have a circular fillet, and most have a piece which forms a cap; this piece the larva pushes off when it forces open the egg. Released by nature from their prison, they overspread the plant on which they feed, extracting, by the help of the rostrum, the juices appropriated for their nourishment: even in this state, the larvæ are not all so peaceably inclined; some are voracious in an eminent degree, and spare neither sex nor species they can conquer. In their perfect state they are mere cannibals, glutting themselves with the blood of animals; they destroy caterpillars, flies, and even the coleopterous tribe, whose hardness of elytra one would imagine was proof against their attacks; yet they have fallen an easy prey to the sharp piercing nature of the rostrum of the bug, and the uncautious naturalist may experience a feeling severity of its nature. The cimex lectularius, or house-bug, is particularly acceptable to the palate of spiders, and is even sought after by wood-bugs, which is not indeed surprising, when the general voracity of this genus is considered.

The methods of expelling house-bugs are various; as oil of turpentine, the smoke of corn-mint, of narrow-leaved wild cress, of bugbane, herb-robert, the reddish agaric, mustard, Guinea pepper, peat or turf, &c. but for the most effectual method of destroying them, see the article Bug, vol. iii. p. 493.

To illustrate this article more satisfactorily for the naturalist, we have given figures of many of the most rare and curious species, which are delineated in the annexed engraving. Fig. 1. represents the cimex lectularius, or common house-bug, magnified. It is said to be the only one of this genus that is for ever destitute both of elytra and wings. Its offensive appearance and nauseous smell are sufficiently experienced in those houses where they are suffered to intrude. Their sting is attended with a slight inflammation, and very painful. 2. Cimex annulatus, of a light brown colour, and oval shape. This is magnified; being in nature about the size of a large cherry-stone. The thorax has two annular black bands crossing it from side to side; close to which the escutcheon joins, which is

CIMEX.

Different Species of the Cimex or Bug.

is very large, entirely covers the abdomen, and is marked all over with different shaped spots like eyes; whence it has been named the *argus*: it is a native of Sierra Leone, in Africa. 3. Cimex corticatus; a very curious species, drawn to its natural size. It is singularly thin and flat, and near an inch long; the eyes are small and round; it is furnished with a beak that extends to the middle of the abdomen; the escutcheon is large and triangular; the elytra or wing-cases are entirely opake and small, not covering the abdomen, which appears denticulated, and of a yellowish green; the head, corslet, and elytra, are of a beautiful fawn colour inclining to red: it is found at Brasil. 4. Cimex cristatus, a very singular insect, somewhat resembling a spider. It is near an inch and a quarter long; the head very small; the neck long and slender; the thorax is small and black, the escutcheon large and crested, rising high, and dentated like the comb of a cock. The whole insect is of a fine ferruginous brown, except a large oval spot on the extremity of each elytrum, which is of a beautiful gold green: it is a native of the island of St. Vincent. 5. Cimex crenulatus, from Antigua; about three quarters of an inch long; the head is small, and red, striped with black; eyes round and projecting; the thorax is red, marked with black; the escutcheon greenish black; the elytra the same except at the ends, which are dark brown; the wings are a light transparent straw-colour; down the center of the abdomen passes a broad line of a shining bluish green; the sides red, indented with lines of black. 6. Cimex papillosus; a large and handsome species, very thick, gibbous at the stern, and much compressed: the head is small, the thorax rising high and large, the escutcheon triangular, all of a bright yellowish olive colour; the elytra are the same, except at the tips, which are membranaceous and transparent, the inner wings are nearly the same, but of a brighter colour. The abdomen is of a dark purple, annulated, and dentated at the sides, which have a bright coppery gloss; the anus terminates in two angular points, with a small thorn or cornicle on each side: it measures upwards of an inch, and is a native of China. 7. Cimex Druræi, so named from Mr. D. Drury, author of the Illustration of Exotic Insects, who first introduced it; it is an ugly species, about three quarters of an inch long: the body is large, squat, and wholly of a deep scarlet, except two broad transverse bands of black which cross the abdomen, and four round spots, two upon the thorax, about the size of tares, and two just above the anus, but smaller; the wing-cases or elytra are of a dark olive-colour; and the inner wings are the same, but membranaceous, and somewhat lighter: this is a native of South America, and is reckoned a very rare and curious insect. 8. Cimex Senegalensis, a large species, found in Senegal, measuring in its expanded state, from wing to wing, near two inches: the head is dark mazarine blue; the thorax cream-colour, charged with two oblong square blue-green spots, which gives it the appearance of being toothed, or like the letter m inverted; the escutcheon is of a triangular form, and of the same deep blue-green, with the abdominal point terminated by cream-colour; the elytra are blue-green half way from the chest, and then fringed with a yellowish brown; the inferior wings are membranaceous, and nearly white; the abdomen is red, annulated with black, obtuse, dentated at the sides, and bordered with round black spots. 9. Cimex aurantius, the general cast of the insect being an aurora or golden colour. It ranks among the handsomest of the bugs: the head and thorax are of an auburn brown, surrounded with a cream-coloured margin on the anterior side, in the form of a crescent; at the points of which an angular return is made, of the same colour, which enters the elytra in shape of a spine; the superior and inferior wings are very similar, the latter being the lightest; the abdomen is large, broad, and annulated with chesnut belts on a golden ground; the anus is gibbous, terminating in a blunt chesnut protuberance, with a spine on each side; it is a native of India, and is found in the islands of Java and Ceylon; and measures full two inches in its alar extent. 10. Cimex paradoxus, the leaf-insect described above, from Dr. Sparrman. 11. Cimex Merianæ, thus named from madam Merian, who first discovered this frightful insect at Surinam, and figured it from the life in her inimitable collection, from which our figure is taken. It is the largest known species of the cimex tribe, measuring three inches and a half from head to tail, and near six inches in alar extent. It is of a rich ferruginous brown colour, armed with a single sharp curved spine on the head, and another at the anus; eyes black and very prominent; two large dark-brown spots on the thorax, about the size of peas; two others more oblong behind; and others of various forms and sizes on the fore-legs; the elytra are reticulated with white, and are very thick and strong; the interior wings are membranaceous, and of a delicate straw-colour. Fig. 12, is the larva of this gigantic cimex, which differs but little from the perfect insect, except in the want of its wings. It is the same with the larvæ of all the bug species; the body being nearly the same in their creeping or caterpillar state, as when they have protruded their elytra and their wings. This is not only the largest, but the most destructive and voracious, of the cimex genus, attacking and devouring, in its creeping state, toads, frogs, lizards, aquatic insects, and even fish; and in its winged state, preying upon reptiles, birds, and the larger animals, and even on the weaker individuals of its own family.

CIMICI'FUGA, *s.* [*quod cimices fugant*; from its quality of driving away bugs.] In botany, a genus of the class polyandria, order tetragynia, natural order multisiliquæ. The generic characters are—Calyx: perianthium five-leaved; leaflets roundish, concave, caducous. Corolla: nectaries four, petal-shaped, urceolate, cartilaginous. Stamina: filaments twenty, filiform; antheræ twin. Pistillum: germs four to seven; styles recurved; stigmas longitudinal on the style. Perianthium: capsules oblong, opening with a lateral suture. Seeds; very many, covered with spreading scales.—*Essential Character*. Calyx, four or five-leaved; nectaries four, urceolate; capsules four to seven.

There is but one species, cimicifuga fœtida, or stinking bugbane. Linnæus remarks, that it bears a great resemblance to actæa racemosa. Root perennial, thick knotty, short, with many thickish fibres creeping transversely; stem sometimes two yards in height, red at the base, thence pale green, slightly hirsute, scarcely striated, soon dividing in two, one branch naked for the space of three inches, then swelling into a knot, and subdividing into three hirsute branchlets, each sustaining a pinnate glutinose leaf, the pinnas serrate, hairy on the rib, pale green, veined: the other branch near the base bears a leaf similar to the other, with more following which are gradually smaller, till the uppermost becomes entire; flowers in long terminating racemes, alternate, globular, on very short pedicels; seeds several oblong, covered all round with membranaceous linear oblong flexile pale scales, and fastened along the whole of the opening suture. The whole plant has a strong virose smell occasioning the head-ach. Native of the farther Siberia, from the river Jenisea; flowering the middle of July, and ripening its seed the middle of August. It was introduced here in 1777, by Messrs. Gordon and Græfer. See ACTÆA.

CIMKOWICK'ZE, a town of Lithuania, in the palatinate of Novogodrek: eighteen miles west of Sluck.

CIMMER'II, anciently a people near the Palus Mæotis. They invaded Asia Minor 1284 years before Christ, and seized upon the kingdom of Cyaxares. After they had been masters of the country for twenty-eight years, they were driven back by Alyattes king of Lydia.—It is the name also of another nation on the western coast of Italy. The country which they inhabited was supposed to be so gloomy, so surrounded with mountains, woods, and forests, that to express a great obscurity, the expression

sion of *Cimmerian darkness* has proverbially been used; and Homer, according to Plutarch, drew his images of hell and Pluto from the gloomy and dismal country where they dwelt.

CIMMER'IUM, in ancient geography, a town at the mouth of the Palus Mæotis, from which the Bosphorus Cimmerius is named; that strait which joins the Euxine and the Palus Mæotis. *Cimmerii* was the name of the people; and here stood the Promontorium Cimmerium; and hence probably the modern appellation *Crim*. *Homer*.

CIMO'LIA, *s.* [from Κιμωλος, *Cimolus*, an island in the Cretan sea, where it is procured.] An epithet of a species of earth or clay, called pipe-maker's clay; also fullers' earth.

CI'MOLITE, *s.* A fine species of clay, supposed to be the *cimolia creta* of Pliny. It abounds in *Cimolo*, now Argentiera, one of the islands on the coast of Greece. It was famed among the ancients for its medical uses, and for its property of cleansing garments. As a detergent, it actually excels our fullers' earth, and is therefore, even at this day, commonly employed by the natives in washing and bleaching. Specimens of this remarkable substance, brought from the east by Mr. Hawkins, have happily afforded an opportunity for M. Klaproth to ascertain its qualities, and to subject it to chemical analysis. It is of a greyish white colour, but takes somewhat of a reddish shade by exposure to the air; which renders it probable that the *cimolia ad purpurissum inclinans* is really the same with the *candida*. Its surface is smooth and fatty to the touch, but its fracture is earthy and uneven, and though soft it is not easily broken. Its specific gravity is exactly double that of water. A hundred parts of cimolite were found to contain sixty-three of silex, twenty-three of alumine, one and half of the oyxd of iron, and twelve of water. It ranks therefore with the clays, and its qualities, as a substitute for soap, probably arise from the extreme fineness of its integrant particles.

CIMO'LUS, in ancient geography, an island in the Cretan sea, one of the Cyclades, now called *Argentiera*.

CI'MON, an Athenian, son of Miltiades and Hegisipyle. He was famous for his debaucheries in his youth, and the reformation of his morals when arrived to years of discretion. He behaved with great courage at the battle of Salamis, and rendered himself popular by his munificence and valour. He defeated the Persian fleet, took 200 ships, and totally routed their land army the same day, in the year of Rome 284. The money that he obtained by his victories was not applied for his own private use, but with it he fortified and embellished the city. He some time after lost all his popularity, and was banished by the Athenians, who declared war against the Lacedæmonians. He was recalled from his exile, and at his return he made a reconciliation between Lacedæmon and his countrymen. He was afterwards appointed to carry on the war against Persia in Egypt and Cyprus, with a fleet of 200 ships, and on the coast of Asia he gave battle to the enemy, and totally ruined their fleet. He died as he was besieging the town of Citium in Cyprus. He may be called the last of the Greeks whose spirit and boldness defeated the armies of the barbarians. He was such an inveterate enemy to the Persian power, that he formed a plan of totally destroying it; and in his wars he had so reduced the Persians, that they promised in a treaty not to pass the Chelidonian island with their fleet, or to approach within a day's journey of the Grecian seas.

CINALO'A, a province of North America, in New Mexico, lying between New Biscay and the Gulf of California, discovered in the year 1532, by Nunez de Gusman; the air is pure and healthy, the land good and fertile, producing abundance of maize, legumes, fruits, and cotton. The natives are robust and warlike, and were with difficulty brought to submit to the Spaniards: they make use of bows with poisoned arrows, clubs of red wood, and bucklers.

CINALO'A, a town of Mexico, in a province of the same name: 630 miles north-west of Mexico. Lat. 26. 26. N. lon. 92. 0. W. Ferro.

CINA'RA, *s.* in botany. See CYNARA.

CINAROI'DES, *s.* in botany. See PROTEA.

CINCHO'NA, *s.* [so named from the countess del *Cinchon*, lady of a Spanish viceroy, whose cure is said first to have brought the Peruvian bark into reputation.] In botany, a genus of the class pentandria, order monogynia, natural order of contortæ. The generic characters are—Calyx: perianthium one-leafed, superior, short, five-toothed, permanent; teeth sharp. Corolla: monopetalous, funnel-shaped, five-cleft; tube long, obscurely angular; segments lanceolate or linear, equalling the tube. Stamina: filaments five, in the middle of the tube; antheræ linear, erect. Pistillum: germ inferior, turbinate, obscurely angular; style the length of the stamens; stigma thick, bifid, or entire. Pericarpium: capsule crowned with the calyx, bipartile, opening into two parts inwardly; the partition parallel. Seeds: many, oblong, compressed, surrounded with a membranaceous wing.—*Essential Character*. Capsule inferior, two-celled, bipartile, the valves parallel to the partitions, opening inwardly.

Description. The cinchonas are trees. The branches are round except at the top, where they are obscurely four-cornered; the flowering-branches are alternately compressed. The leaves are opposite, undivided, and quite entire. Stipules are interposed between the leaves, and pressed close to the branches. The inflorescence in most of the species is a brachiate panicle, with trifid peduncles. Swartz proposes to divide the species into such as have a short, or an elongated, tube to the corolla.

Species. I. Flowers tomentose, stamens included. 1. Cinchona officinalis, or common jesuits' bark, or officinal cinchona: leaves ovate-lanceolate, smooth; capsules oblong. Officinal cinchona is a tall tree, with a trunk rather bigger than a man's thigh. The branches are covered with a purplish brown bark, frequently rugged with obliquely-transverse chinks, and scarred by the fallen leaves. These are ovate, or ovate-lanceolate, sharp, even, smooth on both sides, veinless above, obliquely nerved, the lower nerves opposite; beneath they are a little paler and veined: they are about two inches long, approximating at the ends of the branches, but remote on the flowering-branches; they spread very much. It is a native of Peru, growing most abundantly on a long chain of mountains extending to the north and south of Loxa, between two and five degrees of south latitude. Here the trunks of these trees frequently exceed in size the body of a man. The soil in which they thrive best is a red clayey or rocky ground, especially on the banks of small rivers or torrents. The most proper season for cutting the bark is from September to November, which is the only time of some intermission from rain. On a spot where the trees abound, having made a road to it from the nearest plantation in the low country, they build huts for the workmen, and a large hut for the bark. Each Indian is provided with a large knife, and a bag that will hold about fifty pounds of green bark: he cuts down the bark as high as he can reach from the ground; he then fastens a stick about half a yard long, with tough withs to the tree like the step of a ladder, and having sliced off the bark as high as he can reach with this, he fixes a new step, and thus mounts to the top, another Indian below gathering up what he cuts: this they do by turns, going from tree to tree until the bag is full. Care is taken not to cut the bark wet; and, if it should happen to be so, it is carried directly to the low country to dry, for otherwise it loses its colour, turns black, and rots; and, if it lie any time in the hut without being spread, it runs the same risk; so that, if the weather permit, it remains as short a time there as possible; and, whilst the Indians are cutting, the mules are employed in carrying the bark to the drying place, where it is spread in the open air, and frequently turned. The trees are said soon to perish on being stripped of their bark, and hence a scarcity of it has

The Officinalis, or true Jesuits Bark.

has been apprehended. Condamine however asserts, that the young trees do not die by losing their bark, but send out fresh shoots from the base; and, as the trees which stand to any considerable age, probably increase by seed, the fear that this valuable bark may be exhausted seems to be groundless.

We have no satisfactory account at what time, or by what means, the medicinal efficacy of the Peruvian bark was first discovered. Some of the tales which are commonly related, have too fabulous an air to justify the recital of them here. Geoffrey relates, that the use of the bark was first learned from the following circumstance: Some cinchona-trees, being thrown by the winds into a pool of water, lay there till the water became so bitter that every body refused to drink it, till one of the neighbouring inhabitants being seized with a violent paroxysm of fever, and finding no other water to quench his thirst, was forced to drink of this, by which means he became perfectly cured; and afterwards relating his case to others, they made use of the same remedy. The use of this excellent medicine was very little known till about the year 1638, when a signal cure having been performed by it on the Spanish viceroy's lady, the countess del Cinchon, at Lima, it came into general use; and hence was distinguished by the appellation of *pulvis comitissæ*, *cortex china china* or *chinchina*, *kina kina* or *kinkina*, *quina quina* or *quinquina*. The countess, on her recovery, is said to have distributed a large quantity of the bark among the jesuits, in whose hands it acquired still greater reputation, and by them it was first introduced into Europe, and thence called *jesuits' bark*, *cortex s. pulvis jesuiticus*, *pulvis patrum*, and also *cardinal de Lugo's powder*; that charitable prelate having bought a large quantity of it at a great expence for the use of the poor at Rome.

This bark is brought to us in pieces of different sizes, some rolled up into short quills, and others flat. Those who affect to be nice in the choice of their drugs, prefer such pieces as are rolled up about the size of a common quill. The outside is brownish, and sometimes whitish; the inside of a fine ferruginous brown. To the taste it is astringent and bitter, and it has an advantage over other bitters in being aromatic. To enumerate its virtues would require the extent of a volume. Morton, the contemporary of Sydenham, was one of the first who made considerable use of the bark. From us it was carried into France, where the dauphin was cured by it. Boerhaave restrains the use of the bark, with almost innumerable cautions, while Hoffman and others are as boundless in its praise; and indeed all the prejudices in its disfavour are entirely done away, and its character has long been universally established. This bark gives out its virtues both to cold and boiling water; but the decoction is thicker, and gives out its taste more readily. Its principal use however is in substance, and it may be employed in very considerable doses with the most perfect security. Sometimes it is necessary to join opiates with it, in order to prevent its passing off too suddenly by acting as a purgative. A very elegant tincture of the bark is kept in the shops under the title of *Huxham's tincture*: in which preparation the bark is rendered still more efficacious by the addition of orange-peel and snake-root.

It is not only in fevers of every kind that the bark is so highly successful a remedy, but also in numerous other cases, and particularly in mortifications. It has also been much used of late in cases of acute rheumatism, especially after the violence of the disease has in some degree been moderated by the antiphlogistic treatment, or when an evident remission has taken place. In the fluor albus, profluvia, and hæmorrhages of every kind, the decoction of the bark is of excellent use; and the tincture taken in water of various parts, as chalybeate, &c. is extremely useful in cases of decayed appetite. In short, if any medicine deserved the title of a panacea, the bark would have the fairest claim. Cases however sometimes occur in which its liberal exhibition is found hurtful; viz. where symptoms of congestion, or topical inflammation of the head appear, which are shewn by the redness of the eyes, phrenitic delirium, &c. It has also been sometimes accused of causing a degree of difficulty of breathing.

The other species of cinchona approach in some degree to the virtues of the Peruvian or common officinal bark, but seem less efficacious, and their power less perfectly ascertained in practice. The *red bark* indeed has been often considered as of still higher efficacy than the common, and has been thought to be the bark which, according to Arrot, the Spaniards called *cascarilla colorada*, and was probably the kind brought originally to Europe, and which proved so successful in the hands of Sydenham, Morton, and Lister; it appearing from the testimony of the oldest practitioners, that the bark first employed was of a much higher colour than the common bark.

A new variety of the cinchona, called *yellow bark*, was discovered, and described as being superior in efficacy to the rest, by Dr. Relph, physician to Guy's hospital, who published his account of it in 1794. We call it *new*, because the doctor discovers no traces of the kind in question, except in the account given by Murray, in his *Apparatus Medicam*. of what he terms *cortex Chinæ regius*, seu *flavus*. This appears to be, in fact, the same with the yellow bark lately introduced into this country, and which Dr. Relph thus describes:—"This bark, though denominated *yellow*, is only to be understood as approaching nearer to that colour, than any other species of Peruvian bark imported into this country, especially when reduced to powder. It consists of flattish irregular pieces, of a cinnamon colour, inclining to red, and having in certain directions of the light, a peculiar sparkling appearance on the surface. They are very generally divested of the cuticle, of a fibrous texture, dry, and rigid to the feel, and easily rubbed into powder between the fingers and thumb; neither remarkably weighty, nor the contrary. They have little odour, but to the taste manifest intense bitterness, with a moderate share of astringency, together with a certain flavour corresponding unequivocally to those of the cinchona officinalis. The external surface of this bark, is of a somewhat deeper colour than that of the internal, and in some specimens it is as deep as that of the red bark. The pieces vary much in size; some of them are about two inches and a half in length, an inch in breadth, and the sixth of an inch in thickness; while others are still smaller, and some are to be found from twelve to eighteen inches in length, with the breadth and thickness in proportion. I have also seen whole chests of this bark, the pieces of which were nearly cylindrical, and as completely covered with outer coat, as the most perfect specimens of common bark. The epidermis of the large pieces of the yellow bark, is of a reddish brown colour, rough, and of a somewhat spongy texture; but that of the smaller species is of a grey colour, harder, and much more compact." We have no certain information in what part of Spanish America the species of cinchona, producing this bark, grows; but there is reason to imagine that it is in the interior regions, at a great distance from Lima; and therefore its price must always be greater than that of the common sorts. With respect to the modes of exhibiting it, and to the cases in which it is proper, it seems enough to say, that, wherever and in whatever manner the red or common bark is given, the yellow bark may be substituted with a chance of greater efficacy. It remains, if possible, to secure a regular supply of this drug, in its genuine and perfect state, that it may not, by adulterations and sophistications, lose that character to which it seems justly entitled; which appears, in a great measure, to have been the case with the so much extolled red bark.

2. Cinchona pubescens, or pubescent cinchona: leaves ovate, elongated at the base, pubescent underneath, capsules cylindrical. The branches of this are pubescent to-

wards the end. Leaves a short span in length, a hand in breadth, obtuse. Native of Peru. Communicated to Vahl, by Jussieu.

3. Cinchona macrocarpa, or long-fruited cinchona: leaves oblong, pubescent, underneath ribbed. Branches jointed, the size of a swan's quill. Leaves more than a hand in length, oblong, the younger ones elliptic, somewhat coriaceous; the upper surface smooth and shining, the lower pubescent and ribbed. Native of Santa Fé. Vahl received it from Ortega. It is described in the latter editions of the Systema Vegetabilium, under the name of *cinchona officinalis*; and is there said to have been received from Mutis.

II. Corollas smooth, stamens standing out. 4. Cinchona Caribbæa, or Caribbean cinchona: peduncles axillary, one-flowered. According to Jacquin, this is an erect branching shrub, ten feet high: from fifteen to twenty feet in height, as Swartz affirms. Jacquin says, that the leaves are from two to three inches long, and reflex at the end; that the flowers are of a very pale flesh-colour, and exceedingly sweet-scented; and the capsules, before they are ripe, green, very bitter, and abounding in a juice that excites a heat and irritation on the lips and nostrils. Swartz adds, that the leaves are chiefly crowded at the ends of the twigs; that they are decussated, and channelled along the midrib; that the stipules are blackish; that the peduncles are both terminating and axillary, one-flowered, and smooth; that the tube of the corolla is an inch long and quinquangular; the segments reflex, revolute at the edge; that the filaments are inserted towards the base of the tube; the antheræ narrow, almost the length of the filaments.

Dr. Wright informs us, that the jesuits' bark tree of Jamaica and the Caribbees rises only to twenty feet, with a trunk not thick in proportion, but hard, tough, and of a yellowish-white colour in the inside. The leaves are of a rusty green, and the young buds of a bluish-green, hue. The flowers are of a dusky yellow colour, and the pods black: when ripe they split in two, and are, with their flat brown seeds, in every respect similar to those of cinchona officinalis. The bark in general is smooth and grey on the outside, though in some rough and scabrous; when well dried, the inside is of a dark brown colour. Its flavour at first is sweet, with a mixture of the taste of horse-radish, and of the aromatics of the east; but when swallowed, of that very bitterness and astringency which characterizes the Peruvian bark. It grows near the sea-shore, and is called in Jamaica *sea-side beech*. Linnæus, in the thirteenth edition of Systema Vegetabilium, doubts whether this species belongs to the genus cinchona. It is a native of the West Indies, and was introduced in 1780 by W. P. Perrin, esq.

5. Cinchona corymbifera, or corymbiferous cinchona: leaves oblong-lanceolate; corymbs axillary. Trunk upright, round, smoothish, a fathom or more in height, the thickness of the human arm; branches round, spreading, opposite, the upper ones herbaceous, compressed at the joints. Flowers white, red on the outside; before they open, they appear of a dusky purple. The bark is extremely bitter, and subastringent, very like the common jesuits' bark. Native of the islands of Tongataboo and Eaoowe, in the South Seas; where it is cultivated for the pleasant odour or elegance of the flowers.

6. Cinchona lineata, or lineated cinchona: panicle terminating; leaves ovate, acuminate, smooth; capsules five-cornered. Branches round at bottom, with an ash-coloured bark, purplish at top; leaves on very short petioles, an inch and half long, not at all shining, bluntish, marked with lines on the upper surface along the nerves. Native of the island of Dominica.

7. Cinchona floribunda, or tufted cinchona: panicle terminating; capsules turbinate, smooth; leaves elliptic, acuminate. The whole of this species is very smooth; the branches are round at bottom, but obscurely four-cornered at top, and purplish; leaves resembling those of the coffee shrub, frequently a short span in length, spreading very much, lanceolate-elliptic, on the upper surface even, shining, with a groove along the middle, on the under paler, veined, nerved, the nerves oblique, and but little raised. Native of St. Lucia, Martinico, and Hispaniola. In the first of these islands it was discovered by Mr. Alexander Anderson, about the year 1779, in the woods near the Grand Cul de Sac. The tree there is nearly the size of a cherry-tree, seldom thicker than the thigh, and tolerably straight; the wood is light and porous, without any of the bitterness and astringency of the bark. The flowers, which appear in June, are in small tufts, at first white, but afterwards purplish. The bark is of a lighter red than what was sent to St. Lucia under the name of *red bark*, inclining more to the colour of cinnamon. In this respect it seems to resemble what Dr. Relph calls *yellow bark*. See the first species. The tree grows in a stiff red clay; delights in a shady situation, a north-west aspect, under larger trees, and is generally near the middle of a hill, by some running water.

8. Cinchona brachycarpa: panicle terminating; capsules obovate, ribbed; leaves elliptic, obtuse. The whole plant smooth; leaves on very short petioles; flowers only half the size of those of the preceding species; capsule obovate, with eleven ribs. Native of Jamaica.

9. Cinchona angustifolia, or narrow-leaved cinchona: panicle terminating, capsules oblong, five-cornered; leaves linear-lanceolate, pubescent. This is a small tree, from ten to fifteen feet in height, with an upright smooth trunk, covered with a wrinkled ash-coloured bark, which becomes brown and striated near the root. Leaves acuminate with a bluntish tip, spreading, nerved, somewhat veiny, dusky green, but pubescent beneath. Native of Hispaniola.

CIN'CIA LEX, or CINCIAN LAW, was enacted by M. Cincius, tribune of the people, in the year of Rome 549. By it no man was permitted to take any money as a gift or a fee in judging a cause. *Livy.*

CINCINNA'TI, a flourishing town of the American states, and the present seat of government. It stands on the north bank of the Ohio, opposite the mouth of Licking river, two miles and a half south-west of Fort Washington, and about eight miles westerly of Columbia. Both these towns lie between Great and Little Miami rivers: eighty-two miles north by east of Frankfort, ninety north-west of Lexington, and 779 west by south of Philadelphia. Lat. 39. 22. N. lon. 85. 44. W.

CINCINNA'TUS, (L. Q.) a celebrated Roman, who was informed as he ploughed his field, that the senate had chosen him dictator. Upon this he left his ploughed land with regret, and repaired to the field of battle, where his countrymen were closely besieged by the Volsci and Æqui. He conquered the enemy, and returned to Rome in triumph; and sixteen days after his appointment, he laid down his office, and retired back to plough his fields. In his 80th year, he was again summoned against Præneste as dictator; and after a successful campaign, he resigned the absolute power he had enjoyed only twenty-one days, disregarding the rewards that were offered him by the senate. He flourished about 460 years before Christ. *Livy.*

CINCINNA'TUS, a military township of the American states in New-York district. It has Virgil on the west, and Salem on the east, and lies on two branches of Tioughnioga river, a western branch of the Chenango: fifty-three miles south-west by west of Cooperstown. Lat. 42. 30.

CIN'CLISIS, [κιγκλισις, from κιγκλιζω, to agitate.] An involuntary nictation, or winking of the eyes.

CINC'TURE, *s.* [*cinctura*, Lat.] Something worn round the body:

Columbus found th' American so girt
with feather'd *cincture*, naked else, and wild. *Milton.*

An inclosure.—The court and prison being within the *cincture* of one wall. *Bacon.*—In architecture, a ring or list at the top and bottom of the shaft of a column; separating

The Caribbean Jesuits Bark.

rating the shaft at one end from the base, at the other from the capital. It is supposed to be in imitation of the girths or ferrils anciently used to strengthen and preserve the primitive wood columns.

CIN'DER, *s.* [*cendre*, Fr. from *cineres*, Lat.] A mass ignited and quenched, without being reduced to ashes.—There is in smiths *cinders*, by some adhesion of iron, sometimes to be found a magnetical operation. *Brown.*—A hot coal that has ceased to flame.

CIN'DER-WENCH, or CINDER WOMAN, *s.* A woman whose trade is to rake in heaps of ashes for cinders:

'Tis under so much nasty rubbish laid,
To find it out's the *cinder-woman's*-trade. *Essay on Satire.*

CI'NEAS, a Thessalian minister, and friend to Pyrrhus king of Epirus. He was sent to Rome by his master to sue for peace, which he, however, could not obtain. He told Pyrrhus that the Roman senate was a venerable assembly of kings; and observed, that to fight with them was to fight against another Hydra. He was of such a retentive memory, that the day after his arrival at Rome he could call every senator and knight by his name. *Pliny.*

CINERA'RIA, *s.* [from *cinis*, Lat. ash, ash-coloured, most of the species being the colour of wood-ashes.] In botany, a genus of the class syngenesia, order polygamia superflua, natural order compositæ discoideæ. The generic characters are—Calyx: common simple, many-leaved; leaflets equal. Corolla: compound radiated; corollets hermaphrodite, equal, numerous in the disk; female ligulate, the same number with the leaves of the calyx, in the ray; proper of the hermaphrodite funnel-shaped, with an erect, five-cleft border; female ligulate, lanceolate, toothletted at top. Stamina: in the hermaphrodite, filaments five, filiform, short; anther cylindric, tubulous, five-cleft at top. Pistillum: in the hermaphrodite, germ oblong; style filiform, the length of the stamens; stigmas two, almost erect; females, germ oblong; style filiform, short; stigmas two, oblong, bluntish, revolute. Pericarpium: none; calyx unchanged. Seeds: solitary, linear, quadrangular; pappus hairy, copious. Receptaculum: naked, flattish.—*Essential Character.* Calyx simple, many-leaved, equal; pappus simple; receptaculum naked.

Species. 1. Cineraria geifolia, or kidney-leaved cineraria: peduncles branching; leaves kidney-shaped, suborbiculate, sublobed, toothed, petioled. This species has weak stalks trailing on the ground, but if supported rising four feet high: they are herbaceous, round, striated, and have white hairs scattered over them; leaves alternate, smoothish above, subhirsute beneath, especially the more tender ones, two inches long. Native of the Cape of Good Hope: cultivated in 1759, by Mr. Miller here; but, in the Amsterdam garden in 1697, from seeds sent from Africa.

2. Cineraria cymbalarifolia, or lyre-leaved cineraria: leaves lyrate; the end-leaf kidney-shaped, toothletted; upper stem-leaves clasping, lobed, quite entire. Root a solid bulb; stem herbaceous, simple, even. Native of the Cape of Good Hope.

3. Cineraria Sibirica, or Siberian cineraria: raceme simple; leaves cordate, obtuse, toothletted, even; stem entirely simple, one-leaved. Root perennial; stem undivided, the height of a man. Native of Siberia, the Levant, and, perhaps, the Pyrenees. Introduced in 1784 by Mr. John Bell.

4. Cineraria glauca, or glaucous cineraria: raceme simple; leaves spatulate-cordate, quite entire; stem quite simple. The leaves are of a glaucous hue, and are rather fleshy; the stem is yet higher than that of the foregoing sort, and the ray of the flower more copious. It is perennial, and a native of Siberia.

5. Cineraria sonchifolia, or thistle-leaved cineraria: leaves stem-clasping, sinuate, difform. The lower leaves are sinuate, the upper simple and quite entire; flowers large and purple. Native of the Cape of Good Hope.

6. Cineraria cordifolia, or heart-leaved cineraria: panicle few flowered; stem-leaves petioled, cordate, sharply serrate, smooth; stem angular. Root perennial, fibrose, brown; stem from one to two feet high, straight, obscurely angular, a little striated at top, fistulose, simple, almost smooth and green. The difference between this, and No. 7. 8. 9. consists principally in the leaves, which are broad-cordate, serrate-crenate, veined, shining, more or less villose on the back, petioled; the petioles of the root-leaves and lower stem-leaves are long, keeled, naked, and not in the least winged; the following stem-leaves are winged; the upper ones run into the petiole, and lose their cordate form. The younger Linnæus says, that it differs sufficiently from the third sort, in its panicled flowers not branching, in its petioled stem-leaves, and in its spreading calyx. Native of Austria and Swisserland: introduced in 1775, by doctors Pitcairn and Fothergill.

7. Cineraria crispa, or curled cineraria: flowers panicled; stem-leaves spatulate-oblong, serrate, obtuse, clasping; dilated and toothed at the base. This is two feet high; the peduncle and calyx are more villose than in the foregoing; root-leaves cordate, decurrent along the whole of the petiole, and laciniate-gashed; upper stem-leaves oblong, acute, sharply and unequally gash-serrate, sessile; all curled and waved about the edge. Native of Austria.

8. Cineraria integrifolia, or mountain cineraria, or fleawort: leaves oblong, obscurely toothed (or almost entire), shaggy; flowers in a simple involucred umbel, sometimes single. According to Linnæus, this plant is extremely variable. Jacquin has examined all the supposed varieties in their native places of growth, and has figured them in his Austrian Flora. De la Chenal (Act. Helv. viii. p. 137.) is of opinion, that Jacquin's plants may be comprehended under two species: 1. with leaves cordate-oblong, and naked petioles: 2. with the lower leaves ovate-oblong, on petioles not naked but membranaceous; the upper lanceolate elliptic or only ligulate; stem clasping. The several varieties are found on the Alps and Pyrenees, in Swisserland, Austria, about Montpelier, in Siberia, &c. The plant, which grows in high pastures or open chalky downs in some parts of England, as on Gogmagog-hills, Bartlow-hills, and Newmarket-heath, and near Basingstoke and Andover, has the radical leaves numerous, spreading on the ground, ovate, obovate, or spatulate, obscurely toothed, but always so, more or less, and turned back on the edge, generally lengthened out at the base, and clothed with loose shaggy wool; stem three to six inches high, (sometimes eight, nine, or twelve,) upright, simple, woolly, angular, or furrowed; stem-leaves lanceolate, woolly, half-stem-clasping, subappressed, very entire, alternate; flowers one to four, seldom more, yellow; perennial; flowering in May and June.

9. Cineraria longifolia, or long-leaved cineraria: leaves obscurely toothletted; all oblong. All the leaves of this are oblong; the root-leaves are attenuated into the petiole, and very slightly toothed. Native of Austria.

10. Cineraria palustris, or marsh cineraria: flowers corymbed; leaves broad-lanceolate, tooth-sinuated; stem villose. Leaves thick, tomentose, and almost clammy, covering the stem quite up to the flowers; the root perennial, large, fibrose, running deep in muddy ditches; stem one to three feet high, stout, hollow, with a thick clammy long wool. Grows in marshes in many parts of Europe; with us in Lincolnshire, about Marsh and Chatteris in the isle of Ely, near Norwich, Yarmouth, and Hadiscoe, in Norfolk; about Pillin-moss in Lancashire, and Aberavon in Merionethshire. A variety, with leaves not jagged, is mentioned by Ray to have been found by him in Norfolk. Another variety was observed by Mr. Woodward near Ramsey in Huntingdonshire, less woolly than the former; stem slender, about eighteen inches high; leaves ligulate-lanceolate, toothed; the lower about four inches long, the upper two and a half to one and a half, and not more than one-fourth wide; flowers smaller; but the fructification perfectly similar.

11. Cineraria aurea, or golden cineraria: flowers corymbed; leaves lanceolate, ferrate, tomentose underneath. Stature of fenecio paludofus, but the flowers twice as large, yellow, with a large ray. Native of Siberia; perennial.

12. Cineraria maritima, or fea cineraria; flowers panicled; leaves pinnatifid, tomentofe; divifions finuated; ftem fhrubby. Stems many, woody, two or three feet high, divided in many branches, which have a white downy bark; leaves very woolly, fix or eight inches long, deeply finuated, and jagged on their border. The ftems which fupport the flowers are a foot or more in length, having two or three fmall leaves on each, fhaped like thofe below, and terminated by many yellow flowers growing in panicles (or rather corymbs) fhaped like thofe of common ragwort; thefe appear from June to Auguft, and the feeds ripen the beginning of October. Gerard and Parkinfon fpeak of this plant as a native of Britain. Ray fays it is very common every where on the coaft of the Mediterranean, but that you will look for it in vain in England, or any of the northern countries of Europe. Yet Miller affirms that it grows naturally on the coafts of England and Wales. There is a variety of this, with ftems more woody; they rife higher, and do not branch fo much; the leaves are broader, not fo much finuated, and of a very dark green on their upper fide; the flowers are produced in fmaller bunches, and rarely produce feeds in England; nor are the plants fo hardy. It is a native of the fea coafts of Dauphiny, Italy, and Sicily.

13. Cineraria Canadenfis, or Canada cineraria: flowers panicled; leaves pinnatifid, fubvillofe; divifions finuated; ftem herbaceous. The daughter of the foregoing; the leaves, however, not tomentofe, but only fubvillofe, efpecially underneath. Found in Canada by Kalm.

14. Cineraria capillacea, or hairy cineraria: leaves pinnate; pinnas capillaceous, entire. 15. Cineraria linifolia, or flax-leaved cineraria: peduncles one-flowered; leaves fcattered; ftem fhrubby. 16. Cineraria purpurata, or purple cineraria: ftem fub-biflorous; leaves obovate, fubtomentofe. Natives of the Cape.

17. Cineraria amelloides, or blue-flowered cineraria, or cape after: peduncles one-flowered; leaves oppofite, ovate, naked; ftem underfhrubby. The leaves are petioled, ovate-oblong, green, and not afh-coloured; feeds elliptic, compreffed, pale, furrounded with a gently fwelling whitifh rim; ftem purplifh, rough, dividing into many branches near the root, fo as to form a low bufhy plant, feldom rifing more than two feet high; but the branches extending more than a foot on every fide; leaves about an inch long, and a third part of an inch broad, thick, fucculent, rough, feffile, generally two, but fometimes three, at a joint, or even four, two being larger and two fmaller. Towards the upper part of the branches arife the peduncles, from four to fix inches long, naked, each fupporting one flower, the ray of which is of a fine fky blue, and, after it has been fome time expanded, turns back towards the calyx. The whole plant is a little acrid to the tafte. It is never without flowers the whole year. The feeds were fent to Mr. Miller from the Cape in the year 1753, and vegetated the following fpring in the Chelfea garden.

18. Cineraria Americana, or American cineraria: fhrubby; panicles axillary; leaves alternate, petioled, broad-lanceolate, ferrate; fmooth above, and hoary underneath. The whole plant is clothed with an epidermis of very fine wool, which may eafily be rubbed off like a thin membrane; the branches, petioles, peduncles, and lower furface of the leaves, are white with it; ftems woody; leaves veined, the confiftence of evergreens. Obferved in South America by Mutis.

19. Cineraria alata, or winged cineraria: ftem herbaceous; leaves obovate, decurrent; flowers corymbed. Stem erect, fparingly branched, angular, even, two feet high, with a branch next the flowers farther progreffive; leaves quite entire, even, oleraceous, decurrent to the next, an inch in length. It forms the link between the Cacalias and the Othonnas. Native of the Cape.

20. Cineraria elongata, or long cineraria: leaves fubcordate gnawn; peduncles very long, fubulate-fcaly. Stem erect, branched, a foot and half high, reddifh, at the ramifications tomentofe. Native of the Cape.

21. Cineraria cacalioides, or cacalia cineraria: leaves columnar, oblong, flefhy; panicle terminal, elongated, few-flowered; peduncles alternate. This very much refembles the cacalias, or foreign coltsfoot, in the flefhinefs of the herb; indeed the fpecies in general are little more than *cacalia* furnifhed with a ray.

22. Cineraria denticulata, or dentated cineraria: leaves lanceolate, fmooth, toothletted; flowers panicled. 23. Cineraria perfoliata: leaves ovate, cordate, ftem-clafping; peduncles one-flowered, elongated. 24. Cineraria lineata: leaves lanceolate, tomentofe underneath, ferrated at the end, toothed at the bafe. Found at the Cape by Thunberg.

25. Cineraria haftifolia, or fpear-leaved cineraria: leaves haftate; divifions lateral, bifid, divaricated. Stem erect, more than a fpan high; flower yellow. Native of the Cape; this we owe to Sparrmann.

26. Cineraria Japonica, or Japan cineraria: leaves fword-fhaped, toothed, tomentofe; flowers terminal. Stem round, fimple, erect, tomentofe, a fpan high; leaves alternate, acute, attenuated to both ends, erect; the lower a hand in length, the upper gradually fhorter; flowers folitary or tern, yellow. Native of Japan.

27. Cineraria rotundifolia, or round-leaved cineraria: panicles few-flowered; leaves petioled, ovate-roundifh, quite entire, tomentofe underneath; ftem arboreous. 28. Cineraria repanda, or broad cineraria: panicles compound, racemed, diffufed; leaves petioled, ovate, repand-finuate, tomentofe underneath; ftem arboreous. Natives of New Zealand.

29. Cineraria lanata, or woolly cineraria: peduncles one-flowered; leaves cordate-roundifh, feven-angled, lanuginous underneath. In the beauty of its bloffoms, this fpecies, lately introduced from Africa, by far eclipfes all the others cultivated in our gardens; its petals exteriorly are of a moft vivid purple, interiorly they are white. It flowers early in the fpring; and, by proper management, may be made to flower the whole year through. Found in the Canary Iflands by Maffon, and introduced in 1780.

30. Cineraria humifufa, or trailing cineraria: peduncles one-flowered; leaves kidney-form, fomewhat angular, petioles eared, or naked at the end. The flowers are yellow, and both they and the calyxes are villofe and fomewhat rugged.

31. Cineraria vifcofa, or clammy cineraria: peduncles one-flowered; leaves pinnatifid-lobed, acute, vifcid, fomewhat flefhy. Perhaps this may be nothing more than a variety of the foregoing. They are both natives of the Cape of Good Hope, were found there by Maffon, and were introduced in 1774.

32. Cineraria populifolia, or poplar-leaved cineraria: flowers corymbed; leaves cordate, fomewhat angular, tomentofe underneath, petioles having feveral pairs of appendicles at the end. This is a fhrub with an angular tomentofe hoary ftem; leaves refembling thofe of white poplar, nerved, veined, green, and very fmooth on the upper furface, but white on the under; flowers yellow. Found in the Canary Iflands by Maffon.

33. Cineraria aurita, or purple-flowered cineraria: flowers corymbed; leaves cordate, fomewhat angular, tomentofe underneath; petioles two-eared at the bafe: Flowers purple; leaves refembling thofe of the poplar; and varying with larger and fmaller earlets. Native of Madeira; found there by Maffon.

34. Cineraria malvæfolia, or mallow-leaved cineraria: flowers cymed; leaves cordate, angular, fomewhat tomentofe underneath; petioles fimple. Native of the Canary Iflands, and St. Miguel one of the Azores; found there by Maffon, and introduced in 1777.

35. Cineraria cruenta, or purple-leaved cineraria: flowers cymed; leaves cordate, angular, purple underneath; petioles eared at the base. Native of the Canary Islands; introduced in 1777 by Masson.

36. Cineraria lobata, or lobed cineraria: flowers corymbed; leaves roundish, many-lobed, smooth; petioles eared at the base; calyxes subcalicled. This has the herb of a cineraria; but, having a bracte or two under the calyx, like a calycle, it can scarcely be distinguished from a senecio. Found at the Cape of Good Hope by Masson; and introduced in 1774.

37. Cineraria repanda, or Loureiro's cineraria: panicled, diffused; leaves ovate lanceolate, serrate-repand, smooth. Stem suffruticose, erect, round, smooth, four feet high, branched; leaves alternate; flowers yellow, terminating. Native of China, near Canton, described by Loureiro, whose name we have given it to distinguish it from the 28th species.

38. Cineraria minuta, or small cineraria: leaves pinnatifid; stem one-flowered, capillary. Root annual; stems often two, capillary, two inches high, at first woolly, but afterwards almost smooth, one-flowered; leaves alternate, sessile, violet-coloured underneath. Native of Spain, near Aranjuez; flowering in May.

39. Cineraria glabra, or smooth cineraria: flowers corymbed; calyxes cylindric; leaves oblong, acute, somewhat toothletted, nerveless smooth on both sides, and a little succulent; stem shrubby. 40. Cineraria discolor: flowers corymbed; leaves oblong-lanceolate, acuminate, somewhat toothletted, smooth, beneath white tomentose; stem shrubby. Native of Jamaica.

Propagation and Culture. All the sorts may be increased by cuttings, planted in a shady border during the summer months, and duly watered. These will put out roots in a month or five weeks, soon after which it will be proper to transplant them into pots, because their roots are very apt to spread in the full ground. As most of these plants grow naturally at the Cape of Good Hope, they are too tender to live through the winters in England, in the open air; yet, if they are nursed tenderly, they are apt to draw up weak; the surest way, therefore, to preserve them, is to make young plants annually from cuttings, and to place them in a common hot-bed frame in winter, where they may enjoy the full air in mild weather, but be screened from the frost; and in summer to place them abroad with other hardier sorts of exotic plants.

The twelfth is hardier; and, when the cuttings or slips are well rooted, they should be planted in a dry rubbishy soil, where they will resist the cold of our ordinary winters very well, and continue many years; but, in rich moist ground, the plants are often so very luxuriant in summer, as to be killed in winter where there is much frost. The 29th is by some persons kept in the stove, and may be made to flower earlier by that means; but it succeeds better in a common greenhouse, with no more heat than is just necessary to keep out the frost; it may, indeed, be kept in a common hot-bed frame, unless the weather prove very severe. What renders this plant a more valuable acquisition to the greenhouse, is its hardiness, its readiness to flower, and the facility with which it may be propagated by cuttings. As this plant, with many others which are obliged to be confined, is liable to be infested with aphides, or, in vulgar phrase, to become lousy; the best way to have handsome, healthy, strong-flowering, plants, is to procure a constant succession by cuttings, which strike very readily, if placed in a pot, and plunged into a bed of tan. See OTHONNA ABROTANIFOLIA, and OTHONNA FRUTESCENS.

CINERA'TION, *s.* [from *cineres*, Lat.] The reduction of any thing by fire to ashes. A term of chemistry.

CINERI'TIOUS, *adj.* [*cinericius*, Lat.] Having the form or state of ashes.—The nerves arise from the glands of the *cineritious* part of the brain, and are terminated in all parts of the body. *Cheyne.*

CINE'RULENT, *adj.* [*cineres*, Lat.] Full of ashes.

CINE'SI, a town of Sicily, in the valley of Mazara: excellent manna is collected in its neighbourhood: twenty miles west of Palermo.

CI'NGLE, *s.* [*cingulum*. Lat.] A girth for a horse.

CIN'GULUM VENERIS, *s.* in chiromancy, the girdle of Venus, the figure of a semicircle drawn from a space between the middle finger, to the space between the middle finger and ring finger.

CIN'NA (L. Corn.), a Roman who oppressed the republic with his cruelties. He was banished by Octavius for attempting to make the fugitive slaves free. He joined himself with Marius; and with him at the head of the slaves he defeated his enemies, and made himself consul even to a fourth time. He massacred so many citizens at Rome, that his name became odious; and one of his officers assassinated him at Ancona, as he was preparing war against Sylla.

CIN'NA (C. Helvius), a poet intimate with Cæsar. He went to attend the obsequies of Cæsar, and being mistaken by the populace for the other Cinna, he was torn to pieces.—Also a grandson of Pompey's. He conspired against Augustus, who pardoned him, and made him one of his most intimate friends. He was made consul in the year of Rome 785, and made Augustus his heir.

CIN'NA, *s.* in botany, a genus of the class monandria, order digynia, in the natural order of grasses. The generic characters are—Calyx: glume one-flowered, two-valved, compressed, linear, keeled, acuminate; one valve shorter, mucronated. Corolla: glume bivalve, compressed, linear; outer valve within the smaller valve of the calyx, longer, with somewhat of an awn below the tip; inner slender, shorter. Stamina: filament one, capillary; anther oblong, forked at each end. Pistillum: germ turbinated; styles two, capillary, very short; stigmas longer, plumous. Pericarpium: none; glume involving. Seed: one, cylindric.—*Essential Character.* Calyx, glume two-valve, one-flowered; corolla, glume two-valve; seed, one.

There is but one species, called cinna arundinacea. It is a grass, the size of oats; root perennial; culms many; leaves broadish, smooth, many-nerved, rugged about the edge; panicle glaucous, oblong, attenuated, somewhat compressed, composed of imbricate racemes; keel of the calyx rough, one of the valves having an awn-like point; anther purple; styles hirsute. Native of Canada; whence the seeds were sent by Kalm. Since this grass varies with one, two, and three, stamens, it may very reasonably be associated with the agrostides; accordingly, it is now generally agreed to remove it into that genus; and Retzius assigns it the following specific character: Panicle contracted, awnless; flowers acuminate, with one, two, or three, stamens; leaves plane, rugged.

CIN'NABAR, [*cinnabaris*, Lat.] An ore of mercury, consisting of that metal united with sulphur. This combination is also made by art. The native cinnabar is of different shades, from yellowish to a deep red, and even black. It is found either in hard or friable masses, irregularly figured or crystalized in cubes, sometimes though rarely transparent, and its texture is either radiated, striated, scaly, or granular. One hundred parts contain pretty regularly eighty parts mercury and twenty sulphur. In closed vessels it sublimes by heat, but in open vessels it is decomposed. The principal cinnibar mines which are wrought in Europe, are those of the Palatinate and those of Spain. In the Palatinate the ore is decomposed by mixing it with one third of its weight of lime, and distillation in iron cucurbits one inch thick, three feet nine inches long, one foot wide, with an aperture of five inches. These vessels are disposed in a gallery, forty-eight being arranged in two parallel lines, a second row above the first. An earthen pot is one third part filled with water, adapted to the neck of each cucurbit, and accurately luted on. The gallery is heated by a fire lighted at the two ends, and several apertures, formed in the upper part, serve the purpose of chimneys. The heat is kept up for ten or twelve hours before the process is finished. The same process was also followed at Almaden

den in Spain, till the year 1647, when the following was adopted on account of its greater simplicity and economy. The furnace is twelve feet high, and four feet and a half diameter within. At the distance of five feet and a half from the ground is an arched floor, upon which the ore is deposited, and a fire is kindled in the ash-hole. The sublimed mercury escapes through twelve apertures, formed in the upper part of the laboratory. To these apertures rows of aludels inserted one in the other are adjusted, and disposed parallel upon a terrace, which terminates in a small building separated into as many chambers as there are files of aludels. Each chamber has a cavity in the middle, to receive the small quantity of mercury which may arrive to that distance. Every furnace contains two hundred quintals of cinnabar, and the fire is kept up for three days. The sulphur which burns is disengaged in the form of sulphurous acid, and escapes through small chimneys made in each chamber. Every repetition of the process affords from twenty-five to sixty quintals of mercury. The mine of Almaden has been wrought from time immemorial. Its veins are from three to fourteen feet in breadth; and their breadth is even larger where they join.

Artificial cinnabar is known in commerce by the name of vermilion, and ought to be used instead of native, in all cases wherein this compound is meant to be applied to medical purposes, on account of its greater purity. The manufacture of this pigment has long been in the hands of the Hollanders, who carefully kept it a secret; and as there is some difficulty in perfectly succeeding in the process, chemical writers have given various methods of performing it. The manufactory of artificial cinnabar at Amsterdam, is one of the most considerable in Holland. Forty-eight thousand pounds of vermilion are said to be annually made in three furnaces by four workmen, besides other mercurial preparations. Their ethiops mineral is first prepared by mixing together 150 pounds of sulphur with 1080 pounds of pure mercury, and then exposing the mixture to a moderate heat in a flat-bottomed polished iron vessel, one foot in depth, and two feet and a half in diameter: its form is that of a chocolate machine. The mercurial ethiops thus prepared is then pounded, in order more readily to be put into small earthen bottles, capable of holding each about twenty-four ounces of water. Thirty or forty of these bottles are filled in readiness for the subsequent operation. In the next place three large pots, or sublimatory vessels, made of clay and very pure sand, are taken. These vessels are previously covered with a coating of lute, which is suffered to become perfectly solid and dry before the vessel is used. These pots are placed over three furnaces, upon iron circles. The sublimatory vessels may be of different sizes, and the furnaces are constructed in such a manner as that the flame circulates freely round the vessels to two thirds of their height.

When the vessels are duly placed in their furnaces, a moderate fire is first lighted, which is gradually raised until they become red hot. The fuel is turf, or peat, commonly used throughout the United Provinces. As soon as the vessels are red hot, a bottle of the ethiops is poured into the first, another into the second, and another into the third. In the subsequent progress of the operation, two, three, and perhaps more bottles may be poured in at a time; but this depends on the strength of the inflammation exhibited by the ethiops after its introduction, the flame of which sometimes rises to the height of four, and even to six, feet. When this is a little diminished, the mouth of the vessel is covered with a plate of iron, one foot square, and an inch and a half thick, which perfectly closes it. In this way, during thirty-four hours, the whole of the prepared matter is introduced into three pots; that is to say, for each pot three hundred and sixty pounds of mercury, and fifty of sulphur. After all the ethiops been has introduced, the fire is duly kept up; and, when the whole sublimation has taken place, it is suffered to go out, which requires thirty-six hours from first to last. The workmen know when the fire is too strong, or too weak, by the appearance of the flame when the iron cover is taken off: if too strong, the flame rises to the height of several feet; if, on the contrary, it be too weak, the flame barely appears playing about the edges of the pot. The proper degree of heat is when, upon taking off the cover, a brisk flame appears, but does not rise more than three or four inches above the opening. In the last thirty-six hours, the mass is stirred every quarter or half an hour with an iron triangle, to accelerate the sublimation. When the whole is cool, the vessels are taken out by means of iron circles, which prevent their breaking. The cinnabar is taken out by breaking the vessel. Each vessel constantly affords four hundred pounds of cinnabar, the loss of original weight in each being ten pounds. The workmen relieve each other night and day, every twelve hours. They likewise manufacture on the same premises the corrosive sublimate of mercury, and the red calx called red precipitate. Cinnabar is a word now confined to the native and factitious sorts; but formerly it was applied to dragon's blood, madder-root, ceruse calcined to redness, and to sundry other articles.—For the modern names, and latest methods, of preparing ethiops, and cinnabar, see CHEMISTRY, p. 282, of this volume.

CIN'NADON, a Lacedæmonian youth, who resolved to put to death the Ephori, and seize upon the sovereign power. His conspiracy was discovered, and he was put to death. *Aristot.*

CIN'NAMON, [κινναμωμον, from קנמון *kinnamon* Arab.] the bark of several species of laurus. The true cinnamon is from the laurus cinnamomum; and the base cinnamon, which is often sold for the true, is from the laurus cassia. See LAURUS. The white cinnamon, called also Winter's bark, is the bark of a tree frequent in the island of St. Domingo, Guadaloupe, &c. See CANELLA.

CIN'NAMUS, a Greek historian, who wrote a history of the eastern empire, during the reigns of John and Manuel Commenes, from 1118 to 1143. His style is reckoned the best of the modern Greek authors. He died after 1183.

CIN'NERETH, CINERETH, CHINERETH, (Moses,) or GENNESARETH, in ancient geography, a lake of the Lower Galilee; called the *Sea of Galilee*, (Matthew;) *of Tiberius*, (John.) Its name *Gennesareth* is from a small cognominal district upon it. In breadth forty stadia, in length 140. The water fresh and fit to drink, and abounding in fish.

CINQUE, *s.* [French.] A five. It is used in games, alone; but is often compounded with other words, to designate five parts.

CINQUE-FOIL, *s.* [*cinque feuille*, Fr.] A kind of five-leaved clover. See POTENTILLA, SIBBALDIA, and COMMARUM.

CINQUE MARS, a town in France, in the department of the Indre and Loire: ten miles north-west of Tours.

CINQUE-PACE, *s.* [*cinque pas*, Fr.] A kind of grave dance, of five slow steps.—Wooing, wedding, and repenting, is a Scotch jig, a measure, and a *cinque-pace*. The first suit is hot and hasty, like a Scotch jig, and full as fantastical; the wedding, mannerly and modest, as a measure full of state and gravity; and then comes repentance, and with his bad legs, falls into the *cinque-pace* faster and faster, till he sinks into the grave. *Shakespeare.*

CINQUE-PORTS, [*quinque portus*, Lat.] Those havens that lie towards France, and therefore have been thought by our kings to be such as ought to be vigilantly guarded and preserved against invasion: in which respect they have an especial governor, called *lord warden of the cinque-ports*, and divers privileges granted them, as a peculiar jurisdiction; their warden having not only the authority of an admiral amongst them, but sending out writs in his own name, &c. 4 *Inst.* 222. Cambden says, that Kent is accounted the key of England; and that William the Conqueror was the first that made a constable of Dover castle, and warden of the cinque-ports, which he did to bring that

that country under a stricter submission to his government; but king John was the first who granted the privileges to those ports, which they still enjoy: however, it was upon condition that they should provide a certain number of ships at their own charge for forty days, as often as the king should have occasion for them in the wars, he being then under a necessity of having a navy for passing into Normandy, to recover that dukedom which he had lost. And this service the barons of the cinque ports acknowledged and performed, upon the king's summons, attended with their ships the time limited at their proper costs, and staying as long after as the king pleased at his own charge. *Somner of Roman Ports in Kent.*

The cinque-ports, as we now account them, are, Dover, Sandwich, Romney, Winchelsea, and Rye; and to these we may add Hythe and Hastings, which are reckoned as part or members of the cinque-ports: though by the first institution it is said that Winchelsea and Rye were added as members, and that the others were the cinque-ports: there are also several other towns adjoining that have the privileges of the ports. These cinque-ports have certain franchises to hold pleas, &c. and the king's writs do not run there; but on a judgment in any of the king's courts, if the defendant hath no goods, &c. except in the ports, the plaintiff may get the records certified into chancery, and from thence sent by mittimus to the lord warden to make execution. 4 *Inst.* 223. The constable of Dover castle is lord warden of the cinque-ports. And there are several courts within the cinque-ports; one before the constable, others within the ports themselves, before the mayors and jurats; another, which is called *curia quinque portuum apud Shepway*: there is likewise a court of chancery, in the cinque ports, to decide matters of equity; but no original writs issue thence. 1 *Danv. Abr.* 793. the jurisdiction of the cinque-ports is general, extending to personal, real, and mixed actions: and, if any erroneous judgment is given in the cinque-ports before any of the mayors and jurats, error lies according to the custom, by bill in nature of error, before the lord warden of the cinque-ports, in his court of Shepway. And in these cases the mayor and jurats may be fined, and the mayor removed. *Cromp. Jurisd.* 138. —and error lies from the court of Shepway to the court of king's-bench. *Jenk.* 71. 1 *Sid.* 356.

It has been observed that the cinque-ports are not *jura regalia*, like counties palatine, but are parcel of the county of Kent: so that if a writ be brought against one for land within the cinque ports, and he appears and pleads to it, and judgment is given against him in the common pleas, this judgment shall bind him; for the land is not exempted out of the county, and the tenant may waive the benefit of his privilege. *Wood's Inst.* 519. The cinque ports cannot award process of outlawry. *Cro. Eliz.* 910. And a *quo-minus* lies to the cinque-ports. If a man is imprisoned at Dover by the lord warden, an habeas corpus may be issued; for the privilege that the king's writ lies not there is intended between party and party, and there can be no such privilege against the king; and an habeas corpus is a prerogative writ, by which the king demands an account of the liberty of the subject. 1 *Nelf. Abr.* 447. Certiorari lies to the cinque-ports, to remove indictments; and the jurisdiction that *brev. dom. regis non currit* is only in civil causes between party and party. 2 *Hawk.* P. C. c. 27.

CIN'QUE-SPOTTED, *adj.* Having five spots:

On her left breast
A mole, *cinque-spotted*, like the crimson drops
I' th' bottom of a cowslip. *Shakespeare.*

CIN'QUE-VILLAS, a town of Portugal, in the province of Beira: two leagues north-east of Almeida.

CIN'QUEL, a town of the island of Sumatra, on the western coast of a river of the same name.

CINTEGABEL'LE, a town of France, in the department of the Upper Garonne, and chief place of a canton, in the district of Muret, situated on the Arriege: sixteen miles south of Toulouse.

CINTRA, a town of Portugal, in Estramadura, situated between the mountains of Cintra, anciently called the Mountains of the Moon, at the mouth of the Tagus. Here was a palace built by the Moors, which was destroyed by an earthquake in 1655, and rebuilt by king Joseph in the same style; it contains four parish churches, and one thousand nine hundred inhabitants: thirteen miles north-west of Lisbon.

CI'NUS or CYNUS, a famous civilian of Pistoia in the fourteenth century. His commentary on the code was finished in 1313: he also wrote on some parts of the digest. He was no less famous for his Italian poems; and is ranked among those who first gave graces to the Tuscan lyric poetry.

CI'NYRA, in the Jewish antiquities, a musical instrument. This, and the Hebrew *cinnor*, which is generally translated *cithera*, *lyra*, *psalterium*, are the same. It was made of wood, and was used in the temple of Jerusalem. Josephus says that the cinyra of the temple had ten strings, and that it was touched with a bow. In another place he says that Solomon made a great number of them with a precious kind of metal called *electrum*.

CI'NYRAS, in fabulous history, a king of Cyprus, son of Paphus. He married Cenchreis, by whom he had a daughter called Myrra. Myrra fell in love with her father, and in the absence of her mother she introduced herself into his bed by means of her nurse. Cinyras had by her a son called Adonis; and when he knew the incest he had committed, he attempted to stab his daughter, who escaped his pursuit and fled to Arabia, where, after she had brought forth, she was changed into a tree which still bears her name. Cinyras, according to some, stabbed himself. *Ovid.*

CINZA'NO, a town of Italy, in the principality of Piedmont: five miles south-south-east of Chivazzo.

CI'ON, *s.* [*sion*, or *scion*, French.] A sprout; a shoot from a plant, or tree.—We have reason to cool our raging motions, our carnal stings, our unbitted lusts; whereof I take this, that you call love, to be a sect or *cion*. *Shakespeare.* —The stately Caledonian oak, newly settled in his triumphant throne, begirt with *cions* of his own royal stem. *Howel.*—The shoot or sprout of the tree engrafted or inserted on the stock of another.—The *cion* over-ruleth the stock; and the stock is but passive, and giveth aliment, but no motion, to the graft. *Bacon.* See the article GRAFTING

CIO'NIS, [from κιων, the uvula.] A diseased enlargement and painful swelling of the uvula.

CIOTA'T (La), a seaport town of France, in the department of the mouths of the Rhône, and chief place of a canton, in the district of Marseilles, situated at the bottom of a bay, in the Mediterranean: in a country which produces delicious fruit, oil, and excellent wine. The harbour is in the form of a horse-shoe, and defended with several forts: four leagues south-east of Marseilles, and seven and a half south-south-east, of Aix. Lat. 43. 10. N. lon. 23. 17. E. Ferro.

CI'PHER, *s.* [*chifre*, Fr. *zifra*, Ital. *cifra*, low Latin, from an oriental root.] An arithmetical character, by which some number is noted; a figure.—An arithmetical mark, which, standing for nothing itself, increases the value of the other figures. See ARITHMETIC.—As, in accounts, *ciphers* and figures pass for real sums, so names pass for things. *South.*—An intertexture of letters engraved usually on boxes or plate, or on the pannels of carriages:

Troy flamed in burnish'd gold; and o'er the throne,
Arms and the man in golden *ciphers* shone. *Pope.*

A character in general.—In succeeding times this wisdom began to be written in *ciphers* and characters, and letters bearing the form of creatures. *Raleigh.*—A secret or occult manner of writing, or the key to it:

This book, as long-liv'd as the elements,
In *cipher* writ, or new-made idioms. *Donne.*

To CI'PHER. *v. n.* To practise arithmetic:

You have been bred to business; you can *cipher*;
I wonder you never used your pen and ink. *Arbuthnot.*

To CI'PHER. *v. a.* To write in occult characters.—He frequented sermons, and penned notes: his notes he *ciphered* with Greek characters. *Hayward.*

CIPIE'RES, a town of France, in the department of the Var: ten miles north of Grasse.

CI'POLIN, *s.* a species of marble. The cipolin from Rome is a green marble with white zones; it gives fire with steel, though difficultly. One hundred parts of it contain 67·8 of mild calcareous earth, 25 of quartz, 8 of shistus, 0·2 of iron, besides the iron contained in the shistus. The cipolin from Autun contains 83 parts mild calcareous earth, 12 of green mica, and one of iron.

CIP'PUS, a noble Roman, who, as he returned home victorious, was told that if he entered the city he must reign there. Unwilling to enslave his country, he assembled the senate without the walls, and banished himself for ever from the city, and retired to live upon a single acre of ground.

CIP'SELA, a town of European Turkey, in the province of Romania: twenty-four miles north-north-west of Gallipoli.

CIR'CADA, *s.* A tribute anciently paid to the bishop or archdeacon for visiting the churches.

CIRCÆ'A, *s.* [from the famous enchantress *Circe.*] In botany, a genus of the class diandria, order monogynia, natural order aggregatæ. The generic characters are—Calyx: perianthium two-leaved; leaflets ovate, concave, deflected, deciduous. Corolla: petals two, obcordate, generally shorter than the calyx, spreading, equal. Stamina: filaments two, capillary, erect, the length of the calyx; antheræ roundish. Pistillum: germ turbinate, inferior; style filiform, the length of the stamens; stigma obtuse, emarginate. Pericarpium: capsule turbinate-ovate, hispid, two-celled, two-valved, opening from the base towards the top. Seeds: solitary, oblong, narrower at the bottom.—*Essential Character.* Corolla, two-petalled; calyx, two-leaved, superior; seed, one, two-celled.

Species. 1. Circæa lutetiana, or common enchanter's nightshade: stem erect; racemes many; leaves ovate. Root perennial, creeping, toothed; the whole plant pubescent; stems from twelve to eighteen inches in height and more, erect, round, villose, or smooth, seldom hairy; the joints swelled, and sometimes purplish, branching; leaves opposite, petioled, subcordate, pointed, even, veined, paler underneath, about two inches long, and an inch broad; or ovate, subserrate, opake, as Linnæus; or elliptic, subvillose, entire, as Scopoli; or cordate-ovate, acuminate, as Dr. Stokes describes them; a little woolly, as Dr. Withering; slightly hairy on the margin, as Lightfoot; or smooth, as Pollich affirms; sometimes reddish, and toothed on the edge; or betwixt toothed and serrate, the points being directed towards the end of the leaf, but the margin between the points hollowed out, according to Dr. Stokes; entire, waved or serrated, and ciliated, according to Haller; flowers in simple racemes on the tops of the branches, both terminating and lateral; frequently solitary; sometimes more than forty flowers in a raceme. It may be presumed, from the disagreement of authors in their description of this plant, that it is subject to variation. It is not uncommon in shady lanes and orchards, under moist hedges and walls, and in woods, flowering in July and August. The seeds stick by their little hooks to any thing that passes; and, according to Boerhaave, this circumstance gave occasion to the name, the fruit laying hold on the clothes of passengers, and drawing them to it, as Circe was fabled to do by her enchantments. It is a weed frequently in gardens, and not very easily destroyed, the roots being creeping. Sheep, however, are said to eat it; and, though it has not found its way into the dispensatories, yet it is esteemed very detersive, and is recommended by Chomel against the piles, used both outwardly in a cataplasm, and inwardly in an infusion.

2. Circæa alpina, or mountain enchanter's nightshade: stem prostrate; raceme single; leaves cordate. Linnæus doubts whether this be a distinct species from the first. Scopoli and most others have no doubt of their being specifically different; and Haller relates that it does not become like the foregoing, and that it is no variety. According to Scopoli, the specific difference does not consist in an ascending stem, a single raceme, or a coloured calyx, but in the form, smoothness, and toothed edge, of the leaves. Grimm remarked several racemes on one plant. Linnæus remarks, that the stem is prostrate, scarcely a finger's length; leaves cordate, toothed, shining; calyx coloured, as is the corolla. And Mr. Woodward, that the raceme is generally one, but that sometimes there are two or three, leaves of a yellower green; and the plant sometimes six inches high. It differs from the foregoing according to Haller and Krocker, in having a decumbent stem, more tender and smooth, less, and scarcely ever more than a span in height; leaves glossy, more deeply cut, more evidently cordate, and notched at the petiole; the calyx redder; and the racemes simple. The whole plant seems to be smooth, smaller, and of a more delicate texture than the common species, seldom branching, the stem usually reclining towards the bottom. Linnæus allows it only a single raceme, others give it two or three, and even five. Haller affirms that it has even more than the common sort. Grows in rocky woods in Lapland, Sweden, Denmark, Switzerland, on mount Scheidegg, Carniola, Silesia, Piedmont, &c. with us about Leeds and Halifax in Yorkshire, in Lancashire, Westmoreland, Cumberland, and Scotland. Mr. Miller found it growing wild in the wood near the Hague.

Propagation and Culture. These plants multiply exceedingly by their creeping roots, and are therefore seldom kept in gardens. If the roots be planted in any shady moist part of a garden, they will increase fast enough without any care.

CIR'CAR, a name given in Hindoostan to a tract of country, which is not very dissimilar to the term county in England, few of them being of less extent than the largest English county.

CIR'CARS (Northern), these are five circars, lying to the north of the Carnatic, or Madras: Cicacole, Condapilly, Ellore, Rajamundry, and Guntoor; the first four are in the hands of the English, the latter belongs to the Nizam. The first four occupy the sea coast, from the Chilka lake on the confines of Cattack, to the northern bank of the Kistnah river, forming, comparatively, a long narrow slip of country, 350 miles long, and from twenty to seventy-five wide. The nature of the country is such as to be easily defensible against an Indian enemy, it having a barrier of mountains and extensive forests on one side, and the sea on the other; the extremities only being open. Its greatest defect is in point of relative situation to Bengal and Madras; it being 350 British miles from the first, and 250 from the latter; so that the troops destined to protect it, cannot be hastily called on any pressing service that may arise at either presidency. The circars, in point of strictness, appertain partly to Golconda (or the Deccan) and partly to Orissa; and are held of the Nizam, on condition of paying him a stipulated quit-rent. When the French took possession of the five circars in 1753, they were valued at about forty-three lacks of rupees per annum. The English never possessed Guntoor, which was estimated at near seven lacks of the above sum; so that thirty-six lacks (360,000l.) should be taken for the true value of the English possession in the circars. In 1784, they were reckoned to produce about that sum. The manufactures of the circars are various; the different kinds of cotton, the muslins of Chicacole, the beautiful woollen carpets of Ellore, and silks of Burrampore, made

from raw materials imported from Madras and China, and the bay salt exported to Madras, which alone amounts in value to twenty-five lacks of rupees, or 7500l. sterling.

CIRCAS'SIA, a country of Asia, bounded on the north by the river Don, on the east by the Caspian Sea and the mouths of the Volga, on the south by Mount Caucasus and the Black Sea, and on the west by part of the Black Sea and the lake of Azoph. It was formerly governed by several independent princes, but is now almost wholly subject to Russia, and included in the government of Caucasus. The Circassians are in general well made, and excellent horsemen; the women generally handsome. Their principal traffic is in slaves, honey, wax, skins of cattle, deer, and tigers. They have no money, and all their commerce is by exchange. The Circassians were formerly Christians; but, for want of instruction and written laws, they content themselves with a bare profession of being Christians or Mahometans.

CIR'CE, in fabulous history, a daughter of Sol and Perseis, celebrated for her knowledge of magic and poisonous herbs. She was sister to Æetes king of Colchis, and to Pasiphae the wife of Minos. She married a Sarmatian prince of Colchis, whom she murdered to obtain the kingdom. She was expelled by her subjects, and carried by her father upon the coasts of Italy in an island called *Ææa*. Ulysses, at his return from the Trojan war, visited her coast; and all his companions, who ran headlong into pleasure and voluptuousness, were changed by Circe's potions into filthy swine. Ulysses, who was fortified against all enchantments by an herb called *moly*, which he had received from Mercury, went to Circe, and demanded, sword in hand, the restoration of his companions to their former state. She complied, and loaded the hero with pleasures and honours. In this voluptuous retreat, Ulysses had by Circe one son called *Telegonus*, or two, according to Hesiod, called *Agrius* and *Latinus*. For one whole year Ulysses forgot his glory in Circe's arms. At his departure, the nymph advised him to descend to hell, and to consult the manes of Tiresias, concerning the fates that attended him. Circe shewed herself cruel to Scylla her rival, and to Picus. *Homer*.

CIRCEN'SIAN GAMES, *s.* A general term under which was comprehended all combats exhibited in the Roman circus, in imitation of the Olympic games in Greece. Most of the feasts of the Romans were accompanied with Circensian games; and the magistrates, and other officers of the republic, frequently presented the people with them, in order to procure their favour. The grand games were held five days, commencing on the 15th of September. See CIRCUS.

To CIR'CINATE, *v. a.* [*circino*, Lat.] To make a circle; to compass round, or turn round.

CIRCINA'TION, *s.* [*circinatio*, Lat.] An orbicular motion; a turning round; a measuring with the compasses.

CIR'CIUS, a rapid and tempestuous wind frequent in Gallia Narbonensis, and unknown in any other country. *Lucan*.

CIR'CLE, *s.* [*circulus*, Lat.] A line continued till it ends where it begun, having all its parts equidistant from a common center. For the mathematical properties of the circle, see GEOMETRY; and for circles of the sphere, see ASTRONOMY, vol. ii. p. 325.—By a *circle* I understand not here perfect geometrical *circle*, but an orbicular figure, whose length is equal to its breadth; and which, as to sense, may seem circular. *Newton*.

Then a deeper still,
In *circle* following *circle*, gathers round
To close the face of things. *Thomson*.

The space included in a circular line. A round body; an orb. It is he that sitteth upon the *circle* of the earth. *Isaiah*.—Compass; inclosure:

A great magician,
Obscured in the *circle* of the forest. *Shakespeare*.

An assembly surrounding the principal person:

To have a box where eunuchs sing,
And, foremost in the *circle*, eye a king. *Pope*.

A company; an assembly.—I will call over to him the whole *circle* of beauties that are disposed among the boxes. *Addison*.—Any series ending as it begins, and perpetually repeated.—There be fruit trees in hot countries, which have blossoms and young fruit, and young fruit and ripe fruit, almost all the year, succeeding one another; but this *circle* of ripening cannot be but in succulent plants, and hot countries. *Bacon*.

Thus in a *circle* runs the peasant's pain,
And the year rolls within itself again. *Dryden*.

An inconclusive form of argument, in which the foregoing proposition is proved by the following, and the following proposition inferred from the foregoing.—That heavy bodies descend by gravity; and again, that gravity is a quality whereby an heavy body descends, is an impertinent *circle*, and teacheth nothing. *Glanville*.—Circumlocution: indirect form of words:

Has he given the lye
In *circle* or oblique, or semicircle,
Or direct parallel? You must challenge him. *Fletcher*.

In electricity, the course of the electrical fluid. See the article ELECTRICITY.

To CIR'CLE, *v. a.* To move round any thing:

Another Cynthia her new journey runs,
And other planets *circle* other suns. *Pope*.

To inclose; to surround:

What stern ungentle hands
Have lopp'd and hew'd, and made thy body bare
Of her two branches, those sweet ornaments,
Whose *circling* shadows kings have sought to sleep in? *Shakespeare*.

To CIR'CLE *in*. To confine; to keep together.—We term those things dry which have a consistence within themselves, and which, to enjoy a determinate figure, do not require the stop or hindrance of another body to limit and *circle* them *in*. *Digby*.

To CIR'CLE, *v. n.* To move circularly; to end where it begins:

The well-fraught bowl
Circles incessant; whilst the humble cell
With quavering laugh and rural jests resounds. *Philips*.

CIR'CLED, *adj.* Having the form of a circle; round:

Th' inconstant moon,
That monthly changes in her *circled* orb. *Shakespeare*.

CIR'CLES of the GERMAN EMPIRE, *s.* Such provinces and principalities of the German empire as have a right to be present at diets. Maximilian I. divided the empire into six, and some years after into ten, circles. This last division was confirmed by Charles V. The circles, as they stand in the Imperial Matricola, are as follow: Austria, Burgundy, the Lower Rhine, Bavaria, Upper Saxony, Franconia, Swabia, Upper Rhine, Westphalia, and the Lower Saxony.

CIR'CLET, *s.* A circle; an orb: properly a little circle:

Then take repast, till Hesperus display'd
His golden *circlet* in the western shade. *Pope*.

CIR'CLING, *particip. adj.* Having the form of a circle; circular; round:

Round he surveys, and well might, where he stood
So high above the *circling* canopy
Of night's extended shade. *Milton*.

CIRCOCE'LE, corrupted from CIRSOCELE, which see.

CIRCONCELLIO'NES, *f.* A fect of fanatics faid to have fprung up in Africa, in the reign of Conftantine. The accounts of them are fo abfurd and contradictory, that it is very doubtful whether they ever exifted at all, at leaft in the lawlefs manner they appear to be defcribed.

CIR'CUIT, *f.* [*circuit*, Fr. *circuitus*, Lat.] The act of moving round any thing.—There are four moons alfo perpetually rolling round the planet Jupiter, and carried along with him in his periodical *circuit* round the fun. *Watts.*—The fpace inclofed in a circle:

He led me up
A woody mountain, whofe high top was plain,
A *circuit* wide inclos'd. *Milton.*

Space; extent; meafured by travelling round.—The lake of Bolfena is reckoned one-and-twenty miles in *circuit*. *Addifon.*—A ring; a diadem; that by which any thing is incircled:

And this fell tempeft fhall not ceafe to rage,
Until the golden *circuit* on my head
Do calm the fury of this mad-brain'd flaw. *Shakefpeare.*

Long deduction of reafon:

Thou fhalt not peep thro' lattices of eyes,
Nor hear thro' labyrinths of ears, nor learn
By *circuit* or collections to difcern. *Donne.*

CIR'CUIT, in law, *f.* A certain divifion of the kingdom appointed for judges to go twice a-year, for the adminiftration of juftice. Thefe circuits are made in the refpective vacations, after Hilary and Trinity terms. The feveral counties of England are divided into fix circuits, viz. 1. Midland; containing the counties of Northampton, Rutland, Lincoln, Nottingham, Derby, Leicefter, Warwick. 2. Norfolk; Bucks, Bedford, Huntingdon, Cambridge, Norfolk, Suffolk. 3. Home; Hertford, Effex, Kent, Suffex, Surrey. 4. Oxford; Berks, Oxford, Hereford, Salop, Gloucefter, Monmouth, Stafford, Worcefter. 5. Weftern; Southampton, Wilts, Dorfet, Cornwall, Devon, Somerfet. 6. Northern; York, Durham, Northumberland, Cumberland, Weftmorland, Lancafhire.

To CIR'CUIT, *v. n.* To move circularly:

Pining with equinoctial heat, unlefs
The cordial cup perpetual motion keep,
Quick *circuiting*. *Philips.*

CIRCUITEER', *f.* One that travels a circuit.—Like your fellow *circuiteer*, the fun, you travel the round of the earth, and behold all the iniquities under the heavens. *Pope.*

CIRCUI'TION, *f.* [*circuitio*, Lat.] The act of going round any thing. Compafs; maze of argument.—To apprehend by what degrees they lean to things in fhew, though not in deed, repugnant one to another, requireth more fharpnefs of wit, more intricate *circuitions* of difcourfe, and depth of judgment, than common ability doth yield. *Hooker.*

CIRCU'ITY OF ACTION, *f.* [*circuitus actionis*, Lat.] In law, a longer courfe of proceeding to recover a thing fued for than is needful; as if a perfon grant a rent-change of ten pounds per annum out of his manor of B. and after, the grantee diffeifeth the grantor of the fame manor, who brings an affife and recovers the land, and twenty pounds damages, which being paid, the grantee brings his action for ten pounds of his rent due during the time of the diffeifin, which he muft have had if no diffeifin had been; this is called *circuity of action*, becaufe, as the grantor was to receive twenty pounds damages, and pay ten pounds rent, he might have received but ten pounds only for damages, and the grantee might have kept the other ten pounds in his hands by way of retainer for his rent, and fo faved his action, which appears to be needlefs. *Terms de Ley.*

CIR'CULAR, *adj.* [*circularis*, Lat.] Round, like a circle; circumfcribed by a circle:

He firft inclos'd for lifts a level ground;
The form was *circular*. *Dryden.*

Succeffive in order; always returning:

From whence th' innumerable race of things
By *circular* fucceffive order fprings. *Rofcommon.*

Vulgar; mean; circumforaneous.—Had Virgil been a *circular* poet, and clofely adhered to hiftory, how could the Romans have had Dido? *Dennis.*—Ending in itfelf: ufed of a paralogifm, where the fecond propofition at once proves the firft, and is proved by it.—One of Cartes's firft principles of reafoning, after he had doubted of every thing, feems to be too *circular* to fafely build upon; for he is for proving the being of God from the truth of our faculties, and the truth of our faculties from the being of a God. *Baker.*

CIR'CULAR LETTER. A letter directed to feveral perfons, who have the fame intereft in fome common affair; as in the convocation of affemblies, or for meetings to elect members in parliament, &c.

CIR'CULAR LINES. Such ftraight lines as are divided from the divifions made in the arch of a circle: as the lines of fines, tangents, and fecants, on the plain fcale and fector.

CIR'CULAR SAILING, is that performed on the arch of a great circle. See NAVIGATION.

CIRCULA'RITY, *f.* A circular form.—The heavens have no diverfity or difference, but a fimplicity of parts, and equiformity in motion, continually fucceeding each other; fo that, from what point foever we compute, the account will be common unto the whole *circularity*. *Brown.*

CIR'CULARLY, *adv.* In form of a circle.—The internal form of it confifts of feveral regions, involving one another like orbs about the fame center; or of the feveral elements caft *circularly* about each other. *Burnet.*—With a circular motion:

Trade, which, like blood, fhould *circularly* flow,
Stopp'd in their channels, found its freedom loft. *Dryden.*

To CIR'CULATE, *v. n.* To move in a circle; to run round; to return to the place whence it departed in a conftant courfe.—Nature is a perpetual motion; and the work of the univerfe *circulates* without any interval or repofe. *L'Eftrange.*—To be difperfed.—As the mints of calumny are perpetually at work, a great number of curious inventions, iffued out from time to time, grow current among the party, and *circulate* through the whole kingdom. *Addifon.*

To CIR'CULATE, *v. a.* To put about.—In the civil wars, the money fpent on both fides was *circulated* at home; no public debts contracted. *Swift.*

CIRCULA'TION, *f.* Motion in a circle; a courfe in which the motion tends to the point from which it began, as the circulation of the blood; for which fee ANATOMY, vol. i. p. 608.—What more obvious, one would think, than the *circulation* of the blood, unknown till the laft age. *Burnet.*—A feries in which the fame order is always obferved, and things always return to the fame ftate.—As for the fins of peace, thou haft brought upon us the miferies of war; fo for the fins of war, thou feeft fit to deny us the bleffing of peace, and to keep us in a *circulation* of miferies. *K. Charles.*—A reciprocal interchange of meaning.—When the apoftle faith of the Jews, that they crucified the Lord of glory; and when the Son of man, being on earth, affirmeth that the Son of man was in heaven at the fame inftant, there is, in thefe two fpeeches, that mutual *circulation* before-mentioned. *Hooker.*

CIR'CULATORY, *f.* A chemical veffel, in which that which rifes from the veffel on the fire is collected, and cooled in another fixed upon it, and falls down again.

CIR'CULATORY, *adj.* Circulatory letters, the fame with CIRCULAR LETTERS.

CIR'CULUS,

CIR'CULUS, *s.* with chemists, a round instrument made of iron, for cutting off the neck of glass-vessels. The operation is performed thus: the instrument being heated, is applied to the glass-vessel, and is kept there till it grows hot, and then with some drops of cold water, or a cold blast upon it, it flies in pieces. And this is the way they cut off the necks of retorts and cucurbits.

CIRCUMAM'BIENCY, *s.* The act of encompassing.—Ice receiveth its figure according unto the surface it concreteth or the *circumambiency* which conformeth it. *Brown.*

CIRCUMAM'BIENT, *adj.* [*circum* and *ambio*, Lat.] Surrounding; encompassing; inclosing: usually spoken of the air.—The *circumambient* coldness towards the sides of the vessel, like the second region, cooling and condensing of it. *Wilkins.*

To CIRCUMAM'BULATE, *v. n.* [from *circum* and *ambulo*, Lat.] To walk round about.

To CIR'CUMCISE, *v. a.* [*circumcido*, Lat.] To cut the prepuce or foreskin, according to the law given to the Jews.—They came to *circumcise* the child. *Luke.*

CIRCUMCI'SION, *s.* [*circoncision*, Fr. of *circumcisio*, Lat. a cutting round about.] A ceremony used by the Jews and Mahometans, of cutting away the prepuce or foreskin of their male children. The Jews perform the operation on the eighth day from the birth; but the Mahometans, who derive the custom from Ismael, usually adjourn it to between the thirteenth and sixteenth year; though sometimes they administer this ordinance so early as the sixth or seventh year, in cases where the subject is deemed capable of making an open profession of his faith, in the customary form: "*La ilah il allah*; there is no god besides THE GOD, [Ο Θεος,] i. e. *God, absolutely so called.*"

The origin of circumcision has been referred by some authors to the Egyptians; and their opinion has been founded on passages adduced from Herodotus, ii. 104. Diodorus Siculus, i. p. 24. edit. Rhodomanni; and Strabo, xvi. p. 760, 761. But the reasons, which prove such opinion to be erroneous, are many and weighty. In the first place it is notorious, that Herodotus, the most respectable of these writers, did not live till many centuries after Moses; and was therefore removed at a greater distance from the source of right information. In the next place, Herodotus received his account from the priests of Egypt. But it is well known, that in many instances they grossly imposed on him, with a view of making him believe the high antiquity of their nation. Then again, Herodotus himself does not pretend to fix, whether the Ethiopians borrowed this rite from the Egyptians, or the Egyptians from the Ethiopians. Fourthly, the Greek, and we may add the Roman, historians, have betrayed extreme ignorance of Jewish concerns in very many instances: and surely, common apprehension would lead us to suppose that Moses, himself a Jew, and the great Jewish historiographer, was much better acquainted with the appointment of his own national institutions, than any Greek historian possibly could be. Fifthly, the Scripture, certainly speaking the sentiments of the Jews, deems the want of circumcision "a reproach" to the Egyptians, Josh. v. 9. in the same manner as it afterwards speaks of the uncircumcised Philistines, 1 Sam. xiv. 6. and xvii. 26. But, had the Jews borrowed circumcision from the Egyptians, there had been no room for such reproach. Sixthly, when Abraham left Egypt, he carried with him many servants, whom he had bought for money, and who therefore were slaves, Gen. xii. 16. and xvii. 13. Had circumcision been an Egyptian rite originally, it is probable Abraham himself would have been circumcised in Egypt: it is more than probable his slaves, purchased in Egypt, would have been there circumcised. Yet we find, that twenty years after his leaving Egypt, and at the advanced age of "ninety and nine years," Gen. xvii. 1-24. Abraham was circumcised, and all his slaves; having till that time been uncircumcised. Seventhly, such was the extreme abhorrence in which the Jews held the Egyptians, that it is impossible to conceive they would adopt from their oppressors this custom in particular, when they were so carefully guarded from admitting amongst them any other Egyptian usage. Eighthly, Artapanus, whose words are in Eusebius's Præp. Evang. l. 9. 27. asserts, "that the Ethiopians borrowed it (i. e. circumcision) from the Jews, through their veneration for Moses; instead of learning it, as Herodotus fancied, from the Egyptians." Ninthly, Josephus also says, "God commanded it to Abraham; desirous that his posterity might continue distinct, and not be blended with other people:" l. 10. 5. Tenthly, Tacitus remarks, that the Jews "circumcidere genitalia instituere, ut diversitate noscantur." Hist. v. 5. Tacitus was a writer of such disposition, as to leave us no room for doubting that he spoke according to received opinion: it follows therefore, that, in his time, circumcision was deemed a rite of Jewish origin. On his words we may moreover observe, that if circumcision were originally Egyptian, the whole force of his sentence is entirely done away; for, his object was, to point out the Jews as a singular people, separating themselves from others by diversity of rites, of which circumcision was one. The eleventh reason is, that if the Jews had not been the original institutors of circumcision, the terms "*Curti, Verpi, Recutiti,*" would never have been applied to them *exclusively*, as we find them applied by the Roman poets. Lastly, weighing all these considerations, we conclude in the sentiments and language of one, who is "instar omnium," the great GROTIUS, who having proved that the Jews could have been induced to maintain their religion by no other motive than the deepest conviction that Moses wrought miracles, adds these words: "Neither is it credible, that a people of so obstinate a disposition, could ever be persuaded any otherwise to submit to a law loaded with so many rites and ceremonies; or that wise men, amongst the many distinctions of religion which human reason might invent, should choose circumcision; which could not be performed without great pain, and was laughed at by strangers, and had nothing to recommend it but THE AUTHORITY OF GOD." Grot. Truth of Christ. Rel. i. 14. On these grounds we are firmly persuaded, that circumcision is of divine appointment, instituted originally as the mark of a covenant with Abraham; and from Abraham derived, through his posterity, to many eastern nations.

CIRCUMCI'SION-STONE, *s.* A variety of the jaspachates which comes from the Amazon river. It melts by the solar heat into a brown opake glass, less hard than the stone itself.

To CIRCUMDU'CT, *v. a.* [*circumduco*, Lat.] To contravene; to nullify: a term of civil law.—Acts of judicature may be cancelled and *circumducted* by the will and direction of the judge; as also by the consent of the parties litigant, before the judge has pronounced and given sentence. *Ayliffe.*

CIRCUMDUC'TION, *s.* Nullification; cancellation.—The citation may be circumducted, though the defendant should not appear; and the defendant must be cited, as a *circumduction* requires. *Ayliffe.*—A leading about.—By long *circumduction* perhaps any truth may be derived from any other truth. *Hooker.*

CIRCUM'FERENCE, *s.* [from *circumferentia*, Lat.] The periphery; the line including and surrounding any thing:

> Extend thus far thy bounds,
> This be thy just *circumference*, O world! *Milton.*

The space inclosed in a circle:

> He first inclos'd for lists a level ground,
> The whole *circumference* a mile around. *Dryden.*

The external part of an orbicular body.—The bubble, being looked on by the light of the clouds reflected from it, seemed red at its apparent *circumference*. If the clouds were viewed through it, the colour at its *circumference* would

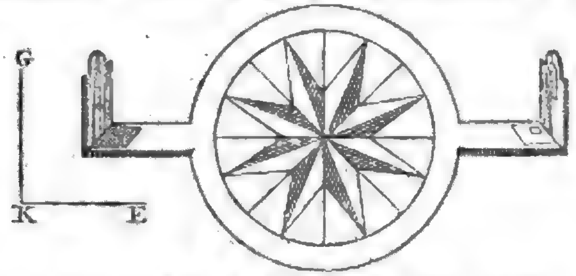
would be blue. *Newton.*—An orb; a circle; any thing circular or orbicular:

His pond'rous ſhield, large and round,
Behind him caſt; the broad *circumference*
Hung on his ſhoulders like the moon. *Milton.*

To CIRCUM'FERENCE, *v. a.* To include in a circular ſpace. *Not proper.*—Nor is the vigour of this great body included only in itſelf, or *circumferenced* by its ſurface; but diffuſed at indeterminate diſtances. *Brown.*

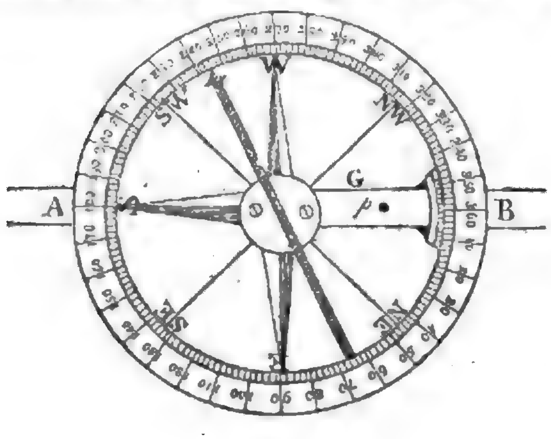
CIRCUMFEREN'TOR, *ſ.* A particular inſtrument uſed by ſurveyors for taking angles. It conſiſts of a braſs circle and index all of a piece; the diameter of the circle is commonly about ſeven inches; the index about fourteen inches long and an inch and a half broad. On the circle is a card or compaſs, divided into 360 degrees; the meridian line of which anſwers to the middle of the breadth of the index. On the limb or circumference of the circle is ſoldered a braſs ring; which, with another fitted with a glaſs, forms a kind of box for the needle, which is ſuſpended on a pivot in the center of the circle. There are alſo two ſights to ſcrew on, and ſlide up and down the index, as alſo a ſpangle and ſocket ſcrewed on the under ſide of the circle, to receive the head of the three-legged ſtaff.

To take, or obſerve, the Quantity of an Angle by the Circumferentor.—The angle propoſed being EKG, as delineated in the annexed figure; place the inſtrument at K,



then direct the ſights to E, and obſerve what degrees are cut by the ſouth end of the needle, which let be 295; then, turning the inſtrument about on its ſtand, direct the ſights to G, noting again what degrees are cut by the ſouth end of the needle, which ſuppoſe are 213. This done, ſubtract the leſs number from the greater, viz. 213 from 295, and the remainder, or 82 degrees, is the quantity of the angle EKG ſought.

A circumferentor has been invented by Mr. Jones, mathematical inſtrument-maker in Holborn, London, on an improved conſtruction. From a very ſimple contrivance, it is rendered ſufficient to take angles with the accuracy of a common theodolite; and by it angles of altitude and depreſſion may be obſerved as readily as horizontal ones. The improvement chiefly conſiſts in an arm or index G, as repreſented in the following figure, ſo applied to the



center of the compaſs box, and within it, that, at the time of obſerving, by only ſlipping a pin *p* out, the circle of degrees alone may move round, and leave the index G fixed. This index will remain ſtationary, from its being attached to the ſocket that ſcrews on the head of the ſtaff. On the end of this index, next the degrees in the box, there is a graduated nonius ſcale, by which the circle of 360 degrees is ſubdivided into 5 minutes, or leſs if deſired. To take angles of altitude or depreſſions, the inſtrument is turned down on its ball and ſocket into a perpendicular poſition, and adjuſted to its level by a plumb-line hung on a pin at the back of the box, and made to coincide with a mark made thereon. Then by looking through the ſight-holes as in the preceding figure, the angles are ſhown on the circle of degrees by the nonius. The arms A B of the inſtrument ſlip off, and the whole packs into a portable caſe but five inches and half ſquare and three deep.

CIR'CUMFLEX, *ſ.* [*circumflexus*, Lat. bowed or bent.] An accent uſed to regulate the pronunciation of ſyllables, including or participating the acute and grave.—The *circumflex* keeps the voice in a middle tune, and therefore in the Latin is compounded of both the other. *Holder.*

CIRCUM'FLUENCE, *ſ.* An incloſure of waters.

CIRCUM'FLUENT, *adj.* [*circumfluens*, Lat.] Flowing round any thing:

I rule the Paphian race,
Whoſe bounds the deep *circumfluent* waves embrace. *Pope.*

CIRCUM'FLUOUS, *adj.* [*circumfluus*, Lat.] Environing with waters:

He the world
Built on *circumfluous* waters calm, in wide
Cryſtalline ocean. *Milton.*

CIRCUMFORA'NEOUS, *adj.* [*circumforaneus*, Lat.] Wandering from houſe to houſe: as, a *circumforaneous* fiddler, one that plays at people's doors.

To CIRCUMFU'SE, *v. a.* [*circumfuſus*, Lat.] To pour round; to ſpread every way.—Men ſee better, when their eyes are againſt the ſun, or candle, if they put their hand before their eye. The glaring ſun, or candle, weakens the eye; whereas the light *circumfuſed* is enough for the perception. *Bacon.*

This nymph the god Cephiſus had abus'd,
With all his winding waters *circumfus'd.* *Addiſon.*

CIRCUMFU'SILE, *adj.* [*circum* and *fuſilis*, Lat.] That which may be poured or ſpread round any thing:

Artiſt divine, whoſe ſkilful hands infold
The victim's horn with *circumfuſile* gold. *Pope.*

CIRCUMFU'SION, *ſ.* The act of ſpreading round; the ſtate of being poured round.

To CIRCUMGY'RATE, *v. a.* [*circum* and *gyrus*, Lat.] To roll round.—All the glands of the body be congeries of various ſorts of veſſels curled, *circumgyrated*, and complicated together. *Ray.*

CIRCUMGYRA'TION, *ſ.* The act of running round.—The ſun turns round his own axis in twenty-five days, from his firſt being put into ſuch a *circumgyration. Cheyne.*

CIRCUMJA'CENT, *adj.* [*circumjacens*, Lat.] Lying round any thing; bordering on every ſide.

CIRCUMI'TION, *ſ.* [from *circumeo*, *circumitum*, Lat.] The act of going round.

CIRCUMLIGA'TION, *ſ.* [*circumligo*, Lat.] The act of binding round. The bond with which any thing is encompaſſed.

CIRCUMLOCU'TION, *ſ.* [*circumlocutio*, Lat.] A circuit or compaſs of words; periphraſis.—Virgil, ſtudying brevity, could bring theſe words into a narrow compaſs, which a tranſlator cannot render without *circumlocutions. Dryden.*—The uſe of indirect expreſſions.—Theſe people are not to be dealt withal, but by a train of myſtery and *circumlocution. L'Eſtrange.*—In oratory, it is the art of avoiding any thing diſagreeable or inconvenient to be expreſſed

preſſed in direct terms; by intimating the ſenſe in a kind of paraphraſe, ſo conceived as to ſoften or break its force. Thus Cicero, unable to deny that Clodius was ſlain by Milo, owns it, with this *circumlocution*: "Milo's ſervants being prevented from aſſiſting their maſter, who was reported to be killed by Clodius; they, in his abſence, and without his privity, or conſent, did what every body would expect from their own ſervants on ſuch an occaſion."

CIRCUMMU'RED, *adj.* [from *circum* and *murus*, Lat.] Walled round; encompaſſed with a wall.—He hath a garden *circummured* with bricks. *Shakeſpeare.*

CIRCUMNA'VIGABLE, *adj.* [from *circumnavigate.*] That which may be ſailed round.—The being of Antipodes, the habitableneſs of the torrid zone, and the rendering the whole terraqueous globe *circumnavigable*. *Ray.*

To CIRCUMNA'VIGATE, *v. a.* [*circum* and *navigo*, Lat.] To ſail round.

CIRCUMNAVIGA'TION, *ſ.* The act of ſailing round.—What he ſays concerning the *circumnavigation* of Africa, from the ſtraits of Gibraltar to the Red Sea, is very remarkable. *Arbuthnot.*

CIRCUMNA'VIGATOR, *ſ.* One that ſails round.

CIRCUMPLICA'TION, *ſ.* [*circumplico*, Lat.] The act of enwrapping on every ſide. The ſtate of being enwrapped.

CIRCUMPO'LAR, *adj.* [from *circum* and *polar.*] Stars near the North pole, which move round it, and never ſet in the Northern latitudes, are ſaid to be *circumpolar ſtars.*

CIRCUMPOSI'TION, *ſ.* [from *circum* and *poſition.*] The act of placing any thing circularly.—Now is your ſeaſon for *circumpoſition*, by tiles or baſkets of earth. *Evelyn.*

CIRCUMPOTA'TIO, *ſ.* in antiquity, a funeral feaſt in honour of the dead, very frequent among the Romans and the Athenians. Solon at Athens, and the decemviri at Rome, endeavoured to reform this cuſtom, thinking it abſurd that mirth and drunkenneſs ſhould mingle with ſorrow and grief.

CIRCUMRA'SION, *ſ.* [*circumraſio*, Lat.] The act of ſhaving or paring round.

CIRCUMROTA'TION, *ſ.* [*circum* and *roto*, Lat.] The act of whirling round with a motion like that of a wheel; circumvolution; circumgyration. The ſtate of being whirled round.

To CIR'CUMSCRIBE, *v. a.* [*circum* and *ſcribo*, Lat.] To incloſe in certain lines or boundaries. To bound; to limit; to confine:

The good Andronicus
With honour and with fortune is return'd;
From whence he *circumſcribed* with his ſword,
And brought to yoke the enemies of Rome. *Shakeſpeare.*

CIRCUMSCRIP'TION, *ſ.* [*circumſcriptio*, Lat.] Determination of particular form or magnitude.—In the *circumſcription* of many leaves, flowers, fruits, and ſeeds, nature affects a regular figure. *Ray.*—Limitation; boundary; contraction; confinement:

I would not my unhouſed free condition
Put into *circumſcription* and confine. *Shakeſpeare.*

CIRCUMSCRIP'TIVE, *adj.* Incloſing the ſuperficies; marking the form or limits on the outſide.—Stones regular, are diſtinguiſhed by their external forms: ſuch as is *circumſcriptive*, or depending upon the whole ſtone, as in the eagle-ſtone, is properly called the figure. *Grew.*

CIR'CUMSPECT, *adj.* [*circumſpectus*, Lat.] Cautious; attentive to every thing; watchful on all ſides:

None are for me,
That look into me with conſid'rate eyes:
High-reaching Buckingham grows *circumſpect*. *Shakeſp.*

CIRCUMSPEC'TION, *ſ.* Watchfulneſs on every ſide; caution; general attention.—Obſerve the ſudden growth of wickedneſs, from want of care and *circumſpection* in the firſt impreſſions. *Clarendon.*

So ſaying, his proud ſtep he ſcornful turn'd,
But with ſly *circumſpection*. *Milton.*

CIRCUMSPEC'TIVE, *adj.* [*circumſpicio*, *circumſpectum*, Lat.] Looking round every way; attentive; vigilant; cautious:

No leſs alike the politic and wiſe,
All ſly ſlow things, with *circumſpective* eyes. *Pope.*

CIRCUMSPEC'TIVELY, *adv.* Cautiouſly; vigilantly; attentively; with watchfulneſs every way; watchfully.

CIR'CUMSPECTLY, *adv.* With watchfulneſs every way; cautiouſly; watchfully; vigilantly.—Their authority weighs more with me than the concurrent ſuffrages of a thouſand eyes, who never examined the thing ſo carefully and *circumſpectly*. *Ray.*

CIR'CUMSPECTNESS, *ſ.* Caution; vigilance; watchfulneſs on every ſide.—Travel forces *circumſpectneſs* on thoſe abroad, who at home are nurſed in ſecurity. *Wotton.*

CIR'CUMSTANCE, *ſ.* [*circumſtantia*, Lat.] Something appendant or relative to a fact: the ſame to a moral action as accident to a natural ſubſtance.—Our confeſſing or concealing perſecuted truths, vary and change their very nature, according to different *circumſtances*, of time, place, and perſons. *South.*—The adjuncts of a fact, which make it more or leſs criminal, or make an accuſation more or leſs probable:

Of theſe ſuppoſed crimes give me leave,
By *circumſtance*, but to acquit myſelf. *Shakeſpeare.*

Accident; ſomething adventitious, which may be taken away without the annihilation of the principal thing conſidered:

Senſe outſide knows, the ſoul through all things ſees;
Senſe, *circumſtance*; ſhe doth the ſubſtance view. *Davies.*

Incident; event: generally of a minute or ſubordinate kind.—He defended Carliſle with very remarkable *circumſtances* of courage, induſtry, and patience. *Clarendon.*—Condition; ſtate of affairs. It is frequently uſed with reſpect to wealth or poverty; as, good or ill *circumſtances*.—None but a virtuous man can hope well in all *circumſtances*. *Bacon.*—When men are eaſy in their *circumſtances*, they are naturally enemies to innovations. *Addiſon.*

To CIR'CUMSTANCE, *v. a.* To place in particular ſituation, or relation to the things:

Virtue, art, beauty, fortune, now I ſee,
Rareneſs or uſe, not nature, value brings;
And ſuch as they are *circumſtanc'd*, they be. *Donne.*

CIR'CUMSTANT, *adj.* [*circumſtans*, Lat.] Surrounding; environing.—Its beams fly to viſit the remoteſt parts of the world, and it gives motion to all *circumſtant* bodies. *Digby.*

CIRCUMSTAN'TIAL, *adj.* [*circumſtantialis*, low Lat.] Accidental; not eſſential.—Who would not prefer a religion that differs from our own in the *circumſtantials*, before one that differs from it in the eſſentials? *Addiſon.*—Incidental; happening by chance; caſual:

Virtue's but anguiſh, when 'tis ſeveral,
By occaſion wak'd, and *circumſtantial*. *Donne.*

Full of ſmall events; particular; detailed.—He had been provoked by men's tedious and *circumſtantial* recitals of their affairs, or by their multiplied queſtions about his own. *Prior.*

CIRCUMSTANTIA'LITY, *ſ.* The appendage of circumſtances; the ſtate of any thing as modified by circumſtances.

CIRCUMSTAN'TIALLY, *adv.* According to circumſtance; not eſſentially; accidentally.—Of the fancy and intellect, the powers are only *circumſtantially* different. *Glanville.*—Minutely; exactly; in every circumſtance or particular.—Lucian agrees with Homer in every point *circumſtantially*. *Broome.*

To CIRCUMSTAN'TIATE, *v. a.* To place in particular circumſtances; to inveſt with particular accidents or adjuncts.—If the act were otherwiſe *circumſtantiated*, it might will that freely, which now it wills freely. *Bramhall.*—To place in a particular condition, as with regard to power or wealth.—A number infinitely ſuperior, and the

the best *circumstantiated* imaginable, are for the succession of Hanover. *Swift.*

CIRCUMSTAN'TIBUS, or BY-STANDERS, a term in law, signifying the supplying or making up the number of jurors, if any impannelled appear not, or appearing are challenged by either party, by adding to them so many of those that are present, or standing-by (*tales de circumstantibus*) that are qualified, as will serve the turn. Stat. 35 Hen. VIII. c. 6. 5 Eliz. c. 25.

To CIRCUMVAL'LATE, *v. a.* [*circumvallo*, Lat.] To inclose round with trenches or fortifications.

CIRCUMVALLA'TION, *s.* The art or act of casting up fortifications round the place. See the article FORTIFICATION.—When the czar first acquainted himself with mathematical learning, he practised all the rules of *circumvallation* and contravallation at the siege of a town in Livonia. *Watts.*—The fortification or trench thrown up round a place besieged.—This gave respite to finish those stupendous *circumvallations* and barricadoes, reared up by sea and land. *Howell.*

CIRCUMVEC'TION, *s.* [*circumvectio*, Lat.] The act of carrying round. The state of being carried round.

To CIRCUMVE'NT, *v. a.* [*circumvenio*, Lat.] To deceive; to cheat; to impose upon; to delude.—He, fearing to be betrayed or *circumvented* by his cruel brother, fled to Barbarossa. *Knolles.*

CIRCUMVEN'TION, *s.* Fraud; imposture; cheat; delusion.—If he is in the city, he must avoid haranguing against *circumvention* in commerce. *Collier.*—Prevention; pre-occupation. *This sense is now out of use:*

Whatever hath been thought on in this state,
That could be brought to bodily act, ere Rome
Had *circumvention*. *Shakespeare.*

To CIRCUMVE'ST, *v. a.* [*circumvestio*, Lat.] To cover round with a garment:

Who on this base the earth did'st firmly found,
And mad'st the deep to *circumvest* it round. *Wotton.*

CIRCUMVOLA'TION, *s.* [*circumvolo*, Lat.] The act of flying round.

To CIRCUMVOL'VE, *v. a.* [*circumvolvo*, Lat.] To roll round; to put into a circular motion.—Could solid orbs be accommodated to phenomena, yet to ascribe each sphere an intelligence to *circumvolve* it, were unphilosophical. *Glanville.*

CIRCUMVOLU'TION, *s.* [*circumvolutus*, Lat.] The act of rolling round. The state of being rolled round.—The twisting of the guts, is really either a *circumvolution*, or insertion of one part of the gut within the other. *Arbuthnot.*—The thing rolled round another.—Consider the obliquity or closeness of these *circumvolutions*; the nearer they are, the higher may be the instrument. *Wilkins.*

CIR'CUS, or CIRQUE, *s.* [from כרכ *carka*, to surround, Chald.] An open space or area for sports, with seats round for the spectators.—A pleasant valley, like one of those *circuses*, which in great cities somewhere doth give a pleasant spectacle of running horses. *Sidney.*

See the *cirque* falls! th' unpillar'd temple nods;
Streets pav'd with heroes, Tyber choak'd with gods. *Pope.*

The Roman circus was a large oblong edifice, arched at one end; encompassed with porticos, and furnished with rows of seats, placed ascending over each other. In the middle was a kind of foot-bank, or eminence, with obelisks, statues, and posts, at each end. This served them for the courses of their *bigæ* and *quadrigæ*. There were no less than ten circuses at Rome; the largest was built by the elder Tarquin, called *Circus Maximus*, between the Aventine and Palatine mounts. It was so called, either because of its vast circumference, or because the great games were celebrated in it, or because it was consecrated to the great gods, viz. to Vertumnus, Neptune, Jupiter, Juno, Minerva, and the Dii Penates of Rome. Dionysius Halicarnassensis says, that it was three stadia and a half in length, and four jugera broad; and these measures, according to Pliny, allowing to the Roman stadia 625 Roman feet, each of which is twelve inches, will give for the length 2187 Roman feet, or somewhat more than three English furlongs; and as to the breadth, allowing for each of the jugera 240 Roman feet, it will be 960 Roman feet. It was beautified and enlarged by the Roman emperors, so as to seat 250,000 spectators. The most magnificent circuses were those of Augustus and Nero. There are still some remains of the circuses at Rome, at Nismes, and other places.

The games of the CIRCUS, which some call *Circensian games*, were combats celebrated in the circus, in honour of Consus the god of councils; and thence also called *Consualia*. They were also called *Roman games*, *Ludi Romani*, either on account of their antiquity, as being coeval with the Roman people, or because established by the Romans; and the games held there, the great games, *ludi magni*, because celebrated with more expence and magnificence than others; and because held in honour of the great god Neptune, who was their Consus. Those who say they were instituted in honour of the sun, confound the *pompa circensis*, or procession of the circus, with the games. The games of the circus were instituted by Evander, and re-established by Romulus, in imitation of the Olympian games among the Greeks. The pomp, or procession, was only a part of the games, making the prelude, and consisting of a simple cavalcade of chariots. Till the time of the elder Tarquin, they were held in an island of the Tiber, and were called *Roman games*; after that prince had built the circus, they took their name from it. There were six kinds of exercises in the circus: the first was wrestling, and fighting with swords, staves, and pikes; the second was racing; the third, dancing; the fourth, throwing quoits, arrows, and cestus, all of which were on foot; the fifth was horse-racing; the sixth, chariot-racing, whether with two horses or with four. In this last exercise, the competitors were at first divided into two squadrons or quadrils; then into four, each bearing the names of the colours they wore; *factio alba*, *russea*, &c. At first there was only white and red, then green was added, and blue. Domitian added two more colours, but they did not continue. It was Oenomaus who first invented this method of distinguishing the quadrils by colours. The green was for those who represented the earth; the blue for the sea, &c.

CIRE', a town of France, in the department of the Lower Charente, and chief place of a canton, in the district of Rocheford: two leagues and a half north of Rocheford.

CIREL'LA, a town of Italy, in the kingdom of Naples, and province of Calabria Citra, near which were formerly mines of gold, silver, and lead, vestiges of which are now visible: eight miles south-south-east of Scalea.

CI'RENCESTER, a large and populous borough town in Gloucestershire, situate near the borders of Wiltshire. At this place three of the ancient military roads of the Romans met, i. e. the Foss-way, the Irmin-street, and the Icknild-street. The chief trade of the town is woolstapling, and the manufacture of heavy edge-tools, which are generally much esteemed. From the junction of the Thames with the Severn, a canal has been made to Cirencester, by which means it has the advantage of water-carriage to most parts of the kingdom. This town is by some reckoned the largest, as well as the oldest, in the county. It is said to have been built by Cissa, one of the Saxon viceroys. It was of great note, both under the Romans and Saxons, of whom it is said the latter built the abbey here, of which two old gate-houses still remain, as does the abbey-barn. Its abbot was mitred. King Canute, the Dane, held a general council here, anno 1020. It was formerly two miles round, but suffered much by the Danes, the barons' wars, the civil war, &c. that not above one-fourth of that compass is now inhabited. The air here is remarkably healthy. Coming into the town from Gloucester, a great part of the street is a hollow-way, where a portion of the river Churn runs, which empties itself into one of the arms of that river at the second bridge.

bridge. Tradition says the river formerly ran through the town. The Stroudwater navigation has communication with this town, from which great advantage cannot but arise.' It had also three parish-churches, though now but one, a large and beautiful structure, supported by two rows of pillars; whose tower is forty-four yards high, wherein are twelve bells and chimes. The chapels, of which there are five, have some good monuments, and those of St. Mary and St. John stone roofs. The windows, now mutilated, were formerly of painted glass. The altar is without balustrades, but paved with black and white marble. It has a stone pulpit and two fonts, one modern of marble, and an old one of stone on a pillar. St. Lawrence's church is now converted into dwelling-houses. The south porch of St. John's church is a fine Gothic structure, thirty-eight feet broad and fifty high. Over this porch is the town-hall. This town has its name from the river Churn, that passes by it towards the Thames, and the word *cestre*, i. e. castle, it having been fortified by the Romans, who established here a military station of the first importance, and made it the metropolis of the province of the *Dobuni*, whence it became the *Corinium* of Ptolemy, and the *Durocornovium* of Antoninus. Henry III. took its castle from the barons, and demolished it. Henry IV. gave it a charter and several privileges; and queen Elizabeth gave them another, by which it was incorporated, with a steward and bailiff, but is now governed by two high constables, and fourteen wardsmen over the seven wards, appointed annually at the court-leet. It is observed, that in this town the first act of rebellion was committed in 1641, and that here was the first blood shed at the memorable revolution in 1668. The foundation of the old wall is visible in many places, and on examination, in 1774, was found to be eight feet thick, built with hewn stone. Antiquities, especially Roman, are dug up here every day, as was a fine Mosaic pavement, particularly in a tract of ground, now converted into a garden, &c. called the *Leauses*, where great quantities of ancient carvings and inscriptions are dug up. A Roman building, supported by brick pillars three feet and a half high, was discovered near this spot in 1723, and several sepulchral stones, some with, some without, inscriptions. In 1780 the ground was opened, and a building that had extended upwards of forty-three feet was explored: it consisted of three floors, supported by pillars, and evidently appeared to have been the remains of hypocausts, or subterraneous ovens. The coins found were chiefly of Antoninus, Dioclesian, and Constantine. There is a piece of ground on the south-west of the town, just without the city-wall, called the *Querns*, full of large heaps of stones, but now covered with herbage, within which is a plat called the *Bull-ring*, which very probably was a Roman theatre. Here are several hospitals and alms-houses, besides a charity-school for twenty boys, who are clothed in yellow, and taught to make stockings; and another for twenty girls, who are put out apprentices. And a legacy of 80l. has been left by an old tailor, to be lent to young tradesmen, for two years, without interest, to set them up, upon giving good and sufficient security to repay the principal.

Cirencester has sent two members to parliament ever since A. D. 1568. Here are two good weekly markets on Monday and Friday; and three annual fairs, viz. Easter-Tuesday, July 18, and November 8. The town is distant from Bristol thirty-six miles, Bath thirty-three, Oxford thirty-four, Gloucester seventeen, Cheltenham fourteen, and London ninety.

Adjoining the town is the noble mansion and beautiful and extensive plantations called Oakley-park, the seat of earl Bathurst. Not far from which is Badmington, the seat of his grace the duke of Beaufort. This magnificent mansion stands almost in the center of a large tract of ground, inclosed by a wall near ten miles in circumference, within which are several distinct parts for red and fallow deer; in these parks are many large beautiful plantations of firs and forest trees. The grand approach is through the park, from Worcester-lodge, which is a fine lofty free-stone building, with iron gates: this stands at the distance of two miles and three quarters from the house, by the road to Cirencester. Here is a fine collection of paintings, done by some of the most eminent of the old masters; also several curious antiques. The library is very noble, and contains a vast number of valuable books. The parish church adjoins the mansion-house, and was lately re-built at the duke's expence. It is a very handsome structure; the inside light and airy; the wood-work of Dutch oak, highly varnished with copal; the altar is richly decorated; and upon the pavement, within the rails, are the arms of Beaufort, with supporters, &c. done in Mosaic, composed of lapis lazuli and other curious sorts of marble. The altar-piece is a masterly painting, representing Christ disputing with the doctors; here are also two superb marble monuments, one erected to the memory of the late duke, and the other to his father, executed by the best sculptors in Italy.

CIREN'ZA, a town of Italy, in the kingdom of Naples, and province of Calabria Ultra: twelve miles north of Girace.

CIREN'ZA, city of; see Acerenza.

CI'REY, a town of France, in the department of the the Meurte, and chief place of a canton, in the district of Blamont: three miles east of Blamont.

CI'RIE, a town of Italy, and capital of a marquisate, in the principality of Piedmont, which comprehends likewise the towns of St. Maurice, Nolli, and Robasome, situated near the foot of the Grecian Alps, on the Doria. It contains three parish churches, and several religious houses. In 1705, it was taken by the French, under the duke of Feuillade. It is eight miles north-north-west of Turin.

CIRK'NITZ, a town of Carniola, situated on a lake surrounded with steep and rude mountains of the same name: fourteen miles south-south-west of Laybach, and 168 south-south-west of Vienna.

CIROFER'RI, an excellent Italian painter and architect, born at Rome in 1614, and the disciple of Peter de Cortona, whose designs he imitated with such exactness, that it is difficult to distinguish them. He was esteemed by pope Alexander VII. and his three successors, and died at Rome in 1689.

CIR'RI, *s.* in ichthyology, certain oblong and soft appendages, hanging from the under jaws or mouths of some fishes: these cirri, commonly translated *beards*, afford marks to distinguish the different species of the fishes on which they are found.

CIRRI'GEROUS, [*cirriger*, of *cirrus*, a lock, and *gero*, Lat. to bear.] Bearing curled locks or crests of feathers.

CIR'RUS, or Cirrhus, *s.* [from κερας, a horn.] In botany, a clasper or tendril; that fine spiral string or fibre put out from the footstalks, by which some plants, as the ivy, vine, &c. fasten themselves to walls, pales, or trees, for support. The term is synonymous to the capreolus, clavicula, and viticulus, of other botanists; and is ranked by Linnæus among the fulcra, or parts of plants that serve for protection, support, and defence.

CIR'SION, *s.* in botany. See Carduus.

CIR'SIUM, *s.* in botany. See Arctium, Carduus, and Cnicum.

CIRSOCE'LE, *s.* [from κιρσος, a varix, and κηλη, a tumour.] A disease consisting in a varicose state of the spermatic vessels.

CIR'TA, in ancient geography, a metropolis and royal residence, not far from the river Ampsaga, in Numidia Propria. A colony surnamed *Colonia Sittianorum*, very rich, when in the hands of Syphax. The colony was led by P. Sittius, under the auspices of Cæsar, and was surnamed *Julia*. Now called *Constantina*, in Algiers.

CISAL'PINE, *s.* Any thing on this side the Alps. The Romans divided Gaul and the country called *Lombardy*, into Cisalpine and Transalpine. That which was

Cisalpine with regard to the Romans, is Transalpine with regard to us.

CISAL'PINE REPUBLIC. The Cisalpine republic was created by the French republic in the year 1796; it was firmly established, in consequence of the peace of Campo Formio, in 1797; and was acknowledged by the emperor of Germany, the king of Sardinia, Spain, Swisserland, the pope, &c. It comprehends, beside the whole of Austrian Lombardy, and part of the former republic of Venice, the territories of the duke of Modena, the papal provinces of Ferrara, Bologna, and Romagna.

The different provinces of the Cisalpine republic are situate between 26 and 32 degrees of longitude, and between 43 and 45 degrees of latitude. The republic is bounded on the north by Swisserland, the Tyrol, and *Maritime Austria*, (the name now given to the states of Venice, ceded by the French to the emperor of Germany, in consequence of the peace of Campo Formio;) on the east by the Adriatic Sea and Austria Proper; on the south by territories formerly belonging to the pope, by Tuscany, the Mediterranean, and Parma; on the west by Parma, and the states of the king of Sardinia.

The whole territorial dimensions of the Cisalpine republic contain 3,567 square miles, and 3,447,384 souls, viz.

	Square Miles.	Inhabitants.
1. The duchy of Milan - -	811	1,116,892
2. The duchy of Mantua, with (3.) the principalities Castiglione and Salferino	185	207,331
4. The acquired provinces formerly belonging to the republic of Venice, viz. the Bergamesco, the Bresciano, and the territories of Verona and Rodigo, situated on the right bank of the Adige, the White Canal, the Tartaro, the canal Polisella, and the Po - - - - - - -	463	666,000
5. The duchy of Modena, with the principalities of Massa and Carrara -	431	460,000
6. The lands obtained from the duke of Parma, the duchy of Guastillo, Sabionetta, and Bozzola - -	27	18,000
7. The three legations, Ferrara, Bologna, and Romagna, formerly papal	1152	775,861
8. The territories of the Grisons, belonging to Worms, Cleves, and the Valteline	324	100,000
9. The four (commonly termed) Italian bailiwicks - - - - -	174	103,000
Total	3,567	3,447,384

CIS'LEU, *s.* in Hebrew chronology, the ninth month of their ecclesiastical, and third of their civil, year, answering nearly to our November.

CIS'MAR, a town of Germany, in the duchy of Holstein, not far from the Baltic: seventeen miles north of Travemunde. Lat. 54. 14. N. lon. 11. 2. E. Greenwich.

CIS'ME. See CHISME.

CIS'MONE, a town of Italy, in the Trevisan, on the Brenta: eighteen miles north of Vicenza, and twenty-four north-west of Trevigio.

CIS'MONE, a river of Germany, in the county of Tyrol, which runs into the Brenta, near Kofel.

CI'SORS. See SCISSORS.

CISPADA'NA GAL'LIA, in ancient geography, a district of Italy, to the south of the Po, occupied by the Gauls in the time of the kings of Rome, separated from Liguria on the west by the Iria, running from south to north into the Po; bounded on the south by the Apennine, and on the east by the Adriatic. The term is formed analogically, there being much mention in Cicero, Tacitus, Suetonius, and ancient inscriptions, made of the *Transpadani*; which, and *Cispadani*, are terms used with respect to Rome. Ptolemy calls the *Cispadana* peculiarly *Gallia Togata*, extending between the Po and Apennine, to the Sapis and Rubicon.

CIS'SA, *s.* [from κισσα, a gluttonous bird.] A depraved appetite, proceeding from previous gluttony and voracity.

CIS'SA, or CISSUM, in ancient geography, a town of the Hither Spain, in Lacetania, on the east side of the Iberus thought to be Guissona, where the Carthaginians were first defeated by Scipio. Another Cissa of Thrace, situated on the river Ægos Potamus, which Scylax seems to call *Cressa*, or *Crissa*; so that the reading is doubtful.

CISSAM'PELOS, *s.* [κισσαμπελος, *hederæ vitis*, vine of ivy.] In botany, a genus of the class dioecia, order monadelphia, natural order sarmentaceæ. The generic characters are—I. Male. Calyx: none, unless the corolla be called so. Corolla: petals four, ovate, flat expanded; nectary, the membranaceous disk of the flower, wheel-shaped. Stamina: filaments four, very small, coalescent; antheræ broad, flat. II. Female. Calyx: none, except the bracte. Corolla: none; nectary the membranaceous lateral edge of the germ, dilated outwards. Pistillum: germ roundish; styles three; stigmas three, erect, acute. Perianthium: berry globular, one-celled. Seed: solitary, wrinkled, somewhat compressed.—*Essential Character.* Male. Calyx, four-leaved; corolla, none; nectaries, wheel-shaped; Stamina, four, with connate filaments. Female. Calyx, one-leafed, ligulate-roundish; corolla, none; styles, three; berry one-seeded.

Species. 1. Cissampelos pareira: leaves peltate, cordate, emarginate, and entire. Stem climbing and twining, from ten to fifteen feet in height; flowers numerous, dusky yellow, minute; The fruit is a roundish, compressed, scarlet drupe; containing a single nut, or very hard seed, compressed, triply echinate, wrinkled at the edge, two-celled. In mountain coppices it is smooth, with cordate entire leaves, hoary underneath. In champaign calcareous situations it is hirsute, with cordate-roundish emarginate leaves, which are tomentose. Native of the West-Indies. Linnæus suggests that it is, perhaps the female of the following species: but Swartz asserts that it is not; that having the leaves petioled (not peltate) and entire. The leaf applied whole or bruised to a wound, cures it very effectually; it is also a remedy against the bite of poisonous animals; the root is excellent in the stone; it is looked upon as an excellent diuretic, and is in frequent use among the negroes in all obstructions of the urinary passages. The root, which is the part chiefly used, has a pleasant bitterish taste, and answers well in decoctions.

2. Cissampelos caapeba: leaves petioled at the base, entire. The second sort has round heart-shaped leaves, which are extremely woolly and soft to the touch; these have their foot-stalks placed at the base between the two ears; the flowers of this come out in bunches from the side of the stalks, in the same manner as the first. The stalks and every part of the plant is covered with a soft woolly down. The seeds of both these plants were sent from Jamaica, by the late Dr. Houstoun, and succeeded in the Chelsea garden, where the plants produced their flowers for several years; the fruit of the first sort was produced, but would not grow, though it seemed to be perfectly ripened: but the plants growing at some distance from the male, were probably not impregnated.

3. Cissampelos smilacina, or smilax-leaved cissampelos: leaves cordate, acute, angular. The stalks are slender, running up walls, and twining about posts and trees. The leaves resemble those of common ivy. The berries are red, about the bigness of small peas, and grow in clusters. Linnæus had not an opportunity of seeing the fructification complete. It is a native of Carolina. Introduced about 1776, by John Hope, M. D.

4. Cissampelos fruticosa: stem erect, shrubby, leaves ovate, petioled, entire. 5. Cissampelos Capensis: stem twining, leaves ovate, obtuse, petioled, entire. Found at the Cape of Good Hope by Thunberg.

Propagation and Culture. These plants are propagated by seeds, which should be sown upon a hot-bed in the spring; and the plants must afterwards be treated in the same

ſame way as other tender exotics, keeping them conſtantly in the bark-ſtove, otherwiſe they will not live in this country. The firſt thrives beſt in a rich ſhady ſoil, grows well both in the high and low lands of Jamaica, and may be very eaſily propagated there. See MENISPERMUM.

CIS'SOID, in geometry, a curve of the ſecond order, firſt invented by Diocles, whence it is called the ciſſoid of Diocles. See FLUXIONS.

CIS'SUS, *ſ.* [from κισσος, ivy.] In botany, a genus of the claſs tetrandria, order monogynia, natural order of hederaceæ. The generic characters are—Calyx: involucre many leaved, very ſmall. Perianthium: one-leafed, flat, ſhort, four-cornered. Corolla: petals four, concave. Nectary a rim ſurrounding the germ. Stamina: filaments four, the length of the corolla, inſerted into the nectary; antheræ roundiſh. Piſtillum: germ roundiſh, obtuſely four-cornered, retuſe. Style filiform, the length of the ſtamens. Stigma ſimple, acute. Perianthium: berry round, ſhining, umbilicate. Seed: a roundiſh ſtone. This genus has a great affinity with hedera; the fruit is a berry, and it has one-fifth leſs in the parts of the flower: alſo with vitis.—*Eſſential Character.* Berry one-ſeeded, ſurrounded by the calyx, and four-parted corolla.

Species. 1. Ciſſus vitiginea, or vine-leaved ciſſus: leaves cordate, with about five lobes, tormentoſe. Linnæus obſerves, that this ſpecies of ciſſus has the appearance of a vine; but differs in the calyx, corolla, number of ſtamens, and in having a ſtyle. The ſtem is tormentoſe: the branches villoſe, hoary at top, and ſubquadrangular. Leaves alternate, two inches long, entire, ſometimes ſlightly angular towards the tip, three-lobed or obſcurely five-lobed, (like thoſe of mallow,) nerved and veined, more villoſe beneath, bluntly and unequally toothed, the middle lobe larger than the others; the younger ones tomentoſe on both ſides: they are on unguicular petioles. Flowers hoary, moſt of them deciduous: fruitful pedicels commonly in pairs and divaricating. Berries pear-ſhaped, the ſize of peaſe, of a blueiſh glaucous colour. Native of the Eaſt-Indies; introduced here about the year 1772.

2. Ciſſus repanda: leaves cordate, entire or ſublobed, repand, ſmooth on both ſides. The branches of this are round, flexuoſe, jointed, tomentoſe, but becoming ſmooth by age. Leaves petioled, from two to three inches in length, and ſtill more in breadth, of a more firm texture than in the other ſpecies, nerved and veined, thoſe which are more advanced ſmooth on both ſides, but the younger ones villoſe; the notches finiſh in a minute dagger point: they are very blunt, but ſometimes have a ſhort blunt point at the end. Native of the Eaſt-Indies.

3. Ciſſus latifolia: leaves cordate-ovate villoſe acuminate ſetaceous-ſerrate, branches four-cornered. Branches jointed, woody, as are alſo the petioles and peduncles, ferruginous-tomentoſe, eſpecially at top, by age becoming ſmooth at bottom. Native of the Eaſt-Indies.

4. Ciſſus cordifolia: leaves cordate quite entire. Branches ſimple, knotty. Native of South-America.

5. Ciſſus rotundifolia: leaves cordate-roundiſh, ſerrate. Native of Arabia.

6. Ciſſus ſicyoides: leaves ſubcordate, naked, briſtly-ſerrate, branchlets round. Native of Jamaica, in waſte places, by walls, and on rocks: Jacquin ſays, in all the Caribbee iſlands, and the neighbouring continent, differing in habit according to the ſituation in which it grows. The berries of this and ſome other ſorts are ſometimes eaten by the natives and negroes, but they are chiefly food for birds.

7. Ciſſus quadrangularis: leaves cordate, fleſhy, ſerrate-toothed, ſtem four-cornered, ſomewhat ſwelling. Native of Arabia and the Eaſt-Indies; found alſo near Moxambique in Africa, by Loureiro.

8. Ciſſus acida, or three-leaved ciſſus: leaves ternate, obovate, ſmooth, fleſhy-gaſhed: native of Jamaica, in woods near the coaſt. The whole of it is acid. Cultivated, as we learn from Plukenet, in 1692, at the royal garden, Hampton Court.

9. Ciſſus trifoliata: leaves ternate, roundiſh, hirſute, with a few teeth, branches angular and membranaceous. Native of the Weſt-Indies, climbing high above the branches of the trees, in the hedges, upon the mountains.

10. Ciſſus crenata: leaves ternate, leaflets roundiſh, crenate. Native of the Eaſt-Indies.

11. Ciſſus carnoſa: leaves ternate, ovate, obtuſe, ſerrate, ſmooth; branches and petioles round. The whole plant ſmooth; branches ſtriated, round. Native of the Eaſt-Indies.

12. Ciſſus obovata: leaves ternate; leaflets obovate, quite entire, ſmooth. Native of America.

13. Ciſſus pedata: leaves pedate; leaflets, lanceolate, ſerrate, tomentoſe underneath. Branches tomentoſe, hoary. Native of the Eaſt-Indies.

14. Ciſſus heptaphylla: leaves in ſevens, ſerrate, hiſpid. This is a ſarmentoſe ſcandent ſhrub; branches pubeſcent; leaves alternate, petioled, compoſed of a pair, a ternate, and a ſingle leaflet larger than the reſt, a ſecond time petioled. Koenig ſent it from Calcutta.

15. Ciſſus umbellata: leaves ovate, quite entire, flowers umbelled; ſtem ſhrubby, twining, long, branched; leaves oppoſite, ſmooth; flowers white, in compound terminating umbels. Native of China about Canton.

Propagation and Culture. The plants are preſerved in ſome of the European gardens, more for the ſake of variety, than for uſe or beauty, as they rarely produce either fruit or flowers in moderate climates. They are propagated either by laying their flexible branches down in pots of earth, where they will put out roots in four or five months, or by planting cuttings in pots filled with light earth, which ſhould be plunged into a moderate hot-bed of tanners bark, covering the pots cloſely with hand-glaſſes to exclude the outer air: the cuttings muſt be frequently refreſhed with water, but not too much given at each time. When theſe or the layers are well rooted, they ſhould be carefully taken up, and each planted in a ſmall pot filled with light earth, and plunged into the hot-bed of tan, where they ſhould conſtantly remain, being too tender to thrive in England, but with this care. Therefore they ſhould be ſhifted into larger pots when it is neceſſary, and their branches muſt be ſupported with ſtakes, to prevent them from trailing over the neighbouring plants; and in warm weather the plants ſhould have free air admitted to them daily. With this treatment they will thrive very well.

CIST, *ſ.* [*ciſta*, Latin.] A caſe; a tegument: commonly uſed in medicinal language for the coat or incloſure of a tumour.

CI'STED, *adj.* [from *ciſt.*] Incloſed in a ciſt, or bag.

CISTER'CIANS, in church-hiſtory, a religious order founded in the 11th century, by St. Robert, a Benedictine. They became ſo powerful, that they governed almoſt all Europe, both in ſpirituals and temporals. Cardinal de Vitri, deſcribing their obſervances, ſays, they neither wore ſkins nor ſhirts; nor ever ate fleſh, except in ſickneſs; and abſtained from fiſh, eggs, milk, and cheeſe: they lay upon ſtraw-beds, in tunics and cowls: they roſe at midnight to prayers: they ſpent the day in labour, reading, and prayer: and in all their exerciſes obſerved a continual ſilence. The habit of the ciſtercian monks is a white robe, in the nature of a caſſock, with a black ſcapulary and hood, and is girt with a wooden girdle. The nuns wear a white tunic, and a black ſcapulary and girdle.

CI'STERN, *ſ.* [*ciſterna*, Latin.] A receptacle of water for domeſtic uſes.—'Tis not the rain that waters the whole earth, but that which falls into his own *ciſtern*, that muſt relieve him. *South.*—A reſervoir: an incloſed fountain:

Had no part as kindly ſtaid behind,
In the wide *ciſterns* of the lakes confin'd,
Did not the ſprings and rivers drench the land,
Our globe would grow a wilderneſs of ſand. *Blackmore.*

Any receptacle or repoſitory of water:

So half my Egypt were submerg'd, and made
A *cistern* for scal'd snakes. *Shakespeare.*

CISTER'NA, a town of Italy, in the principality of Piedmont: twelve miles east-south-east of Turin.

CISTER'NA NUOVA, a town of Italy, in the kingdom of Naples, and province of Capitanata: four miles south-east Monte Angelo.

CISTERNI'NO, a town of Italy, in the kingdom of Naples, and province of Bari; sixteen miles south-south-east of Monopoli.

CISTOI'DES, *s.* in botany. See MAHERNIA.

CISTUS, *s.* [Derivation very uncertain: said to be named from the youth *Cistus*, the fable concerning whom may be seen in Cassianus Bassus. Others derive it from κις, κιος, a worm or weevil. Miller says it is so called, because the seed is inclosed in a *cista*, or capsule.] ROCK-ROSE, or GUM CISTUS; in botany, a genus of the class polyandria, order monogynia, natural order of rotaceæ. The generic characters are—Calyx: perianthium five-leaved, permanent; leaflets roundish, concave; of which two alternate ones are lower and smaller. Corolla: petals five, roundish, flat, spreading, very large. Stamina: filaments numerous, capillary, shorter than the corolla; antheræ roundish, small. Pistillum roundish. Style simple, the length of the stamens; stigma flat, orbiculate. Perianthium; capsule roundish, covered with the calyx. Seeds: numerous, roundish, small.—*Essential Character.* Corolla: five-petalled. Calyx: five-leaved; with two of the leaflets smaller; capsule.

Description. The history of this genus is extremely obscure, on account of the abundance of varieties which occur in it. The species may be much elucidated, says Linnæus, if botanists will attend the following circumstances, in their native places of growth. 1. Whether the trunk be shrubby, undershrubby, annual or perennial. 2. Whether the stem be erect or decumbent. 3. Whether the leaves be opposite or alternate, and what is their form. 4. Whether there be two stipules or none. 5. Whether the peduncle be one-flowered or many-flowered; naked, or with a bracte. 6. What is the form of the petals. 7. Whether the capsules have five or three valves. 8. Whether the calyx be equal or unequal. The following species are shrubby; from 1 to 13, 50, 52 to 55, 56, 57, 58, 60, 61, 62: these are undershrubs; from 14 to 24, 32 to 49, 51, 59, 63 to 66: a few others are herbaceous, from 25, to 31. The following grow erect; from 2 to 13, 16, 17, 20, 21, 26, 28, 31, 32, 33, 41, 46, 62, 63, 66: and these are decumbent; 14, 15, 18, 22, 23, 24, 34 to 37, 44, 45, 47, 48, 49, 59. Most of the species have the leaves opposite; in some they are alternate, as in 15, 17, 18, 27, 39; but some species have the lower leaves opposite, and the upper ones alternate. The following species have stipules; 28 to 49, 51, 64, 65: the others have none; 1 to 27, 50, 52 to 55, 57 to 63, 66. Species 3, 4, 6, 26, 42, 64, 65, have naked peduncles: in 23, 30, 36, 41, 43, 48, 49, 62, 63, 66, they are bracted. The corolla is white in the following species; 3 to 7, 35, 37, 41, 46 to 48, 55, 66. Purple in these; 2, 8 to 11, 22, 45 to 54, 60, 61. Yellow in the rest; 1, 12 to 21, 23 to 34, 36 to 40, 42 to 45, 50, 51, 56, 59, 62, 63, 64, 65. But some of these vary with white and even rose-coloured corollas, as 44 and 45. But the principal difference in these plants is in the capsule, which in some is five or ten-celled, with as many valves; in others one-celled and three-valved. Hence this great genus might very commodiously be divided into two, as Tournefort, Miller, Jussieu, Gærtner, and others, have done, at least in the *artificial* arrangement, for undoubtedly they all constitute one natural genus. They may be distinguished thus: *Cistus* or rock-rose, has a five or ten-celled capsule, with as many valves. Seeds fixed to the axis; embryo spiral; these are shrubs or undershrubs; the leaves opposite and naked; the flowers in umbels, with unequal calycine leaflets; and the corolla either purple or white, commonly large and specious. *Helianthemum*, or dwarf sunflower, has a one-celled three-valved capsule, with the seeds fixed to the valves. Embryo uncinate-inflected. These are suffruticose or herbaceous; the leaves opposite, or sometimes alternate, stipuled or naked; the flowers in spikes or racemes, with two of the calycine leaflets minute, and a corolla commonly yellow, seldom purple or white, smaller than that of the Cistus, very deciduous in both.

Species. I. Without stipules, shrubby. 1. Cistus Capensis, or Cape cistus: leaves ovate-lanceolate, petioled, three-nerved, toothletted, naked on both sides. Branches round, purplish, having hairs thinly scattered over them; leaves three inches long, remote, the upper ones sessile, but not connate, the lower attenuated into a very short petiole; they are acute, imperfectly three-nerved, the nerves towards the middle evanescent, smooth on both sides, toothletted and ciliate, with long hairs, especially the uppermost. Linnæus remarks, that this differs from the other species in the toothlets of the leaves: it is a native of the Cape of Good Hope.

2. Cistus villosus; hairy rock-rose, or shrubby cistus: leaves ovate, petioled, rough with hairs. This has a strong woody stem, covered with a rough bark, and three or four feet high, dividing into many branches, so as to form a large bushy head. The flowers are produced at the ends of the branches, four or five together, almost in form of an umbel, but it rarely happens that more than one is open at the same time. The petals are large, purple, and spread open like a rose; they are but of short duration, generally falling off the same day they expand; but there is a succession of fresh flowers every day for a considerable time, in May and June; generally again in September and October, if the autumn be favourable; and even in the winter, if the plants be protected from frost. According to the observation of Linnæus, the leaves are wrinkled, green on both sides, and pubescent: native of Italy and Spain. In Linnæus's species and Miller's Dictionary, it is named pilosus.

3. Cistus populifolius, poplar-leaved cistus, or rock-rose: leaves cordate, even, acuminate, petioled. This has a stiff slender woody stem, six or seven feet high, sending out many branches the whole length. These branches and the leaves are hairy; the calyxes also are very hairy: but the branches and leaves, when farther advanced, become naked. The leaves are large, of a light green colour, sessile with many nerves. The flowers are produced at the ends of the branches, on naked peduncles. The corolla is white, and soon drops off. Linnæus adds, that the petals are tinged with purple on their edges, that the stamens are yellow; and that the calyxes, before they unfold, appear three-cornered: native of Portugal: cultivated in 1656, by John Tradescent, junior: flowers in June and July.

4. Cistus laurifolius, or bay-leaved gum-cistus: leaves oblong-ovate, petioled, three-nerved, the upper surface smooth; petioles connate at the base. This rises with a strong woody stem to the height of five or six feet, sending out many erect hairy branches. Leaves lanceolate, acute, thick, dark green above, and white beneath, very glutinous in warm weather. According to Linnæus, they are wrinkled, green on both sides, and scarce visibly hairy: the petioles become purple at the base. The flowers are produced at the ends of the branches upon long naked peduncles, branching on their sides into smaller ones, each sustaining one large white flower, with a hairy calyx: it flowers in June and July. Native of Spain: cultivated in 1752, by Miller.

5. Cistus ladaniferus, or Spanish gum-cistus: leaves lanceolate, even on the upper surface; petioles united at the base, and sheathing. Height five or six feet, with a strong woody stem, sending out many hairy branches. Leaves smooth on their upper side, but veined on their under, on short foot-stalks which join at their base, where they form a sort of sheath to the branch: native of the hills of Spain and Portugal: cultivated in 1656, by John Tradescant, junior. Mr. Curtis observes, that the name ladaniferus is not strictly proper, since this is not the plant

plant whence *ladanum* is produced, although in a warmer climate it affords a similar gum. There is a variety, which Miller makes a distinct species: it has smooth branches, covered with a reddish-brown bark. The leaves are narrow-lanceolate, whitish on their under side, of a dark green above, having three longitudinal veins. The petals are very large, roundish, white, with a large purple spot at their base. The whole plant exsudes a sweet glutinous substance in warm weather, which has a very strong balsamic scent, and perfumes the air to a great distance. It flowers from June to August. There is a variety with white flowers, having no purple spots, which is in all other respects the same with this.

6. Cistus Monspeliensis, or Montpelier gum-cistus: leaves linear-lanceolate, sessile, villose on both sides, three-nerved. Stem slender, from three to four feet high, sending out many hairy branches from the bottom upwards: leaves very dark green, in warm weather covered with a glutinous sweet-scented substance: the peduncles, which come out at the ends of the branches, are long, naked, and sustain many white flowers, rising above each other; their calyxes are bordered, and end in sharp points. It flowers from June to August. According to Linnæus, the upper leaves are broader at the base, but the rest are linear; they are netted and three-nerved underneath. Raceme on long peduncles, often bifid. Capsule, as Gærtner says, five-celled, five-valved; with four smooth blackish seeds in each cell: native of Narbonne, and the kingdom of Valencia: cultivated in 1656, by John Tradescant, junior.

The variety, or olive-leaved rock-rose of Miller, has, according to him, the stem about four feet high, with hairy, glutinous, erect, branches; and long, narrow, hairy, leaves, ending in points, deep green on both sides, having a deep furrow on their upper side made by the midrib. The flowers are on long peduncles at the ends of the branches, are of a pale sulphur colour, and have an acute bordered calyx. It flowers at the same time with the other.

7. Cistus salvifolius, or sage-leaved cistus: leaves ovate, petioled, hirsute on both sides; stem slender, smooth, covered with a brown bark, never rising more than three feet high, and sending out many weak branches spreading horizontally: leaves obtuse, without veins, not so soft as in many other species. It flowers from June to August: native of Italy, Sicily, Narbonne, Swisserland and Carniola: cultivated before 1551, in Sion garden.

8. Cistus incanus, or hoary rock-rose, or rose-cistus: leaves spatulate, tomentose, wrinkled; the lower connate at the base and sheathing. Native of Spain and Narbonne: cultivated in 1596, by Gerarde.

9. Cistus Creticus, or Cretan ladaniferous cistus: leaves spatulate-ovate, petioled, nerveless, rugged; calyxes lanceolate. Branching, diffused, a foot and a half high and more; stem and branches round, and somewhat villose. It flowers copiously in June and July, and the seeds ripen in September. Native of the Levant. This is the species from which the drug called ladanum is procured. It is a resin, which is secreted from the leaves and other parts of the shrub, and is scraped off by means of a kind of rake, to which numerous leathern thongs are appended instead of teeth; this instrument, being drawn backwards and forwards over the plant from time to time, collects the resin. Ladanum is seen in different degrees of purity: the best is in dark-coloured masses, of the consistence of a soft plaister, growing still softer on being handled. It is indeed subject to many sophistications from the more or less careful manner in which it is at first collected, and from the fradulent practices of those through whose hands it afterwards passes. The chief use of ladanum in modern practice is in fumigations, its fragrant smell having made it a constant ingredient in such preparations. Sometimes it is used in troches, and in the Paris Pharmacopœia there is a pectoral troche in which there is a good quantity of ladanum, with musk and amber. In the old German shops is kept a tincture of ladanum which is used in female weaknesses, &c. but is not known with us. It should be observed that ladanum gives out its active matter to spirit of wine, and little or nothing to water, from its being entirely resinous, and consequently not soluble in water.

10. Cistus albidus, or white-leaved cistus: leaves ovate-lanceolate, tomentose, hoary, sessile, mostly three-nerved. This differs from the other species, which it very much resembles, in the branches being tomentose, not hairy: the leaves paler, soft, horizontal, sessile, by no means either petioled, or sheathing, broad-lanceolate, mostly three-nerved. Native of Narbonne and Spain: cultivated in 1656, by John Tradescant, junior.

11. Cistus crispus, or curled-leaved cistus: leaves lanceolate, pubescent, three-nerved, waved: branches weak, slender, woody, spreading horizontally. This shrub is seldom more than two or three feet in height: the corollas are purple; Mr. Miller says white, coming out upon naked peduncles from the wings of the leaves, in June and July, and succeeded by ripe seeds in August and September. It is a native of Portugal; and was cultivated in 1731, by Mr. Miller.

12. Cistus halimifolius, or sea parslane-leaved cistus: leaves lanceolate, hoary, peduncles wand-like. This is an upright shrub, three or four feet high: branches round, ash-coloured, angular at the top, the younger ones dotted with yellow: leaves very white, scarcely soft, without veins, obtuse, flat, about an inch in length. Peduncle terminating, compound, white: partial peduncles, below opposite, above alternate. It differs from several others, to which it otherwise bears some resemblance, in having the peduncles in panicles not at all hairy; the calyxes erect, smaller, acute, somewhat rugged, not ovate, acuminate, hirsute; and the smaller leaflets inserted into the calyx itself, not below the base of it into the pedicel. According to Miller, it rises four or five feet high, and branches from the ground so as to form a large bush. The leaves on the lower part of the branches have footstalks, but those at the top coalesce at their base and surround the stalk. The peduncles are a foot in length, naked, hairy; and put out two or four shorter peduncles on the side, each supporting three or four flowers: these are large, of a bright yellow colour, but of short duration: they appear in June and July. It is a native of Portugal. Vahl made his description from numerous specimens collected in Barbary: it was cultivated in 1656, by John Tradescant, junior.

13. Cistus libanotis, or rosemary-leaved cistus: leaves linear, revolute; flowers umbelled, yellow. A shrub resembling rosemary; stem naked, purplish; with a few yellow flowers: found in Spain by Loefling: introduced 1783, by P. M. A. Broussonet, M. D.

II. Without stipules, undershrubby. 14. Cistus umbellatus, or umbelled cistus: procumbent; leaves opposite; flowers umbelled. Stems low, trailing, woody, seldom branching, and not more than four or five inches long; leaves narrow and hoary; flowers white, in small clusters at the ends of the stalks: it seldom continues longer than two years. Linnæus observes, that the umbels are peduncled. Native of the south of France and Spain. Mr. Miller says, he received the seeds from Istria: he cultivated it in 1731.

15. Cistus lævipes, or cluster-leaved cistus: ascending; leaves alternate, fascicled, filiform, smooth; peduncles racemed; root woody, creeping very much; stems many, round, becoming woody; when young, herbaceous, glaucous, branched, diffused, spreading horizontally, or ascending, very few erect; leaves glaucous, linear, narrow, acute; with each leaf come out two others one-third shorter, between these from the axil other leaves come out successively in the same manner, so as to form a bunch sitting close to the branch. The flowers are thin in villose racemes at the ends of the branches, on long smooth pedicels, and are without scent. Native of the south of France about Montpellier: cultivated 1690, in the royal garden at Hampton Court.

16.

16. Cistus calycinus: erect; leaves linear; peduncles, one-flowered; calyxes three-leaved Stem a foot high, erect; branches reddish. Native of the south of Europe.

17. Cistus Syriacus, or Syrian cistus: erect; leaves lanceolate, revolute; flowers racemed. Stem erect; the younger branches somewhat villose; leaves acute, quite entire, subsessile, alternate, somewhat villose, pale green. Native of the Levant. Introduced in 1788, by Thouin.

18. Cistus fumana, or heath-leaved cistus: procumbent; leaves alternate, linear, rugged about the edge; peduncles one-flowered. Stems seldom longer than a foot. In autumn this species is often covered with tufts of leaves in shape of roses, so as to resemble a sedum more than a cistus. Native of Gothland, France, Swisserland, Austria, Carniola.

19. Cistus canus, or myrtle-leaved dwarf cistus; procumbent; leaves opposite, obovate, villose, tomentose underneath; flowers subumbelled. The old stems are procumbent and naked; but those which bear leaves and flowers are erect. Native of the south of France, Spain, Portugal, Austria, Carniola, and Piedmont. Introduced in 1772, by Monf. Richard.

20. Cistus Italicus, or Italian cistus: leaves opposite, hispid; lower ovate, upper lanceolate; branches spreading. Stem erect, a span high: perhaps a variety of the foregoing.

21. Cistus marifolius, or marum-leaved cistus: leaves opposite, oblong, petioled, flat, hoary, underneath. Stems upright, shrubby, a foot and a half high, sending out branches the whole length; leaves small, silvery, opposite, smooth; the flower-stalks branch; and the flowers, which are white, are produced in short spikes at the ends of the branches. According to Linnæus, it varies with lanceolate leaves, smooth above, and oval leaves, somewhat hairy above, but they are always densely tomentose. underneath and hoary white. Native of the south of Europe: cultivated in 1731, by Mr. Miller.

22. Cistus roseus, or rose-flowered cistus: procumbent; leaves opposite, oblong, rolled back at the edge, somewhat hoary on both sides. This species Allioni suspects to be nothing more than a variety of cistus helianthemum, though the stem of this be more branching and shrubby; the leaves more firm and somewhat hoary underneath. For it is not unusual to see cistus helianthemum of a rose colour in maritime situations; and stems that in cold places are annual and perishable, often become in warm climates perennial and shrubby. Native of the county of Nice and Unelia. Miller says, it was found growing near Smyrna, by Dr. Sherard, who first sent the seeds to England: it was cultivated in the botanic garden at Chelsea in 1723.

23. Cistus Anglicus, or English cistus: procumbent; leaves opposite, oblong, revolute, hairy; flowers racemed: stem scarcely six inches high, oblique, all rugged; leaves lanceolate, like those of hyssop, roughish, not even, green on both sides; flowers white, nodding; but when in bloom erect. This species was first observed by Mr. Newton on some rocks near Kendal in Westmoreland. It has been since found by Mr. Fitz Roberts, at Buck Barrow Bank Scar between Brigsteer and Conswick, and about Cartmel-wells in Lancashire; at Betram-beuke, about a mile to the west of Kendal, by Mr. Richardson; in Caernarvonshire by Mr. Pennant; and in Anglesea, by Mr. Davies: it flowers in May.

24. Cistus Oelandicus: procumbent; leaves opposite, oblong, smooth on both sides; petioles ciliate; petals emarginate. According to Linnæus, in Flora Suecica, this differs from cistus helianthemum in having smaller, narrower, leaves; stems smaller, more erect, smoother, more woody, and redder; more flowers at the tops of the branches, and they less, without a spot in the middle; the petals smaller, not touching each other on the sides. It is no variety, but sufficiently distinct in its appearance, the calyxes not being reflected, the corollas usually closed, the germ smooth, the style bent in, the stigma hispid, usually four-cleft, and in the leaves having the edge not in the least reflected. It does not however appear to Haller that this is very different from the common cistus helianthemum. See No. 19. and 20. There is little doubt but that the species have been too much multiplied.

III. Without stipules, herbaceous. 25. Cistus tuberaria, or plantain-leaved cistus: perennial; root-leaves, ovate, three-nerved, tomentose; stem-leaves smooth, lanceolate; the upper alternate. Root hard, perennial, gradually narrower as it descends; stem a foot high, simple, villose at bottom. Native of Spain, in Catalonia and near Benicasi in the kingdom of Valencia: also in the south of France, and about Pisa.

26. Cistus guttatus, or annual spotted-flowered cistus: leaves opposite, lanceolate, three-nerved, racemes without bractes. Root annual; stem upright, five or six inches high: that and the rest of the plant covered with spreading hairs; flowers erect, but when just out of bloom pendant; petals yellow, with a very dark purple spot, approaching to black at the base; fruits erect. Native of the south of Europe, in sandy soils: observed by Brewer, in sandy pastures on Llech-ddue, near Holyhead, Anglesea, flowering in June; and by Dr. Sherard on the west side of the isle of Jersey, near Grosnez castle. Columna and Ray remarked it at the foot of mount Vesuvius, without any spots in the corolla.

27. Cistus Canadensis, or Canadian cistus: all the leaves alternate, lanceolate, stem ascending. This is a perennial plant, and was found in Canada, by Kalm.

IV. With stipules, herbaceous. 28. Cistus ledifolius, or ledum-leaved cistus: erect, smooth; flowers solitary, subsessile, opposite to a ternate leaf. This rises higher with greater stems than the next species, but is not less hairy; having two or three leaves set at the several joints, longer and narrower than in salicifolius, and smaller pointed, somewhat rough, and of a deep green colour; the flowers grow singly towards the top, and are of a pale yellow. This plant puts on different appearances, according to the soil and situation. In a good soil, if the plants stand single, and are not injured by weeds, they will rise near a foot and a half high, the leaves will be two inches and a half long, and near half an inch broad in the middle; but in a poor soil they do not rise more than half that height: the leaves are much narrower, and the seed-vessels not half so large. When they are cultivated in a garden they are found not to differ. It is an annual plant. Native of the south of France and Italy; found also by Dr. Sherard near Smyrna: cultivated in 1731, by Mr. Miller.

29. Cistus salicifolius, or willow-leaved annual cistus: spreading, villose; flowers racemed, erect; pedicels horizontal. Native of Spain and Portugal, monte Baldo, near Verona, and in the county of Nice; sandy pastures near Bream-downs in Somersetshire. Annual; flowering in June and July. Miller has made two species of it.

30. Cistus Niloticus: erect, subtomentose; flowers racemed, solitary, sessile, opposite-leaved. Stem somewhat woody, a foot high, round. Native of Egypt: annual.

31. Cistus Ægyptiacus, or Egyptian cistus: erect; leaves linear-lanceolate, petioled; calyxes inflated, larger than the corolla. Root annual, putting out one stem only, which is erect, but not able to support the weight of the fruits; flowers drooping and without scent. Native of Egypt.

V. With stipules, undershrubby. 32. Cistus squamatus: leaves covered with orbiculate scales. Branches rather erect, at bottom four-cornered; The whole plant is covered with orbiculate scales, depressed in the center. It was observed in Spain by Loefling.

33. Cistus lippii: erect; leaves alternate and opposite, lanceolate, rugged; spikes directed one way. Stem round, pubescent, whitish, bifid or sparingly branched; branches below the forking of the stem, lateral, simple, white. The wild plant has the branches and leaves hoary on both sides. Native of Egypt, near Alexandria, &c.

34. Cistus surreianus, or small-flowered cistus: procumbent; leaves ovate-oblong, somewhat hairy; petals lanceolate. This resembles cistus helianthemum very much in all its parts, except in the flower, which has the petals oblong and narrow, spreading out like the points of a star,

ftar, as it is commonly painted. The feed-veffels are alfo fmaller. It was difcovered by Edward Du-Bois, near Croydon in Surry. Mr. Hudfon and others confider this as a mere variety of the common fort; the only material difference being in the fhape of the petals: Dillenius on the contrary, who cultivated it at Eltham, and obferved it in many other gardens; and Miller who cultivated it above thirty years, and never found it to vary from feed; do not hefitate to pronounce it a diftinct fpecies.

35. Ciftus nummularius: lower leaves orbiculate, upper ovate. Stems long, trailing, and dividing into many branches; leaves veined, of a light green on their upper fide, but of a greyifh colour beneath, with three narrow erect ftipules at their bafe. The flowers are pretty large, white, and grow in clufters at the ends of the branches. Found by Magnol, on mount Capouladon near Montpellier; John Bauhin had it from Bafil.

36. Ciftus Canarienfis, or Canary ciftus: procumbent; leaves fubovate, alternate and oppofite; racemes erect. Root perennial; ftems fhrubby, erect or afcending, round, fcabrous, a fpan high, branched. It flowers from June to Auguft; the bloffoms expand only in the morning. Native of Fuertaventura, one of the Canary iflands; whence it was fent to Jacquin by Fr. Maffon.

37. Ciftus fœtidus: procumbent; ftipules lanceolate; leaves oblong, rugged. Root perennial; branches, annual. Branches, leaves, racemes, and calyxes, befet with fcabrous villofe hairs. It has a ftrong fmell like bryony; and approaches to ciftus mutabilis, in habit, time of flowering and fruiting, and in the form of the capfule.

38. Ciftus ferpyllifolius, or wild thyme-leaved ciftus: leaves oblong; calyxes even. Stems fhrubby and crooked, covered with a purplifh brown bark like common heath; branches flender; leaves narrow and ftiff, like thofe of thyme: they are oppofite, and have no ftipule at their bafe. "If fo," obferves Martyn in his edition of Miller's Gardener's Dictionary, "it does not belong to this fection." The flowers are produced on naked peduncles, terminating the branches in a fort of umbel; they are of a pale yellow colour. Native of the Alps of Auftria; cultivated in 1759, by Mr. Miller; it flowers from May to September.

39. Ciftus glutinofus, or clammy ciftus: leaves linear, oppofite, and alternate; peduncles villofe, glutinofe. Root woody, fmall, creeping much; ftems many, a long fpan in height, ftraightifh at bottom woody and branched, but at length folitary, more flender, round, green, naked at the top, villofe and glutinofe with very fhort fpreading hairs. Native of the fouth of Europe.

40. Ciftus thymifolius, or thyme-leaved ciftus: procumbent; leaves oval-linear, oppofite, very fhort heaped. Linnæus has given no defcription of this fpecies. Villars fays, that it is a fmaller plant than his hirfutus, but he doubts whether that be the fame with the pilofus of Linnæus. The leaves are narrower, and difpofed in bundles; the flowers are yellow, but fmaller and fewer. It is villofe, but the tiffue is clofer, which renders it whitifh. The hairs do not iffue from a gland, nor does it feem to be glutinous. The leaves much refemble thofe of thyme, but they are not fo hard, and they are a little whiter. Native of the fouth of France and of Spain: cultivated in 1714, by the duchefs of Beaufort.

41. Ciftus pilofus, or hairy ciftus: almoft upright; leaves linear, with two grooves underneath, hoary; calyxes even. Gerarde refers to this all the fmall fpecies with white flowers; and Allioni agrees with him. It varies with broader ovate leaves, fcarcely revolute; and narrower leaves, revolute on both fides, ufually whitifh. The white colour of the corolla varies exceedingly; and, in the garden, the fame plant will have white, fulphureous, and rofe-coloured, flowers. It is alfo not uncommon on the maritime hills of the county of Nice, with rofe-coloured flowers. Native of the fouth of France, Spain, and Piedmont: cultivated by Mr. Miller in 1759.

42. Ciftus racemofus: leaves linear, calyxes racemed, pointing one way, nerved-angular, fmooth. This is a weak fhrub, half a foot in height; according to Linnæus, the ftature of rofemary: the branches remotely muricated from the fallen leaves, tomentofe, and hoary at the top. Native of Spain.

43. Ciftus anguftifolius: diffufed; leaves lanceolate; calyxes hirfute. Root perennial, branched; ftem round, branched from the bafe, woody; the younger branches, with the leaves, ftipules, and racemes, flightly villofe and hoary.

44. Ciftus helianthemum, or dwarf ciftus, or little funflower: procumbent; ftipules lanceolate; leaves oblong, revolute, fomewhat hairy. According to Linnæus, the petals are fuborbiculate, quite entire, yellow, generally with a tawny ring furrounding the receptacle. The racemes nod before they flower. The leaves have a few hairs fcattered over them. Mr. Curtis obferved that the hairs on the leaves are forked; ftems numerous, round, fmooth at the bottom, at the top flightly hairy, commonly reddifh. Scopoli diftinguifhes this from his grandiflorus, by having the ftipules fhorter than the calyx; whereas in that they are longer. Pollich fays that he has reckoned as far as ninety ftamens in a flower. The ufual colour of the corolla is a full yellow, but it varies to lemon-colour, white, and even rofe-colour; it is alfo faid to be found with a double corolla. It varies likewife fomething in the leaves. Found in dry paftures in many parts of Europe. With us generally in calcareous foils: perennial; flowering from June to Auguft.

45. Ciftus mutabilis, or changeable ciftus: procumbent; ftipules lanceolate; leaves oblong, fmooth, flat. Stems feveral, branching very much, woody at the bottom, and the fize of a common quill, procumbent and brown; from thefe fpring annually numerous, fmooth, afcending, branches, about a foot in length; leaves oppofite, petioled, lanceolate-oblong, bluntifh, quite entire, green, flat, not revolute; feeds few, brown. It flowers in May and June; and the feeds ripen in July.

46. Ciftus hirtus, or rofemary-leaved ciftus: leaves ovate; calyxes hifpid. Stem erect, fending out many fide branches, with the joints pretty clofe; leaves very narrow, oppofite, revolute, the upper furface of a lucid green, and the under hoary; flowers large, white, in fmall clufters at the ends of the branches. Native of the fouth of France, Spain, and Villafranca: cultivated by Mr. Miller in 1759.

47. Ciftus Apenninus, or Apennine ciftus: fpreading; leaves lanceolate, rough with hairs. This is a foot in height, branching, and fpreading; leaves green and rough with hairs on the upper furface, on the lower hoary. Miller makes two fpecies of this, and thus defcribes them: 2. The ftalks are much larger, and extend farther, than thofe of ciftus helianthemum; the leaves are longer and hoary; there are three acuminate erect ftipules at each of the lower joints; the racemes are much longer; the calyx is hairy and whitifh; the corollas are white and larger. 4. The ftems are more erect, the leaves not fo long, the ftipules very fmall, and the whole plant very hoary; the flowers are white, the fpikes fhorter and more compact. Native of Italy, on the Apennines: cultivated in 1731 by Mr. Miller.

48. Ciftus polifolius, or mountain ciftus: procumbent; leaves oblong-ovate, hoary; calyxes even; petals ferrate. Branches many, fpreading on the ground, hoary towards the end, towards the bafe brownifh, with frequent joints, and naked, moft of them a hand in length, but the inner and younger branches much fhorter; leaves thickifh, fomewhat ftiff, revolute, having a prominent rib underneath, hoary, frequent, with others much fmaller growing from the axils; flowers few, terminal, of the fame form and fize with thofe of No. 44; feeds many, three-cornered, dark brown. In a garden, the leaves become larger, lofe their hoarinefs, and become green and hairy. Remarked firft by Plukenet, on Brent down in Somerfetfhire, near the Severn Sea; and found in the fame place, on the middle of the hill, by Dillenius, in July 1726. Native alfo of the fouth of Europe.

49. Cistus Arabicus, or Arabian cistus: procumbent; leaves linear, those on the peduncles alternate, those on the branchlets crowded. This plant is a foot high, suffruticose, and diffused. According to the description of Vahl, the branches are leafless, procumbent at the bottom, then ascending, often a foot high, round, smooth, slender; branchlets from the very base, copious, alternate, distant, spreading very much; the lower ones barren, the uppermost flowering, quite simple, elongated, cinereous-pubescent; leaves on the barren branches crowded, marked with two lines, declining, linear, stiffish, veinless, bluntish, the last tomentose, ash-coloured. Native of Spain.

VI. Species not in Systema Vegetabilium. 50. Cistus medius: leaves ovate-lanceolate, wrinkled, petioled, toothletted. Grows in the county of Nice.

51 Cistus grandiflorus, or great-flowered cistus: stipuled, suffruticose; leaves lanceolate, villose on both sides, acuminate; stipules longer than the calyx. Stem villose, about six inches high; leaves an inch long; flowers in racemes. Found in Carniola and Piedmont.

52. Cistus breviorifolius, or short-leaved cistus: shrubby, without stipules; leaves ovate-lanceolate, connate, hirsute, wrinkled; peduncles longer. This is a native of Portugal.

53. Cistus lusitanicus: shrubby, without stipules; leaves ovate, obtuse, villose, nerved, and wrinkled underneath; flowers larger. This has much larger and rounder leaves, hairy, but even on their upper side, rough and full of veins on their under; branches white and hairy; flowers very large, and of a light purple colour.

54. Cistus hispanicus: shrubby, without stipules, villose; leaves lanceolate, green connate; flowers sessile; calyxes acute. This does not rise so high as either of the former, but sends out branches near the root, which are hairy and erect. At each joint comes out a very slender branch, having three pairs of small leaves of the same shape with the others, and terminated by a single flower; the ends of the branches have three or four flowers sitting close without peduncles. The flowers are of a deep purple colour, and like those of the second. These flower at the same time with the others.

55 Cistus cordifolius: shrubby, without stipules; leaves oblong-cordate, smooth; petioles longer. This sort rises with a smooth shrubby stalk four or five feet high, sending out many slender woody branches, covered with a smooth brown bark, with oblong heart-shaped leaves, which are smooth, and have long foot-stalks. The flowers are produced at the ends of the branches, standing upon pretty long peduncles; they are white, and appear in June, July, and August, but rarely produce any seeds in England.

56. Cistus fasciculatus: leaves in bundles. Stem shrubby, about nine inches high; leaves very narrow and fine, growing in clusters. The flowers come out from the side, and at the ends of the branches, on slender peduncles; they are of a pale straw-colour, and it is seldom longer than two hours before the petals fall off. This plant seldom continues more than two years. Native of the Cape of Good Hope; and sent to Mr. Miller from Holland by Dr. Adrian van Royen.

57. Cistus vaginatus, or oblong-leaved cistus: arborescent, without stipules; leaves oblong, hairy underneath, netted-wrinkled; petioles united at the base, sheathing, furrowed. Found in the island of Teneriffe by Masson, and introduced in 1779. It flowers from April to June. The place of this is between the fourth and fifth species.

58. Cistus laxus, or broad waved-leaved cistus: arborescent, without stipules; leaves ovate-lanceolate, waved, toothletted, smooth, the upper rough with hairs; calycine leaflets roundish-cordate. Native of Spain and Portugal: cultivated in 1656, by Mr. John Tradescant, junior. It flowers in June and July. This should come in between the sixth and seventh.

59. Cistus scabrosus, or rough cistus: undershrubby, without stipules; leaves opposite, ovate, hairy and rugged, three-nerved; calyxes three-leaved. Stems decumbent, round, closely beset with short stellated hairs, and rugged; branches short; leaves subpetioled, an inch in length. Native of Italy and Portugal. It flowers in June and July. Introduced in 1775 by Messieurs Kennedy and Lee. It comes in between the eighteenth and nineteenth species.

60. Cistus sericeus: arborescent, without stipules; leaves ovate, tomentose, three-nerved, the lower petioled, the uppermost sessile; peduncles rough with hairs. Stem two or three feet high; branches round, densely tomentose, hoary-white; leaves opposite, hoary, very soft, flat, bluntish, about an inch in length; the four uppermost sessile, subcordate at the base, the rest ending in a short petiole. Native of Spain and Portugal.

61. Cistus hybridus: arborescent, without stipules; leaves ovate, petioled, hoary; branches scaly; peduncles elongated, rough with hairs. Native of Spain. The proper place of this, and the foregoing, is between the tenth and eleventh species.

62. Cistus elongatus: arborescent, without stipules; leaves lanceolate, hoary; peduncle elongated, two-leaved; that and the racemed calyxes hirsute. This is an upright and very branching shrub, a foot or more in height; branches short, the younger ones tomentose, hoary, with yellowish scales scattered over them; leaves opposite, veinless, hoary on both sides, flat; the younger ones doubled together, patulous at the tip; the leaves also are smaller than in the other species that approach nearest to it. Native of Spain, where this and the preceding sort were found by Vahl. The proper place for this is between the twelfth and thirteenth species.

63. Cistus alternifolius: suffruticose, without stipules; leaves alternate; peduncles lateral and terminating, solitary, one-flowered. This is an erect little shrub, with slender villose branches, and a brown bark; leaves sessile, oblong, erect, flat, quite entire, villose on both sides, becoming black in drying. Native of Brasil. The true place of this is between the twenty-fourth and twenty-fifth species.

64. Cistus lavandulifolius, or lavender-leaved cistus: suffruticose, stipuled; leaves lanceolate-linear, tomentose; calyxes racemed, tomentose, pointing one way, pendulous. This is a shrub, a palm, and sometimes a foot, in height, branched at the bottom; branches round, upright, tomentose, hoary. Native of Spain, south of France, and Barbary. Clusius observed it in the kingdom of Valencia; and Vahl about Marseilles, and on the dry hills of Tunis. Its proper place is between the forty-first and forty-second species.

65. Cistus lanceolatus: suffruticose, without stipules; leaves lanceolate, three-nerved, hairy. Stem suffruticose, branched at the base; branches quite simple, a short span in length, ascending, leafy, smooth at the bottom, tomentose at the top, hoary, as they are also at the base; leaves sessile, two inches long, gradually smaller towards the top, opposite, except the last, which are alternate, hairy, but sometimes, though very seldom, quite smooth. Native of Barbary; and found there on the heaths near Bizerta, by Vahl. The proper place for this is immediately before the twenty-fifth species.

66. Cistus ocymoides: shrubby, without stipules; leaves obovate, three-nerved; those of the branchlets hoary on both sides; reflex at the tip; calyxes racemed; both they and the peduncles quite smooth. This is a small upright shrub, a span high; branches opposite, purple at the bottom, clothed at the base, as are also the branchlets with long thinly scattered hairs; the younger ones are hoary, somewhat angular, and, when examined with a magnifier, have ferruginous dots scattered over them; leaves petioled, opposite, those on the branches, and the lower ones on the flowering-twigs, lanceolate wedge-form, often an inch long, three-nerved, green on both sides, almost naked above, slightly hairy beneath; the younger ones, and those of the barren twigs, obovate, doubled, without apparent veins

veins or nerves. According to Cavanilles, the stem is two feet high, with a brown bark; leaves subconnate, ovate-oblong, white on the lower surface, with a prominent dorsal nerve; those on the elder branches short, narrowed at the base, with a sort of petiole, resembling those of thymus mastichina; on the flowering branches they are many times longer, but still sessile and connate. Native of Spain.

Propagation and Culture. All the various kinds of cistus are very great ornaments to a garden; their flowers, though but of a short duration, are succeeded by fresh ones almost every day for above two months successively; these flowers are many of them about the bigness of a middling rose, but single, and of different colours; the plants continue their leaves all the year. The most desirable sorts for their beauty are the 3d, 4th, 5th, 8th, and 11th. The 6th, 9th, and 10th, are also very handsome. These plants are most of them hardy enough to live in the open air in England, unless in very severe winters, which often destroy many of them, so that a plant or two of each sort may be kept in pots, and sheltered in winter, to preserve the kinds; the rest may be intermixed with other shrubs, where they will make a pretty diversity; and, in such places where they are sheltered by other plants, they will endure the cold much better than where they are scattered singly in the borders.

The 1st, 17th, 30th, 31st, 36th, 49th, and 56th, require the protection of a stove. The 12th is the most tender of the European species, and will hardly live abroad in the winter. The 2d, 3d, and 9th, are the next in tenderness; and, after them, the 4th, 8th, and 12th. Many of these plants will grow to the height of five or six feet, and will have large spreading heads, provided they are permitted to grow uncut; but, if they are ever trimmed, it should be only so much as to prevent their heads from growing too large for their stems; for, whenever this happens, they are apt to fall on the ground, and appear unsightly.

These shrubs are propagated by seeds, and also from cuttings; but the latter method is seldom practised, unless for those sorts which do not produce seeds in England; these are the twelfth and the fifty-fifth sorts; all the others generally produce plenty of seeds, especially those plants which came from seeds; for those which are propagated by cuttings, are very subject to become barren, which is also common to many other plants. The seeds of these plants may be sown in the spring upon a common border of light earth, where the plants will come up in six or seven weeks; and, if they are kept clear from weeds, and thinned where they are too close, they will grow eight or ten inches high the same year; but, as the plants, when young, are liable to injury from hard frost, they should be transplanted, when about an inch high, some into small pots filled with light earth, that they may be removed into shelter in winter, and the others into a warm border, at about six inches distance each way; those which are potted, must be set in a shady situation till they have taken new root; and those planted in the border must be shaded every day with mats till they are rooted, after which the latter will require no other care but to keep them clean from weeds till autumn, when they should have hoops placed over them, that they may be covered in frosty weather; those in the pots may be removed into an open situation, so soon as they have taken new root, where they may remain till the end of October, but, during the summer, they must be shifted into large pots, and be frequently watered; at the end of October they should be placed under a hot-bed frame to screen them from the cold in winter; but, at all times, when the weather is mild, they should be fully exposed to the open air, and only covered in frosts: with this management, the plants will thrive much better than when they are more tenderly treated.

The above method is what the gardeners generally practise; but those who are desirous to have their plants come forward, should sow the seeds on a moderate hot-bed in the spring, which will bring up the plants very soon: but these must have plenty of air when they appear, otherwise they will draw up very weak; when the plants are fit to remove, they should be each planted into a separate small pot, and plunged into a very moderate hot-bed, observing to shade them till they have taken fresh root; then they must have plenty of air admitted to them every day in good weather, to prevent their drawing up weak; and, by degrees, they must be hardened, so as to be removed into the open air the beginning of June, and then they may be treated in the same manner as is before directed for the other seedling plants. By bringing the plants forward in the spring in this method, they will grow to the height of two feet, or more, the first summer, and have many lateral branches, so that they will be strong enough to plant abroad the following spring, and most of them will flower the same summer; whereas those which are sown in the full ground, rarely flower till the year after; nor will they be so strong, or capable to resist the cold of the second winter, as those which have been brought forward. In the spring following, these plants may be turned out of the pots, with all the earth preserved to their roots, and planted in the places where they are to remain, (for they are bad plants to remove when grown old,) observing to give them now and then a little water, until they have taken fresh root; after which time, they will require no farther care than to train them upright in the manner you would have them grow; but those plants which were at first planted into a border in the open ground, should be arched over, and covered with mats in frosty weather, during the first winter, but may be transplanted abroad the succeeding spring. In removing these plants, you should be careful to preserve as much earth about the roots as you can; and, if the season should prove hot and dry, you must water and shade them until they have taken fresh root, after which they will require no other culture than was before directed.

These plants may also be propagated by cuttings, which should be planted in May or June, upon a bed of light earth, keeping them shaded with mats, and frequently refreshed with water, until they have taken root; which will be in about two months time, when you may transplant them into pots filled with good fresh light earth, and they should be set in a shady place until they have taken root, then they may be exposed to the open sun until October, when you should remove them into shelter the first winter; but the succeeding spring you may plant them abroad, as was before directed for the seedling plants.

Most of the perennial sorts of dwarf cistus or sunflower (helianthemum) will thrive in the open air in England; they are propagated by seeds, which may be sown in places where they are to remain, and will require no other care but to keep them clean from weeds, and to thin them where they are too close, always observing to leave those sorts at a greater distance, whose stalks trail on the ground to the greatest length. These plants will continue several years in a poor dry soil; but, in rich ground, or moist situations, they seldom last long; but, as they ripen seeds in plenty, they may be easily renewed. For the annual sorts, the seeds may be sown in April upon a bed of common earth; the plants will come up in May, and flower in July. Mr. Curtis adds, that, though our common dwarf cistus cannot vie with those which are the produce of warmer climates, yet it is one of the most ornamental of our native plants, and admirably well calculated to decorate a rock or dry bank, especially if its several varieties, with white, rose, and lemon-coloured, flowers, be intermixed. It is hardy, easily propagated either by seeds or cuttings, and continues for the greatest part of the summer to put forth daily a multitude of new blossoms. If the variety with double flowers, mentioned by Haller, could be obtained, it would be a valuable acquisition to our gardens. See ANDROMEDA, DIOSMA, KALMIA,

KALMIA, LEDUM, RHODODENDRON, TELEPHIUM, TURNERA, and AZALEA.

CIT, *s.* [contracted from *citizen*.] An inhabitant of a city, in an ill sense; a pert low townsman; a pragmatical trader:

We bring you now to shew what different things
The *cits* or clowns are from the courts of kings. *Johnson.*

CI'TADEL, *s.* [*citadelle*, Fr.] A fortress; a castle, or place of arms, in a city.—As he came to the crown by unjust means, as unjustly he kept it; by force of stranger soldiers in *citadels*, the nests of tyranny and murderers of liberty. *Sidney.*

CI'TAL, *s.* [from *cite*.] Reproof; impeachment:

He made a blushing *cital* of himself,
And chid his truant youth. *Shakespeare.*

Summons; citation; call into a court. Quotation; citation.

CITA'TION, *s.* [*citatio*, Lat.] Quotation; the adduction of any passage from another author; or of another man's words. The passage or words quoted; a quotation.—View the principles in their own authors, and not in the *citations* of those who would confute them. *Watts.*—Enumeration; mention.—These causes effect a consumption endemic to this island: there remains a *citation* of such as may produce it in any country. *Harvey.*

CITA'TION, in law, a summons to appear, applied particularly to process in the spiritual court. The ecclesiastical courts proceed according to the course of the civil and canon laws, by citation, libel, &c. A person is not generally to be cited to appear out of the diocese, or peculiar jurisdiction where he lives, unless it be by the archbishop, in default of the ordinary, where the ordinary is party to the suit, in cases of appeal, &c. and, by law, a defendant may be sued where he lives, though it is for subtracting tithes in another diocese. 1 *Nelf.* 449. By stat. 23 Hen. VIII. c. 9. every archbishop may cite any person dwelling in any bishop's diocese within his province for heresy, &c. if the bishop or other ordinary consents; or if the bishop or ordinary, or judge, do not do his duty in punishing the offence. Where persons are cited out of their diocese, and live out of the jurisdiction of the bishop, a prohibition or consultation may be granted; but, where persons live in the diocese, if when they are cited they do not appear, they are to be excommunicated. The above statute was made to maintain the jurisdiction of inferior dioceses; and, if any person is cited out of the diocese, &c. where the civil or canon law doth not allow it, the party grieved shall have double damages. If one defame another within the peculiar of the archbishop, he may be punished there, although he dwell in any remote place out of the archbishop's peculiar. *Godb.* 190.

CI'TATORY, *adj.* [from *to cite*.] Having the power or form of citation.—If a judge cite one to a place, to which he cannot come with safety, he may freely appeal, though an appeal be inhibited in the letters *citatory*. *Ayliffe.*

To CITE, *v. a.* [*cito*, Lat.] To summon to answer in a court:

Forthwith the *cited* dead,
Of all past ages, to the general doom
Shall hasten. *Milton.*

To enjoin; to call upon another authoritatively; to direct; to summon:

This sad experience *cites* me to reveal,
And what I dictate is from what I feel. *Prior.*

To quote.—Demonstrations in scripture may not otherwise be shewed than by *citing* them out of the scripture. *Hooker.*

CI'TER, *s.* One who cites into a court. One who quotes; a quoter.—I must desire the *citer* henceforward to inform us of his editions too. *Atterbury.*

CITE'SS, *s.* A city woman. A word peculiar to Dryden:

Cits and *citesses* raise a joyful strain;
'Tis a good omen to begin a reign. *Dryden.*

CI'THÆRON, a king, who gave his name to a mountain of Bœotia. This mountain was at the south of the river Asopus. It was sacred to Jupiter and the Muses. Actæon was torn to pieces by his own dogs on this mountain. Hercules killed there an immense lion. *Virgil.*

CITHAREX'YLUM, *s.* [from κιθαρα, a harp, and ξυλον, wood.] FIDDLE-WOOD; in botany, a genus of the class didynamia, order angiospermia, natural order personatæ. The generic characters are—Calyx: perianthium one-leafed, bell-form, five-toothed, acute, permanent. Corolla: one-petalled, funnel-wheel-form: tube twice as long as the perianthium, thicker at the top; border five-parted, two-lipped; segments above villose, oblong, truncate, flat, very spreading. Stamina: filaments four, with the rudiment of a fifth from the middle of the tube, filiform, two of them somewhat longer; antheræ oblong, twin, erect. Pistillum: germ roundish; style filiform, the length of the stamens; stigma obtuse-headed. Pericarpium: berry roundish, somewhat compressed, one-celled. Seeds: two, ovate, two-celled, convex on one side, concave on the other, emarginate at the end.—*Essential Character.* Calyx five toothed, bell-form; corolla funnel-wheel-form; segments above villose, equal; berry two-seeded; seeds two-celled.

Species. 1. Citharexylum cinereum, or ash-coloured fiddle-wood: branches round; calyxes toothed. This is a tree rising with a round upright trunk, not more than a foot in diameter, to the height of fifteen or twenty feet, with a handsome branching head; leaves oblong-oval, acuminate at both ends, entire, shining, commonly opposite, but sometimes alternate, and frequently three together, of different sizes, but mostly above half a foot in length; flowers small, numerous, odoriferous, on short pedicels; corolla white; berries succulent, shining, soft, roundish, first green, next red, and, finally, black. Browne says, that it rises not above eight or nine feet in height; that the veins of the leaves, and all the tender buds, are of a brown colour; the bark of the trunk and lower branches of a whitish ash-colour. It is very common in all the Savannas of Jamaica, and is called *old-woman's bitter*. Also in the woods of Martinique, where the French call it *bois cotelet*.

2. Citharexylum caudatum, or oval-leaved, or long-spiked, fiddle-wood: branches round; calyxes truncate. The leaves are obovate; both they and the racemes are erect. It is but a shrub, says Browne, which seldom grows above ten or twelve feet in height; and bears a great number of small berries, disposed on divided spikes at the extremities of the branches. It is pretty common about Sixteen-mile-walk in Jamaica.

3. Citharexylum quadrangulare, or square-stalked fiddle-wood: branches quadrangular. This differs from the first species in having the berries red when ripe, and all the branches, round indeed, but made unequal by four ribs running down them. The bark is ash-coloured, and it agrees with the cinereum in all other circumstances. It is, perhaps, only a variety. The French call it *bois cotelet carré*. Native of the West Indies, Jamaica, Martinique, &c. Miller thus describes it: It has an upright trunk fifty or sixty feet high, sending out branches on every side, which have several angles, or ribs, running longitudinally, garnished by three oval spear-shaped leaves at every joint, standing in a triangle, upon short foot-stalks; the leaves are about four inches long, and one or two broad, of a lively green colour, pretty much notched on their edges, having several deep veins running from the midrib to the edges; they are of a white colour on their upper side, and very prominent on their under; the flowers come out from the sides, and also at the end of the branches, in loose bunches, which are succeeded by small pulpy berries, inclosing two seeds in each.

4. Citharexylum villosum, or hairy-leaved fiddle-wood: leaves

leaves villose. This is a small tree, about ten feet in height; the trunk and older branches are round and ash-coloured, the younger ones four-cornered and green; the young shoots are villose; leaves somewhat rugged on the upper surface, extremely soft and villose on the lower, three inches long, with an oblong deep-green glandular hole on each side of the petiole at the top; flowers numerous, and smelling extremely sweet; corolla white. Native of St. Domingo.

5. Citharexylum melanocardium, or black-heart fiddle-wood: branches quadrangular; racemes terminating, compound; flowers four-stamened. This tree frequently rises to the height of forty or fifty feet, and is generally looked upon as one of the hardest and best timber trees; the body grows to a considerable thickness, and is covered with a thick whitish bark, which, like the grain of the wood, winds in a loose spiral form; the leaves are pretty long, rugged, and slightly serrate; the flowers are disposed in bunches at the extremities of the branches; the berries are small and yellow, and are sometimes eaten by the negroes; they contain each two hemispheric shells, with two kernels; the nuts way be easily parted into two lobes or segments. Native of Jamaica, chiefly in the low lands and savannas. Miller affirms, that the French call this tree *fidelle*, from its faithfulness or durability in building; and that the English have corrupted the name to *fiddle-wood*, as if it were used for making musical instruments, which is a mistake.

Propagation and Culture. The third sort has been long preserved in some of the curious gardens in England for the sake of variety; the leaves continuing through the year, and being of a fine green colour, make a pretty variety in the stove during the winter season. It may be propagated either by seeds or cuttings; the latter is the usual method in England, where the seeds are not produced; but, when seeds can be obtained from abroad, the plants which rise from them are much better than those raised from cuttings. The seeds should be sown in small pots early in the spring, and plunged into a fresh hot-bed of tanners' bark, and treated in the same manner as other exotic seeds, which are brought from hot countries. If the seeds are fresh, the plants will appear in six or seven weeks, and in about one month more will be fit to transplant; when this is done, the plants should be carefully separated, so as not to tear or break off their roots, and each planted in a small pot filled with light fresh earth, and plunged into the hot-bed again, observing to shade them till they have taken fresh root; after which they should have a large share of air admitted to them in warm weather, and must be frequently watered; in autumn the plants should be removed into the bark-stove, where it will be proper to keep them the first winter, till they have obtained strength; then they may be afterward kept in a dry stove in winter, and in the middle of summer they may be exposed in the open air for two or three months, in a warm situation, with which management the plants will make better progress than when they are more tenderly treated. If the cuttings of these plants are planted in small pots during the summer months, and plunged into a moderate hot-bed, they will take root, and may afterward be treated in the same manner as the seedling plants.

CI'THERN, *s.* [*cithara*, Lat.] A kind of harp; a musical instrument similar to the lyre.—At what time the heathen had profaned it, even in that was it dedicated with songs and *citherns*, and harps and cymbals. *Macc.*

CI'THIBEB, a town of Africa, in the kingdom of Morocco, in the province of Tedla.

CI'TIUM, in ancient geography, a town of Cyprus, situated in the south of the island; famous for the birth of Zeno, author of the sect called *Stoics*; distant two hundred stadia to the west of Salamis. Here Cimon died, in his expedition against Egypt. A colony of Phœnicians, called *Chetim*: and hence it is, that not only Cyprus, but the other islands and many maritime places, are called *Chetim* by the Hebrews; now CHITI.

CI'TIZEN, *s.* [*civis*, Lat. *citoyen*, Fr.] A freeman of a city; not a foreigner; not a slave.—All inhabitants within these walls are not properly citizens, but only such as are called freemen. *Raleigh.*—A townsman; a man of trade; not a gentleman:

When he speaks not like a *citizen*,
You find him like a soldier. *Shakespeare.*

An inhabitant; a dweller in any place; a *citizen* of the world:

Far from noisy Rome secure he lives,
And one more *citizen* to Sybil gives. *Dryden.*

CITOW', a town of Bohemia, in the circle of Schian: ten miles south-east of Raudnitz.

CITRA'RO, a town of Italy, in the kingdom of Naples, and province of Calabria Citra, near the coast of the Tuscan Sea: eighteen miles west of Bisignano.

CI'TRINE, *adj.* [*citrinus*, Lat.] Lemon-coloured, of a dark yellow.—The butterfly, papilio major, has its wings painted with *citrine* and black, both in long streaks and spots. *Grew.*

CI'TRINE, *s.* [*citrinus*, Lat.] A species of crystal of an extremely pure, clear, and fine, texture, generally free from flaws and blemishes. It is ever found in a long and slender column, irregularly hexangular, and terminated by an hexangular pyramid. It is from one to four or five inches in length. This stone is very plentiful in the West Indies. Our jewellers have learned to call it *citrine*; and cut stones for rings out of it, which are often mistaken for topazes. *Hill.*

CI'TRON-TREE, *s.* in botany. See CITRUS.

CI'TRON-WATER. See PHARMACY.

CI'TRUL, *s.* The same with *pumpion*, so named from its yellow colour.

CI'TRUL and CITRUL'LUS. See CUCURBITA.

CI'TRUS, *s.* [derivation uncertain. Some say it is from the name of a place in Asia. Vossius affirms that it is a Latin word, which the Romans had, not from Greece, but from Africa. Others say from the Arabic.] The ORANGE, LEMON, &c. In botany, it is a genus of the class polyadelphia, order icosandria, natural order bicornes, (aurantia, Jussieu.) The generic characters are—Calyx: perianthium one-leafed, five-cleft, flat at the the base, very small, withering. Corolla: petals five, oblong, flat, spreading. Stamina: filaments usually twenty, subulate, compressed, erect, placed in a ring or cylinder, united generally into fewer or more bunches; antheræ oblong. Pistillum: germ superior, roundish; style cylindric, the length of the stamens; stigma globular, nine-celled within. Pericarpium: berry with a fleshy rind, the pulp bladdery, nine-celled, (seven to eleven, G. nine to eighteen, J.) Seeds: in couples, (one to four, G. one or two, J.) subovate, callous; orange has a cordate petiole; citron, lemon, and lime, have a naked and simple petiole.

Description. All the species of citrus are either trees of small growth or shrubs; leaves evergreen, ovate, or ovate-lanceolate, entire or serrate, pellucid-dotted, the petiole frequently margined. On the natural trees there are often solitary axillary spines; peduncles axillary or terminating, one-flowered, or many-flowered. The species seem best distinguished by the petiole, which, in the orange and shaddock, is winged; in the citron, lemon, and lime, naked. The form of the fruit, although not quite constant, may also serve for a distinction. In the orange and shaddock it is spherical, or rather an oblate spheroid, with a red or orange-coloured rind; in the lime, spherical, with a pale rind; in the lemon, oblong, with a nipple-like protuberance at the end; in the citron, oblong, with a very thick rind. Miller distinguishes the citron from the orange, because, in all the varieties of citron which he has examined, he found but ten stamens in the flowers, whereas those of the orange always have more. He treats of citron, lemon, and orange, separately, under the titles of *citrus*, *lemon*, and *aurantium*. It is very difficult

difficult to determine what is a variety, and what a species in this genus. The trees in the eastern countries, their natural place of growth, vary not only in the size and shape of the fruit, but also in the leaves, as appears abundantly from the figures in Rumphius. Many of those which are esteemed to be varieties only in Europe, and are given here as such, in their native woods preserve their differences, such as they are; and there engrafting and inoculating these trees is unknown, but they are left in a state of nature.

Species. 1. Citrus medica. Its varieties are, citrus medica, or sweet citron: fruit, with a thick rough rind. Citrus tuberosa, or common citron: fruit, with a rough knobbed rind. Citrus limon, or common lemon: leaves ovate-lanceolate, acuminate, subserrate. Citrus acris, or sour lemon, or lime: leaves ovate, entire; branches somewhat thorny. Citrus racemosa, or clustered lemon: leaves ovate-lanceolate, subserrate; fruit in clusters; petioles linear, in all the varieties. In its wild state this tree grows to the height of about eight feet, erect and prickly, with long reclining branches; leaves ovate-oblong, alternate, subserrate, smooth, pale green; flowers white, odoriferous, on many-flowered terminating peduncles; fruit, a berry, half a foot in length, ovate, with a protuberance at the tip, nine-celled, or thereabouts; the pulp white, commonly acid; the rind yellow, thick, hardish, odoriferous, irregular; fruit, esculent, both raw and preserved. Properly there are two rinds, the outer thin, with innumerable miliary glands full of a most fragrant oil; the inner thick, white, and fungous; the partitions consist of two very thin diaphanous membranaceous plates, connected at the axis, and inserted into the rind at the periphery; the cells are filled with a bladdery pulp. In each cell are a few seeds, commonly one or two, sometimes three or four.

The English gardens are supplied with several varieties of the citron from Genoa, which is the great nursery for the several parts of Europe of this, as well as lemons and oranges. The gardeners who cultivate them there are as fond of introducing a new variety into their collection, as nursery-men in England are of obtaining a new pear, apple, or peach. The fruit of the citron is seldom eaten raw, but is generally preserved, and made into sweet-meats; which being kept till winter and spring, when there is a scarcity of fruit to furnish out the desert, is the more valuable; but, unless the season be warm, and the trees well managed, the fruit rarely ripens in England. The fairest fruit growing here was in the garden of the duke of Argyle at Whitton, where the trees were trained against a south wall, through which there were flues for warming the air in winter, and glass covers to put over them, when the weather began to be cold. Thus the fruit was as large, and as perfectly ripe, as it is in Italy or Spain. The citron is a native of all the warm regions of Asia. Being introduced into Europe from Media, it had the name of *malus medica*. It seems to have come into Italy after the age of Virgil and Pliny, but before that of Palladius, who appears first to have cultivated it with any success there. According to Haller, the Median apple, described by Theophrastus, is certainly a sort of orange; which fruit, according to Athenæus, first travelled into Greece from Persia. If the Median apple be the orange, the *tristes succi* of Virgil, and the *acres medullæ* of Palladius, must have been much corrected by culture; the latter authors, Theophrastus and Pliny, both speak of it as not eatable, though they celebrate its medical qualities far above its desert.

The lemon-tree. The lemon differs from the orange materially, both in the naked footstalks of the leaves, and in the shape and colour of the fruit; but there is scarcely any distinction between this and the citron. The rind of the fruit, indeed, is generally thicker and more knobbed in the citron than in the lemon; it is also longer and more irregular. Mr. Miller adds, that the bark of the citron-tree is smoother, and the wood less knotty.

Many varieties of the lemon are preserved in some of the Italian gardens, and in both the Indies there are several which have not yet been introduced to the European gardens; but these may be multiplied without end from seeds.

The most remarkable varieties in the English gardens are, 1. The sweet lemon, plain and variegated. 2. The pear-shaped lemon. 3. The imperial lemon. 4. The lemon called Adam's apple. 5. The furrowed lemon. 6. The childing lemon. 7. The lemon with double flowers. 8. Browne mentions the St. Helena lemon as having been then lately introduced to Jamaica, and much cultivated there, on account of its large fruit, which frequently yields above half a pint of juice. 9. In China, and other parts of the east, they have a remarkable variety of lemon or citron, which has a solid fruit, without any cells or pulp, and divided above the middle into five or more long round parts, a little crooked, and having the appearance of the human hand with the fingers a little bent; whence the Chinese call it *phat thu*, or *fingered lemon*. It is a monstrous fruit, a mere curiosity without any use. The common and sweet lemon are brought to England from Spain and Portugal in great plenty; but the latter is not much esteemed. The pear-shaped lemon is a small fruit, with very little juice. The fruit of the imperial lemon is sometimes imported from Italy, but not from Spain or Portugal; probably, therefore, it is not propagated in either of those countries. The Portuguese had many of the most curious sorts of orange, lemon, and citron, trees, brought from the Indies formerly, which seemed to thrive almost as well there as in their native soil, and yet they have not been increased. There are a few trees still remaining in some neglected gardens near Lisbon, almost unnoticed by the inhabitants. The lemon was cultivated in the botanic garden at Oxford, in 1648.

The sour lemon, or lime, grows in its native country to the height of about eight feet, with a crooked trunk, and many diffused branches, which have prickles on them; leaves ovate-lanceolate, almost quite entire; flowers few together, on terminating peduncles; corolla oblong, white, with a purplish spot; stamens twenty in several parcels; berry an inch and a half in diameter, almost globular, with a protuberance at the tip; the surface regular, shining, greenish-yellow, with a very odorous rind; within nine-celled, or thereabouts, abounding in a very acid juice, but having very few subovate seeds. It is a native of Asia, but has long been common and much esteemed in the West Indies. Browne says, that in Jamaica it is a bushy shrub, much raised there for the sake of its fruit, and not unfrequently planted for fences; that, when it grows luxuriantly, it is seldom under twelve or fourteen feet in height, and spreads gently about the top, but that it is often stunted, and of a smaller stature. They have also a sweet lime, which is generally a more upright tree, and bears a fruit, which, in size as well as form, seems to hold a mean between the lime and the lemon. The juice is very insipid, but the bark and fibres of the root have much of that bitter peculiar to the lime. There is no doubt but that any one who would be at the pains of pursuing the subject in the native abode of these fruits, would detect varieties connecting all that are here delivered as species; not only the citron with the lemon and lime, which are certainly no more than varieties, but these also with the shaddock and the orange, which are hardly to be considered as specifically distinct. Mr. Miller affirms, that he has never known the common lemon vary to the lime when raised from seeds, nor the lime vary to the lemon; but that he has always found them continue their difference in leaf and branch; he therefore supposes them to be specifically different. The lime is not often brought to England, nor is it much cultivated in Europe; but in the West Indies the fruit is preferred to the lemon, the juice being reckoned more wholesome, and the acid being more agreeable to the palate.

2. Citrus aurantium, the orange: petioles winged; leaves

The Citron.

leaves acuminate. The orange is a middle-sized ever-green-tree, with a greenish-brown bark; in its native country the branches are prickly; leaves broad-lanceolate, almost quite entire, smooth, with the petioles commonly winged; peduncles many-flowered, terminating; corolla white; stamens twenty, connected in several parcels; berry subglobular, flatted, (an oblate spheroid,) of a golden colour, shining, odorous, three inches in diameter, divided within into about nine cells, filled with a bladdery pulp, having a sweet acid juice in it; rind fleshy, of a middling thickness, covered with a pellicle which is somewhat biting and bitter to the taste. The above description, says Loureiro, the author of it, agrees particularly with that sort of orange which is most common all over the world, and is known in Europe by the name of Portugal or China orange, because it was brought from China by the Portuguese, and by them dispersed over Europe. It is a native of India, China, &c. and was observed by our circumnavigators in the isle of Tanna, in the South Seas.

There are innumerable varieties of the orange in China, and other countries of Asia, as well as in South America and the West Indies, and even in Europe. Loureiro describes the most grateful of all the oranges, as a distinct species, under the title of *citrus nobilis*. The branches do not spread so much as in the common orange, but are rather ascending, and they are not prickly; leaves lanceolate, quite entire, dark green, on linear petioles; berry red within and without, twice as large as the common sort, being five inches in diameter; the skin thick, juicy, sweet, eatable, and irregularly tubercled. It abounds in Cochinchina. The most esteemed fruit in China, according to Grosier, is very small, with a smooth soft skin, of a reddish yellow colour. They have also the four-season or everlasting orange, so called from its being always in fruit and blossom; this also bears a very small fruit; the large clove or mandarine; and the small clove or mandarine; the soft cushion orange; the gold orange, &c. The Chinese oranges are, in general, firmer than those of Europe, their skin does not easily peel off, and the pulp will not separate into small divisions. They commonly give them to the sick, softening them a little at the fire, and mixing sugar with them. Loureiro describes another sort, under the name *citrus fusca*, or brown orange, which, in some respects, seems to approach the Seville orange of Europe. It is a tree above the middle size, with abundance of twisted branches, that rise a little, and are armed with many long stout spines; leaves ovate-lanceolate, quite entire, dark green, of an unpleasant odour, on large, winged, heart-shaped, petioles; flowers on many-flowered subterminating peduncles, white, and not very sweet; berry globular, two inches in diameter, rough, brownish-green; the juice pale, acid, bitterish, and unpleasant. It is very common in Cochinchina. The Seville orange differs little from that of China in the tree, except that it is more hardy, and that the leaves are larger and handsomer. The fruit, however, is very different in the colour of the peel, and in the taste both of that and of the juice, as is well known.

The varieties of the orange most known in the English gardens are, besides the Seville and China already mentioned, 1. The willow-leaved or Turkey orange. 2. The yellow and white striped-leaved. 3. The curled-leaved. 4. The horned orange. 5. The double-flowering. 6. The hermaphrodite. 7. The dwarf or nutmeg orange. The horned orange, like the figured lemon or citron described above, divides into parts, spreading out in form of horns; this and the distorted orange are preserved merely for variety, not being so beautiful as the common sort. The leaves of the dwarf orange are very small, and grow in clusters; the joints of the branches are very near each other; the flowers grow very close together, and appear like a nosegay, the branches being covered with them. This, when in flower, is proper to be placed for ornament in a room or gallery, which it will perfume with its flowers; but it requires care, and is seldom in health.

The first China orange, says Evelyn, (that appeared in Europe,) was sent for a present to count Mellor, then prime minister to the king of Portugal; but of that whole case that came to Lisbon, there was but one only plant which escaped the being so spoiled and tainted, that with great care it had hardly recovered to be since become the parent of all those flourishing trees of that name, cultivated by our gardeners, though not without sensibly degenerating. Receiving this account, adds our famous planter, from the illustrious son of the Condé, I thought fit to mention it for an instance of what industry may produce in less than half an age. South America and the West Indies have been furnished with this fruit, so salutary and agreeable to the palates of the people, and so congenial to those hot climates, from Spain and Portugal.

Mr. Miller informs us, that he sent two small trees of the true Seville orange to Jamaica, where this sort was then wanting, and that from these many other trees were budded, which produced plenty of fruit. Some of these were sent to England; and, although they were long in their passage, yet they were greatly superior to any of the fruit imported from Spain and Portugal, affording three times the quantity of juice.

In England this tree has been cultivated certainly since 1629. The first shifts made to preserve it, will not be incurious to the reader. "The orange-tree (says Parkinson) hath abiden with some extraordinary looking and tending of it, when as neither citron or lemmon-trees would by any means be preserved in any long time. Some keepe them in great square boxes, and lift them to and fro by iron hooks on the sides, or cause them to be rowled by trundels, or small wheeles under them, to place them in an house, or close gallerie, for the winter time; others plant them against a bricke wall in the ground, and defend them by a shed of boardes, covered over with seare cloth in the winter, and by the warmth of a stove, or other such thing, give them some comfort in the colder times; but no tent or meane provision will preserve them." But bishop Gibson, in his additions to Camden's Britannia, probably from Aubrey, says that the orange-trees at Beddington in Surrey, introduced from Italy by a knight of the noble family of the Carews, (sir Francis,) were the first that were brought into England; that they were planted in the open ground, under a moveable covert during the winter months; and that they had been growing there more than a hundred years; that is, before 1595; the first edition of Camden, by bishop Gibson, being printed in 1695. The editors of the Biographia Britannica, article Raleigh, speaking from a tradition preserved in the family, tells us, that these orange-trees were raised by sir Francis Carew from the seeds of the first oranges which were imported into England by sir Walter Raleigh, who had married his niece, the daughter of sir Nicolas Throckmorton. But this is not probable, for the plants raised from these seeds would have required to be inoculated, in order to produce fruit. And it is much more likely that they were plants brought from Italy. Professor Bradley reports, that they always bore fruit in great plenty and perfection; that they grew on the south side of a wall, not nailed against it, but at full liberty to spread; and, by the account of Mr. Henry Day the gardener, they were fourteen feet high; the girt of the stem twenty-nine inches; and the spreading of the branches one way nine feet, and twelve feet another. These trees were entirely killed by the great frost in 1739-40. The year before, they had been inclosed by a permanent building, after the manner of a green-house; so that it is uncertain whether the dampness of new walls, and the want of so much air and light as the trees had been accustomed to, might not have destroyed them, if the frost had not happened.

Citrus aurantium, or orange, has long maintained a very

very respectable place in the Materia Medica. The sort principally employed in medicine is the Seville orange, the juice of which is well known to be a grateful acid liquor, which, by allaying heat, quenching thirst, and promoting various excretions, proves of considerable use in febrile and inflammatory disorders. It is also considered as a powerful antiseptic, and of great efficacy in preventing and curing the scurvy. The juice of the China or common orange possesses the same qualities in an inferior degree. The acid of oranges by uniting with the bile, is said to take off its bitterness; and hence Dr. Cullen thinks it "probable that acid fruits taken in, are often useful in obviating the disorders that might arise from the redundancy of bile, and perhaps from the acrid quality of it. On the other hand, however, if the acids are in greater quantity than can be, or are, properly corrected by the bile present, they seem by some union with that fluid, to acquire a purgative quality that gives a diarrhœa, and the cholic pains that are ready to accompany the operation of every purgative." Not only the juice, but the rind or peel, of the Seville orange, is of considerable medical efficacy; since, besides its use as a stomachic, it has been much celebrated in intermittent fevers; and in testimony of its efficacy in the most obstinate agues, we find several authorities cited by professor Murray. It has also been experienced as a powerful remedy in menorrhagia, and in immoderate uterine evacuations; and for its good effects in these disorders, we have not only the assertions of foreign physicians, but also those of doctors Whytt and Hamilton. It gives out its flavour and taste readily to water, and is useful in all flatulences, in whatever form it be given; it also sits better on the stomach than most other corroborants. The leaves of the orange are not without their virtues, and in particular, as also the flowers, have been celebrated in convulsive disorders; and have been successfully given in the dose of a dram at a time in nervous and hysterical cases.

The virtues of citrus limon, or lemon, are also very considerable. Its juice, as an antiscorbutic, is very generally carried on-board ships destined for long voyages. Taken to the quantity of four or six ounces a-day, it has been found to cure the jaundice. Dr. Whytt found it successful in allaying hysterical palpitations of the heart. The rind is a very grateful aromatic bitter, not so hot as orange-peel, and yields in distillation less quantity of the oil: it is similar in qualities, however, to that of the orange, and is employed in the same intentions. Citrus medica, or citron, is of similar virtues also; the fruit is more flavoured than that of the lemon, and the rind acts more as an emetic; it is the yellow rind which is used, and from it, especially some of its varieties, the perfume called *bergamot* is extracted. Citrons are very rarely kept in the shops, though formerly much used in the Materia Medica. The median apple, whether it were the citron or the orange, was celebrated anciently for correcting unsavoury breaths, as a cure for the asthma, and for expelling poison.

3. Citrus decumana, or Shaddock: petioles winged; leaves obtuse, emarginate. The shaddock was originally regarded by Linnæus only as a variety of the orange, to which it certainly makes very near approaches. It differs in the superior size of the fruit; in having the flowers growing more in bunches, and those bunches being somewhat tomentose. It is a tree above the middle size, with spreading prickly branches. Leaves ovate, subacute, seldom obtuse, very seldom emarginate, smooth, scattered; petioles cordate-winged, the wings as broad as the leaves. Flowers white, very sweet-scented, in copious upright terminating bunches. Corollas reflex. Stamens about twenty, nearly equal to the petals, collected into a many-cleft tube. Berry spheroidal, frequently retuse at each end, eight inches in diameter, of an even surface, greenish-yellow, divided into twelve or more cells, containing some a red, others a white, pulp; the juice in some sweet, in others acid. The rind is very thick, white, fungous, bitter, useless. Seeds ovate, subacute, two or three in each cell.

There are many varieties of this tree; one of which, superior to the rest in the flavour and smell of the fruit, has a smaller trunk, and subglobular fruit, five inches in diameter, yellow on the outside, white and very sweet within. In China it is called *biam yuen*, in Cochinchina *buong ien*, which signifies *sweet ball*. Thunberg describes the fruit in Japan as being the size of a child's head; and says, that it may be kept many weeks on ship-board, if it be hung up; that the juice is of a subacid sweetness, and excellent for quenching thirst. It is a native of India, and is common both in China and Cochinchina; as it is also in Japan, where it was introduced from Batavia. It is found also in the Friendly Islands. It was brought to the West Indies in an East-India ship by captain Shaddock, from whom it has there received its name. The Dutch call it *pompelmoes*. The fruit has greatly degenerated since it has been in the West Indies, by raising the trees from seeds; the greatest part of which produce harsh sour fruit, with a pale yellow pulp; whereas if they would have budded from a good sort, they might have continued it in perfection: but there are few persons there who understand the method of grafting or budding fruit-trees: and they are so negligent of their fruits as to leave the whole to nature, seldom giving themselves any farther trouble than to put the seeds into the ground, and leaving the rest to chance. In England it was cultivated by Mr. Miller in 1739.

4. Citrus Japonica: petioles winged, leaves acute, stem shrubby. This is a small shrub, and the fruit is no bigger than a cherry; it ripens in December and January, and is very sweet and pleasant. It approaches to the citron in having the flowers axillary, but it has winged petioles like the orange; from which, however, it differs in having only one or two axillary flowers, not panicled as in that. Native of Japan, where the fruit is ripe in December and January, and is very sweet and pleasant.

5. Citrus trifoliata: leaves ternate, serrate, with a membranaceous petiole; spines axillary; flowers axillary, solitary. The fruit is bad, with a glutinous pulp. Stem nearly two yards in height; branches alternate, flatted, and angular, flexuose, spreading very much, stiff, very smooth, thorny; thorns alternate, dilated and compressed at the base, spreading very much, acute, smooth, yellow at the end, an inch in length; corolla white; stamens double the length of the petals. This shrub forms strong hedges in Japan, with its long, stiff, sharp, thorns. It flowers in April with leafless branches to May, when the leaves burst forth. The fruit is laxative.

Propagation and Culture. All the trees of this kind may be raised and treated in the same manner as is here directed for the orange.

Where the trees are to be raised for stocks to bud oranges, you should procure some citron-seeds which were duly ripened; for the stocks of this kind are preferable to any other, both for quickness of growth, as also that they will take buds of either orange, lemon, or citron; next to these are the Seville orange seeds. The best seeds are usually to be had from rotten fruits, which are commonly easy to be procured in the spring of the year; then prepare a good hot-bed, of either horse-dung or tanners bark; the last of which is much better, if you can easily procure it. When this bed is in a moderate temper for heat, you must sow your seeds in pots of good rich earth, and plunge them into the hot-bed; observing to give them water frequently, and raise the glasses in the great heat of the day, to give proper air, lest the seeds should suffer by too great heat: in three weeks time your seeds will come up, and if the young plants are not stinted, either for want of proper heat or moisture, they will be, in a month's time after their appearance, fit to transplant into single pots: you must therefore renew

CITRUS.

The Lemon and Orange.

your hot-bed, and having prepared a quantity of ſmall halfpenny pots, which are about five inches over at the top, fill theſe half full of good freſh earth, mixed with very rotten cow dung; and then ſhake out the young plants from the large pots, with all the earth about them, that you may the better ſeparate the plants without tearing their roots; and having half filled the pots with earth, put a ſingle plant into each of the ſmall pots; then fill them up with the ſame earth as before directed, plunging the pots into the new hot-bed, giving them a good watering to fix the earth to their roots; and obſerve to repeat the ſame very often, for this plant, when in a hot-bed, requires much water, but be ſure to ſcreen them from the ſun in the heat of the day. In this method, with due care, your plants will grow to be two feet high by July, when you muſt begin to harden them by degrees, by raiſing your glaſſes very high, and when the weather is good taking them quite off; but do not expoſe them to the open ſun in the heat of the day, but rather take off the glaſſes, and ſhade the plants with mats, which may be taken off when the ſun declines; for the violent heat in the middle of the day would be very injurious to them, eſpecially while young. Toward the end of September you muſt houſe them, obſerving to place them near the windows of the green-houſe, to prevent the damps from moulding their tender ſhoots. During the winter ſeaſon they may be often refreſhed with water; and in March or April, waſh their heads and ſtems, to clear them from the filth that may have ſettled thereon, during their being in the houſe; and you muſt alſo give them a moderate hot-bed in the ſpring, which will greatly forward them; but harden them by the beginning of June, that they may be in right order to bud in Auguſt; when you ſhould make choice of cuttings from trees that are healthy and fruitful, of whatever kinds you pleaſe, obſerving that the ſhoots are round; the buds of theſe being much better and eaſier to part from the wood, than ſuch as are flat. When you have budded the ſtocks, you ſhould remove them into a green-houſe, to defend them from wet, turning the buds from the ſun; but let them have as much free air as poſſible, and refreſh them often with water. In a month's time after budding, you will ſee which of them has taken; you muſt then untie them, that the binding may not pinch the buds, and let them remain in the green-houſe all the winter; then in the ſpring, prepare a moderate hot-bed of tanners bark; and, after having cut off the ſtocks about three inches above the buds, plunge their pots into the hot-bed, obſerving to give them air and water, as the heat of the weather ſhall require; but be ſure to ſcreen them from the violence of the ſun during the heat of the day. In this management, if your buds ſhoot kindly, they will grow to the height of two feet or more, by the end of July; at which time you muſt begin to harden them before the cold weather comes on, that they may the better ſtand in the green-houſe the following winter. In the firſt winter after their ſhooting, you muſt keep them very warm; for, by forcing them in the bark-bed, they will be ſomewhat tenderer; but it is very neceſſary to raiſe them to their height in one ſeaſon, that their ſtems may be ſtraight: for in trees, which are two or more years growing to their heading height, the ſtems are always crooked. In the ſucceeding years, their management will be the ſame as in full grown trees, which will be hereafter treated of: I ſhall therefore now proceed to treat of the management of ſuch trees as are brought over every year in cheſts from Italy; which is, indeed, by much the quicker way of furniſhing a green-houſe with large trees; for thoſe which are raiſed from ſeeds in England, will not grow ſo large in their ſtems under eighteen or twenty years, as theſe are when brought over; and, although their heads are ſmall when we receive them, yet in three years, with good management, they will obtain large heads, and produce fruit.

In the choice of theſe trees, obſerve, firſt, the difference of their ſhoots and leaves, if they have any upon them, to diſtinguiſh their different ſorts; for the ſhaddock and citrons always make much ſtronger ſhoots than the orange; for which reaſon, the Italian gardeners, who raiſe theſe trees for ſale, generally propagate thoſe ſorts, ſo that they bring few of the Seville orange-trees over, which are much more valuable both for their flowers and fruit; alſo prefer thoſe that have two good buds in each ſtock, for many of them have but one, which will always produce an irregular head: the ſtraightneſs of the ſtem, freſhneſs of the branches, and plumpneſs of the bark, are neceſſary obſervations.

When you have furniſhed yourſelf with a parcel of trees, you muſt prepare a moderate hot-bed of tanner's bark, in length and breadth according to the number of trees to be forced: then put your trees into a tub of water upright, about half way of the ſtems, leaving the head and upper part of the ſtem out of water, the better to draw and imbibe the moiſture. In this ſituation they may remain two or three days, according to their plumpneſs when you received them; then take them out, and clean their roots from all filth, cutting off all broken or bruiſed roots, and all the ſmall fibres, which are quite dried by being ſo long out of the earth, and ſcrub the ſtems with a hard hair bruſh, cleaning them afterwards with a cloth; then cut off the branches about ſix inches from the ſtem, and having prepared a quantity of good freſh earth, mixed with very rotten neats dung, plant your trees therein, obſerving never to put them into large pots; for, if they are but big enough to contain their roots, it is ſufficient at firſt planting; and be ſure to put ſome potſherds and large ſtones in the bottom of each pot, to keep the holes at the bottom of the pots from being ſtopped with earth, that the water may freely paſs off, and wrap ſome haybands round their ſtems, from bottom to top, to prevent the ſun from drying their bark; then plunge theſe pots into the bark-bed, watering them well to ſettle the earth to their roots, frequently repeating the ſame all over their heads and ſtems, being very careful not to over-water them, eſpecially before they have made good roots; and obſerve to ſcreen the glaſſes of your hot-bed from the ſun in the heat of the day. If your trees take to grow kindly, as there is little reaſon to doubt, if the directions given be duly obſerved, they will have made ſtrong ſhoots by the beginning of June; at which time you ſhould ſtop their ſhoots, to obtain lateral branches to furniſh their heads; and now you muſt give them air plentifully, and begin to harden them, that in the middle of July they may be removed into the open air, in ſome warm ſituation, defended from the great heat of the ſun, and from winds, that they may be hardened before winter. About the end of September you ſhould houſe theſe plants, ſetting them at firſt in the front of the green-houſe, near the glaſſes, keeping the windows open at all times when the weather will permit; and about the latter end of October, when you bring in the myrtles, and other leſs tender trees, you muſt ſet your oranges in the warmeſt and beſt part of the houſe, placing lower plants or trees in the front, to hide their ſtems. During the winter, let your waterings be frequent, but give them not too much at a time; for now their heads are but ſmall, and therefore incapable to diſcharge too great a quantity of moiſture, and take great care to guard them from froſt.

In the ſpring, when you begin to take out ſome of your hardieſt ſorts of plants to thin your houſe, waſh and cleanſe the ſtems and leaves of your orange-trees, taking out the upper part of the earth in the pots, filling them up again with good, freſh, rich, earth, laying thereon a little rooten neats dung round the outſide of the pots, but do not let it lie near the ſtem of the trees; then place them at wider diſtances in the houſe, that the air may circulate round their heads, giving them air diſcretionally, as the weather grows warm; but do not remove them into the open air until the latter end of May, that the weather is ſettled; for many times, when they are removed out too ſoon, the mornings often proving cold, give them at leaſt a great

a great check, which will change the colour of their leaves, and many times kill the extreme weak part of the shoots. Let the situation for your orange-trees, during the summer season, be as much defended as possible, by tall trees or hedges, from the sun in the heat of the day, and from strong winds, for both these are very hurtful to them.

As these trees advance, it will be necessary in the summer to stop strong shoots where they grow irregularly, to force out lateral branches to fill the head; but do not pinch off the tops from all the shoots, as is the practice of some, which will fill the tree with small shoots too weak to support fruit; but endeavour to form a regular head, and obtain strong shoots, taking away weak trifling branches where they are too close. During the summer season, your orange-trees will require frequent waterings in dry weather, especially if they are large; therefore you should endeavour to have the water as near the trees as possible, to save the trouble of carrying it, which, in a large quantity of trees, takes up much time. Your water should be soft, and exposed to the air, but never add dung of any sort thereto; which, although by many frequently recommended, yet has always been found destructive to these, and all other trees, if much used; it being like hot liquors to human bodies, which at first taking, seem to add vigour, yet certainly leave the body weaker after some time than before.

Your orange-trees will require to be shifted and new potted every other year, therefore you must prepare a quantity of good earth, at least a year before you intend to use it, that it may be well mixed, and perfectly rotten. The best season for this work is about the end of April, that they may have taken fresh root before they are removed out of the green-house; and when this work is performed, it will be necessary to let them remain in the house a fortnight longer than usual, to be well settled. In the performing this work, after you have drawn the trees out of the pots, you must cut off all the roots round the outside of the ball of earth, and take away all mouldy roots, (if any such be;) then with a sharp iron instrument, get as much of the old earth from between the roots as possible, being careful not to break or tear the roots; then set the root of the tree into a large tub of water for about a quarter of an hour, to soak the under part of the ball of earth; and afterwards scrub the stems of the trees with a hard hair-brush, cleaning them and the heads with water, and a soft woollen cloth. Your pots being prepared, with some potsherds and large stones in the bottom, put some of your fresh earth into the pot, about three or four inches thick; and having placed your tree thereon, in the middle of the pot, upright, fill it up with the same rich earth, pressing it down hard with your hands; then water the tree all over the head with a watering-pot that has a rose upon the spout, to let the water fall light and thick, as in a shower of rain; and in watering these trees, do it in the same manner, during the time they abide in the house after shifting; this will greatly refresh their heads, and promote their taking fresh roots. When you first set these trees abroad after shifting, you should place them near the shelter of hedges, and fasten their stems to strong stakes, to prevent their being disturbed by winds, which sometimes will blow fresh planted trees out of the pots, if too much exposed thereto, and thereby greatly injure their new roots.

If old orange-trees have been ill managed, and their heads become ragged and decayed, the best method to restore them, is to cut off the greatest part of their heads early in March, and draw them out of the tubs or pots, and shake off the earth from their roots, cutting away all small fibres and mouldy roots; and then soak and clean their roots, stems, and branches, planting them in good earth, and setting them into a hot-bed of tanners' bark, as was directed for such trees as came from abroad, managing them in the same manner; by this method they will produce new heads, and in two years time become good trees again. But if these are large trees, and have grown in tubs for several years, your best way will be to prepare a parcel of rough baskets, such as are used for basketing evergreens, when sent to a distant place: let these be somewhat less than the tubs you design to plant your trees into; then plant your trees herein, plunging them into the hot-bed, and about the beginning of July, when your trees have made good shoots, you may remove them into the tubs, with their baskets about them, filling the empty space with the same good earth: this will preserve your tubs from rotting in the bark, and the trees will do equally well as if planted into the tubs at first, provided you are careful in removing the baskets, not to disturb their roots; and also let them remain in the green-house a fortnight or three weeks after planting, before you set them abroad. These trees being new potted or tubbed every other year, those years in which they are not shifted, you must in April observe to take out as much of the old earth from the tops of the pots and tubs, and also round the sides of them, as possible, without injuring the roots of the trees, and fill them up with fresh earth; you must also wash and clean their stems and leaves from filth, which will greatly strengthen their flowering, and cause them to shoot vigorously the following summer.

In the management of orange-trees which are in good health, the chief care should be to supply them with water duly, instead of starving them in winter, as is sometimes practised; whereby their fibres are dried, and become mouldy, to the great prejudice of the trees; and not to give them water in too great abundance, but rather to let their waterings be frequent, and given in moderate quantities. You must also observe, that the water has free passage to drain off; for if it be detained in the tubs or pots, it will rot the tender fibres of the trees. During the winter season, they must have a large share of air when the weather is favourable; for nothing is more injurious to these trees than stifling them: nor should they be placed too near each other in the green-house; but set them at such distance, that their branches may be clear of each other, and that the air may circulate freely round their heads. In summer they should be placed where the winds are not violent, and to have the morning and evening sun; for if they are too much exposed to the mid-day sun, they will not thrive. The best situation for them is near some large plantation of trees, which will break the force of the winds, and screen them from the violent heat of the sun. In such a situation they may remain until the beginning of October, or later, according as the season proves favourable; for if they are carried into the green-house early, and the autumn should prove warm, it will occasion the trees to make fresh shoots, which will be weak and tender, and so liable to perish in winter; and sometimes it will occasion their flowering in winter, which greatly weakens the trees; nor should they remain so long abroad as to be injured by morning frosts. The best compost for orange-trees is two-thirds of fresh earth from a good pasture, which should not be too light, nor over stiff, but rather a hazel loam; this should be taken about ten inches deep with the sward, which should be mixed with the earth to rot, and one-third part of neats' dung; these should be mixed together, at least twelve months before it is used, observing to turn it over every month, to mix it well, and to rot the sward; this will also break the clods, and cause the mould to be finer. Before you make use of this earth, you should pass it through a rough screen, to separate the great stones and the roots of the sward therefrom; but by no means sift the earth too fine, for this is very prejudicial to most plants, but particularly to orange-trees.

Of late years there have been many of these trees planted against walls, against which frames of glass are made to fix over them in winter; and some few curious persons have planted these trees in the full ground, and have erected moveable covers to put over the trees in winter, which are so contrived as to be all taken away in summer; where

these have been well executed, the trees have made great progress in their growth, and produced a much larger quantity of fruit, which have ripened so well, as to be extremely good for eating. If these are planted either against walls with design of training the branches to the walls, or in borders at a small distance, so as to train them up as standards, there should be a contrivance of a fire-place or two, in proportion to the length of the wall, and flues carried the whole length of the wall, to warm the air in very cold weather, otherwise it will be very difficult to preserve the trees in very hard winters alive; or, if they do live through the winter, they will be so much weakened by the cold, as not to be recovered the following summer to a proper strength for bearing; so that, wherever the trees are intended to be placed against or near old walls, the flues should be built up against the front, allowing four inches thickness of the brick-work on each side the flues, observing to fasten this with irons, at proper distances, to secure it from separating from the old wall. Where this contrivance is made, there will be no hazard of losing the trees, be the winter ever so severe, with a little proper care; whereas, if this is wanting, there will require great care and trouble to cover and uncover the glasses every day, when there is any sun; and, if the wall is not thicker than they are usually built, the frost will penetrate through the walls in severe winters; so that covering and securing the glasses of the front will not be sufficient to preserve the trees, be it done with ever so much care; therefore the first expence of the walls will save great trouble and charge, and be the securest method.

If the ground is wet, or of a strong clay, so as to detain the moisture, the borders should be raised above the level of the ground, in proportion to the situation of the place; for where the wet lies in winter near the surface, it will greatly prejudice, if not totally destroy, the trees; so that lime-rubbish should be laid at least two feet thick in the bottom of the border, to drain off the wet; and the earth should be laid two and a half or three feet thick thereon, which will be a sufficient depth for the roots of the trees. In these borders there may be a few roots of the Guernsey and belladonna lilies and hæmanthus planted, or any other exotic bulbous-rooted flowers, which do not grow high, or draw too much nourishment from the borders; and these, producing their flowers in autumn or winter, will make a good appearance, and thrive much better than if kept in pots.

The China, dwarf orange, shaddock, and those with striped leaves, are all more tender than the Seville orange, and therefore must be treated with more care, and placed in a warmer part of the green-house in winter. The China orange rarely produces good fruit in England, nor are the leaves of the tree near so large or beautiful as those of the Seville orange; the latter, therefore, should be preferred, and only a tree or two of the China sort kept for variety.

CIT'TA CASTELLA'NA, a town of Italy, in the state of the church, and patrimony of St. Peter, once the see of a bishop, united with Orta: twenty-three miles north of Rome.

CIT'TA DI CASTEL'LO, a town of Italy, in the state of the church, and province of Umbria, situated on the Tiber, the see of a bishop, immediately under the pope; it contains ten churches, and a great number of convents: twenty-three miles south-west of Urbino, and ninety-seven north of Rome.

CIT'TA DUCALE, a town of Italy, in the kingdom of Naples, and province of Abruzzo Ultra, founded in the year 1308, by Robert duke of Calabria, and nearly ruined by an earthquake in the year 1703. It is the see of a bishop, immediately under the pope: eighteen miles west of Aquila.

CIT'TA NUO'VA, a town of Istria: seven miles south of Umago.

CIT'TA DELLA PIEVE, a town of Italy, in the province of Perugia, the see of a bishop: eighteen miles west of Perugia, and sixty-eight north of Rome.

CIT'TA DEL SOLE, a town of Italy, in the duchy of Tuscany, built in the year 1565 by Cosmo I. duke of Tuscany: sixteen miles south-south-west of Ravenna.

CITTADEL'LA, a sea-port town of the island of Minorca, with a good harbour on the north-west coast, surrounded with walls and bastions. It contains two churches and four convents, and 600 houses. Lat. 40. 2. N. lon. 20. 33. E. Peak of Teneriffe.

CITTADEL'LA, a town of Italy, in the Paduan: nineteen miles north-north-west of Padua.

CITTADEL'LA, a town of Italy, in the Paduan, near the Brenta, between Vicenza and Trevigno.

CITTOWI'ANY, a town of Samogitia: ten miles north of Rosienne.

CI'TY, *s.* [*cité*, Fr. *civitas*, Lat.] A large collection of houses and inhabitants.—Men seek safety from numbers better united, and from walls and fortifications, the use whereof is to make the few a match for the many: this is the original of *cities*. *Temple.*—*City*, in a strict sense, means the houses inclosed within the walls: in a larger sense, it reaches to all the suburbs. *Watts.*—The inhabitants of a certain city, as distinguished from other subjects:

I do suspect I have done some offence,
That seems disgracious in the *city*'s eye. *Shakespeare.*

According to Cowel, a city is a town corporate, which hath a bishop and cathedral church, which is called *civitas*, *oppidum*, and *urbs*: *civitas*, in regard it is governed by justice and order of magistracy; *oppidum*, for that it contains a great number of inhabitants; and *urbs*, because it is in due form begirt about with walls. But Crompton, in his Jurisdictions, where he reckons up the cities, leaves out Ely, although it hath a bishop and cathedral church; and puts in Westminster, though it hath not a bishop: and sir Edward Coke makes Cambridge a city, yet there is no mention that it was ever an episcopal see. Indeed it appears by stat. 35 Hen. VIII. c. 10. that there was a bishop of Westminster; since which, in stat. 17 Eliz. c. 5, it is termed a *city* or borough; and, notwithstanding what Coke observes of Cambridge, in stat. 11 Hen. VII. c. 4, Cambridge is called only a town. Kingdoms have been said to contain as many cities as they have sees of archbishops and bishops; but, according to Blount, *city* is a word which hath obtained since the conquest; for in the time of the Saxons there were no cities, but all great towns were called *burghs*, and even London was then stiled *London bourg*, as the capital of Scotland is now called *Edinburgh*. And long after the conquest the word *city* is used promiscuously with the word *burgh*, as in the charter of Leicester it is called both *civitas* and *burgus*; which shews that those writers were mistaken that tell us every city was or is a bishop's see. And, though the word *city* signifies with us such a town corporate as hath usually a bishop and cathedral church, yet it is not always so.

A city, says Blackstone, is a town incorporated, which is or hath been the see of a bishop; and though the bishoprick be dissolved, as at Westminster, yet still it remaineth a city. 1 *Comm.* 114. It appears, however, that Westminster retained the name of city, not because it had been a bishop's see, but because it was expressly created such, in the letters-patent by king Henry VIII. erecting it into a bishoprick. See *Burnet's Reform. Apdx.* There was a similar clause in favour of the other five new-created cities, Chester, Peterborough, Oxford, Gloucester, and Bristol; the charter for Chester is in *Gib. Cod.* 1449; and that for Oxford in 14 *Rym. Fœd.* 754. Lord Coke seems anxious to rank Cambridge among the cities. Mr. Wooddeson, late Vinerian professor, has produced a decisive authority that cities and bishops' sees had not originally any necessary connection with each other. It is that of Ingulphus, who relates, that at the great council assembled in 1072, to settle the claim of precedence between the two archbishops,

bishops, it was decreed that bishops' fees should be transferred from towns to cities. The accidental coincidence of the same number of bishops and cities would naturally produce the supposition that they were connected together as a necessary cause and effect; it is certainly a strong confirmation of the above authority that the same distinction is not paid to bishops' fees in Ireland. Mr. Hargrave, in his notes to 1 *Inst.* 110, proves that although Westminster is a city, and has sent citizens to parliament from the time of Edward VI. it never was incorporated; and this is a striking instance in contradiction of the learned opinions there referred to, viz. that the king could not grant within time or memory to any place the right of sending members to parliament without first creating that place a corporation. 1 *Comm. edit.* 1793.

CI'TY, *adj.* Relating to the city.—His enforcement of the *city* wives. *Shakespeare.*—Resembling the manners of citizens.—Make not a *city* feast of it, to let the meat cool ere we can agree upon the first cut. *Shakespeare.*

CIVES, *s.* in botany. See ALLIUM.

CI'VET, *s.* [*civette*, Fr. *zibetta*, Arab. signifying *scent.*] A perfume from the civet-cat, a species of weasel; for the natural history of which see the generic name VIVERRA. These animals have of late years been introduced into Holland, and afford a considerable branch of commerce, particularly at Amsterdam. The civet is squeezed out, in summer every other day, in winter twice a-week; the quantity procured at once is from two scruples to a dram or more. The juice thus collected is much purer and finer than that which the animal sheds against shrubs or stones in its native climates. Good civet is of a clear yellowish or brownish colour, not fluid, nor hard, but about the consistence of butter or honey, and uniform throughout; of a very strong smell, quite offensive when undiluted, but agreeable when only a small portion of civet is mixed with a large one of other substances. This commodity is rarely to be met with genuine, notwithstanding the sealed bottles in which it is purchased at Amsterdam. Nor have we any certain criteria for distinguishing its adulteration. Some look upon it as genuine, if when rubbed upon paper it sinks in, without leaving any thing upon the surface; and if, when melted in hot water, it totally swims at top: but lard and butter, the substances principally mixed with it, have both these properties equally with the civet itself.

Civet unites easily with oils, both expressed and distilled, but not at all with spirits of wine, nor with water: nor is it rendered miscible with water by the mediation of sugar. Boecler relates, that sugar and rectified spirit are its two best menstrua; but he has certainly never made the experiment with either. The yolk of an egg seems to dispose it to unite with water; but in a very little while the civet separates from the liquor, and falls to the bottom, though it does not prove of such a resinous tenacity as when treated with sugar and spirit of wine. It communicates, however, some share of its smell both to watery and spirituous liquors; hence a small portion of it is often added in odoriferous waters and spirits; as those of lilies of the valley, roses, rhodium wood, orange-flowers, orange-peel, yellow saunders, &c. The Italians make it an ingredient in perfumed oils, and thus obtain the whole of its scent; for oils dissolve the whole substance of the civet. *Neumann.*

CI'VIC, *adj.* [*civicus*, Lat.] Relating to civil honours or practices; not military:

With equal rays immortal Tully shone;
Behind, Rome's genius waits with *civic* crowns,
And the great father of his country owns. *Pope.*

The *civic* crown was given by the ancient Romans to any soldier who had saved the life of a citizen in an engagement. It was reckoned more honourable than any other crown, though composed of no better materials than oak-boughs. Plutarch, in the life of C. M. Coriolanus, accounts for using on this occasion the branches of this tree before all others; because, says he, the oaken wreath being sacred to Jupiter, the great guardian of their city, they thought it the most proper ornament for him who had preserved the life of a citizen. Pliny, speaking of the honour and privileges conferred on those who had merited this crown, says, "They who had once obtained it, might wear it always. When they appeared at the public spectacles, the senate and people rose to do them honour, and they took their seats on these occasions among the senators. They were not only personally excused from all troublesome offices, but procured the same immunity for their father and grandfather by their father's side."

CI'VIDAD DE LAS PALMAS, a sea-port town of the island of Canary, and capital of that and all the islands, the see of a bishop, suffragan of Seville: the town is large, and the inhabitants in general rich, the number about 12,000. The harbour is good, and defended by a fortress.

CI'VIDAD REAL, a town of Spain, and capital of La Mancha, celebrated for a manufacture of leather for gloves. Here are three churches, seven convents, and three hospitals: fifty-seven miles south of Toledo. Lat. 39. 0. N. lon. 12. 44. E. Peak of Teneriffe.

CI'VIDAD DE LOS REYES, a town of South America, in the country of Terra Firma, and province of St. Martha. The heat is moderated in summer by the east wind; but the frequent rains and chilling winds which come from the mountains produce coughs and fevers; the land is fertile, and abounds in pastures. The natives are numerous, warlike, and as yet unsubdued.

CI'VIDAD DEL REY FELIPPE, a town built in the year 1585, on the continent of South America, near the Straits of Magellan, but soon abandoned.

CI'VIDAD DEL RIO DEL ST. PEDRO, a town of South America, in Brasil, situated at the mouth of the river St. Pedro. Lat. 32. 0. S. lon. 34. 15. W. Greenwich.

CI'VIDAD RODRIGO, a town of Spain, in the country of Leon, on the river Aguada, the see of a bishop, suffragan of Compostella, built by Ferdinand II. as a rampart against Portugal, from which it is only about eight miles distant: forty-five miles south-south-west of Salamanca. Lat. 40. 52. N. lon. 10. 14. E. Peak of Teneriffe.

CI'VIL, *adj.* [*civilis*, Lat.] Relating to the community; political; relating to the city or government.—God gave them laws of *civil* regimen, and would not permit their commonweal to be governed by any other laws than his own. *Hooker.*—Relating to any man as a member of a community.—Break not your promise, unless it be unlawful or impossible; either out of your natural or out of your *civil* power. *Taylor.*—Not in anarchy; not wild; not without rule or government:

For rudest minds with harmony were caught,
And *civil* life was by the muses taught. *Roscommon.*

Not foreign; intestine.—From a *civil* war God of his mercy defend us, as that which is most desperate of all others. *Bacon.*—Not ecclesiastical; as, the ecclesiastical courts are controlled by the *civil*. Not natural; as, a person banished or outlawed is said to suffer *civil*, though not natural, death. Not military; as, the *civil* magistrate's authority is obstructed by war. Not criminal; as, this is a *civil* process, not a criminal prosecution. Civilized; not barbarous.—England was very rude and barbarous; for it is but even the other day since England grew *civil*. *Spenser.*—Complaisant; civilized; gentle; well bred; elegant of manners; not rude; not brutal; not coarse:

I heard a mermaid, on a dolphin's back,
Uttering such dulcet and harmonious breath,
That the rude sea grew *civil* at her song. *Shakespeare.*

And fall these sayings from that gentle tongue,
Where *civil* speech and soft persuasion hung? *Prior.*

Grave; sober; not gay or shewy:

Thus night oft see me in thy pale career,
Till *civil* suited morn appear. *Milton.*

Relating

Relating to the ancient consular or imperial government; as, *civil* law.—No woman had it, but a *civil* doctor. *Shakespeare.*

CI'VIL'LAW, that law which every particular nation, commonwealth, or city, has established peculiarly for itself: *jus civile est, quod quisque populus sibi constituit. Just. Inst.* It is now more properly distinguished by the name of *municipal law*: the term *civil law* being chiefly applied to that which the old Romans used, compiled from the laws of nature and of nations. The Roman law was founded first upon the regal constitutions of their ancient kings; next upon the twelve tables of the Decemviri; then upon the laws or statutes enacted by the senate or people; the edicts of the prætor and the responsa prudentum, or opinion of learned lawyers; and lastly, upon the imperial decrees or constitutions of successive emperors. These had by degrees grown to an enormous bulk; but the inconvenience arising therefrom was in part remedied, by the collections of three private lawyers, Gregorius, Hermogenes, and Papinius; and afterwards by the emperor Theodosius the younger, by whose orders a code was compiled A. D. 438, being a methodical collection of all the imperial constitutions then in force; which Theodosian code was the only book of civil law received as authentic in the western part of Europe, till many centuries after. For Justinian commanded only in the eastern remains of the empire; and it was under his auspices that the present body of civil laws was compiled and finished by Trebonian, about the year 533. This consists of—1. The institutes; which contain the elements or first principles of the Roman law, in four books. 2. The digests or pandects, in fifty books; containing the opinions and writings of eminent lawyers, digested in a systematical method. 3. A new code or collection of imperial constitutions, in twelve books; the lapse of a century having rendered the former code of Theodosius imperfect. 4. The novels or new constitutions posterior in time to the other books, and amounting to a supplement to the code containing new decrees of successive emperors, as new questions happened to arise. These form the body of the Roman law, or *corpus juris civilis*, as published about the time of Justinian; which however soon fell into neglect and oblivion till about the year 1130, when a copy of the digests was found at Amalfi in Italy; which accident, concurring with the policy of the Roman ecclesiastics, suddenly gave a new vogue and authority to the civil law, and introduced it into several nations. 1 *Comm.* 80, 81.

The digest or pandects, was collected from the works and commentaries of the ancient lawyers, some whereof lived before the coming of our Saviour. The whole digest is divided into seven parts: the first part contains the elements of the law, as what is justice, right, &c. The second part treats of judges and judgments. The third part of personal action, &c. The fourth part of contracts, pawns, and pledges. The fifth part of wills, testaments, &c. The sixth part of the possession of goods. The seventh part of obligations, crimes, punishments, &c. The institutes contain a system of the whole body of law, and are an epitome of the digest, divided into four books; but sometimes they correct the digest: they are called *institutes*, because they are for instruction, and shew an easy way to the obtaining a knowledge of the civil law: but they are not so distinct and comprehensive as they might be, nor so useful at this time as they were at first. The novels or authentics were published at several times without any method: they are termed *novels*, as they are new laws; and *authentics*, being authentically translated from the Greek into the Latin tongue; and the whole volume is divided into nine collations, constitutions, or sections; and they again into 168 novels, which also are distributed into certain chapters: the first collation relates to heirs, executors, &c. The second the state of the church. The third is against bawds. The fourth concerns marriages. The fifth forbids the alienation of the possessions of the church. The sixth shews the legitimacy of children. The seventh determines who shall be witnesses. The eighth ordains wills to be good, though imperfect. And the ninth contains matter of succession in goods. To the above we may add the book of feuds, which contain the customs and services that the subject or vassal oweth to his prince or lord, for such lands or fees as he holdeth of him. The constitutions of the emperor, were either by a rescript, which was the letter of the emperor in answer to particular persons who enquired the law of him; or by edict, which the emperor established of his own accord, that it might be generally observed by every subject; or by decree, which the emperor pronounced between plaintiff and defendant, upon hearing a particular cause. The power of issuing forth rescripts, edicts, and decrees, was given to the prince by the *lex regia*, wherein the people of Rome wholly submitted themselves to the government of one person, viz. Julius Cæsar, after the defeat of Pompey. And by this submission the prince could not only make laws, but was esteemed above all coercive power of them. How far the *civil law* is adopted and of force in this kingdom, see the article LAW.

CI'VIL YEAR. See CHRONOLOGY.

CIVI'LIAN, *s.* [*civilis*, Lat.] One that professes the knowledge of the old Roman law, and of general equity.—The professors of that law, called *civilians*, because the civil law is their guide, should not be discountenanced nor discouraged. *Bacon.*

CIVI'LITY, *s.* Freedom from barbarity; the state of being civilized.—Divers great monarchies have risen from barbarism to *civility*, and fallen again to ruin. *Davies.*

Wheresoe'er her conquering eagles fled,
Arts, learning, and *civility*, were spread. *Denham.*

Politeness; complaisance; elegance of behaviour.—We, in point of *civility*, yield to others in our own houses. *Swift.*—Rule of decency; practice of politeness:

Love taught him shame; and shame, with love at strife,
Soon taught the sweet *civilities* of life. *Dryden.*

Civility is justly inculcated by didactic writers as a duty of no slight consideration. Without civility, or good-breeding, a court would be the seat of violence and desolation. There, all the passions are in fermentation, because all pursue what but few can obtain; there, if enemies did not embrace, they would stab; there, smiles are often put on to conceal tears; there mutual services are professed, while mutual injuries are intended; and there, the guile of the serpent simulates the gentleness of the dove. To what a degree must good-breeding adorn the beauty of truth, when it can thus soften the deformity of falsehood? On this subject we might offer the following observations. However just the complaints of the misery of life, yet great occasions for the display of beneficence and liberality do not often occur. But there is an hourly necessity for the little kind offices of mutual civility. At the same time that they give pleasure to others, they add to our own happiness and improvement. Habitual acts of kindness have a powerful effect in softening the heart. An intercourse with polished and humane company tends to improve the disposition, because it requires a conformity of manners. And it is certain, that a sense of decorum, and of a proper external behaviour, will restrain those whose natural temper would otherwise break out in acrimonious and petulant conversation. Even the affectation of philanthropy will in time contribute to realise it. The pleasure resulting from an act of kindness naturally excites a wish to repeat it; and indeed the general esteem which the character of benevolence procures, is sufficient to induce those to wish for it who act only from the mean motives of self-interest.

As we are placed in a world where natural evil abounds, we ought to render it supportable to each other as far as human endeavours can avail. All that can add a sweet ingredient to the bitter cup must be infused. Amid the multitude of thorns, every flower that will grow must be cultivated

cultivated with care. But neither pomp nor power are of themſelves able to alleviate the load of life. The heart requires to be ſoothed by ſympathy. A thouſand little attentions from all around us are neceſſary to render our days agreeable. The appearance of neglect in any of thoſe with whom we are connected, chills our boſom with chagrin, or kindles the fire of reſentment. Nothing therefore ſeems ſo likely to enſure happineſs as our mutual endeavours to promote it. Our ſingle endeavours, originating and terminating in ourſelves, are uſually unſucceſsful. Providence has taken care to ſecure that intercourſe which is neceſſary to the exiſtence of ſociety, by rendering it the greateſt ſweetner of human life. By reciprocal attentions we are enabled to become beneficent without expence. A ſmile, and affable addreſs, a look of approbation, are often capable of giving a greater pleaſure than pecuniary benefits can beſtow. The mere participation of the ſtudies and amuſements of others, at the ſame time that it gratifies ourſelves, is often an act of real humanity; becauſe others would not enjoy them without companions. A friendly viſit in a ſolitary hour, is often a greater act of kindneſs than a valuable preſent. It is really matter of ſurpriſe, that thoſe who are diſtinguiſhed by rank and opulence, ſhould ever be unpopular in their own neighbourhood. They muſt know the value of popularity; and ſurely nothing is more eaſily obtained by a ſuperior. Their notice confers honour; and the aſpiring heart of man is always delighted with diſtinction. A gracious look from them diffuſes happineſs on the lower ranks. But it uſually happens, that an overgrown rich man is not the favourite of a neighbouring country; and it is unfortunate, that pride or inadvertence often prevent men from acting the godlike part of making others happy, even when it would contibute the ſame bleſſing on themſelves.

CIVILIZA'TION, *ſ.* A law, an act of juſtice, or judgment, which renders a criminal proceſs civil; which is performed by turning an information into an inqueſt, or the contrary. *Harris.*—The act of civilizing and poliſhing the manners of mankind. The primary meaning of civilization, ſays Mr. Malkin, or as Johnſon writes it, *civility*, is freedom from barbarity; the ſtate of being civilized. Johnſon takes his example from Spencer's ſtate of Ireland. "The Engliſh were at firſt as ſtout and warlike a people as ever the Iriſh; and yet now are brought unto that *civility*, that no nation in the world excelleth them in all goodly converſation, and all the ſtudies of knowledge and humanity." The definition and the example taken together, explain in the fulleſt, moſt correct, and unequivocal manner, the nature of the civilized ſtate. It conſiſts in relinquiſhing all the ferocious purſuits of men, who live in the early and uncultivated periods of ſociety; as war, hunting, plunder, migrating from place to place, promiſcuous concubinage, and a courſe of action, unreſtrained by ſettled rules; all of which the ſavage is well contented to reſign, when he becomes acquainted with the advantages reſulting from a change of condition. To theſe ſucceed peace, agriculture, ſecurity, and regulation of property, fixed habitations in cities or villages, the ordinances of marriage, and permanent laws for the direction of human conduct; licence is improved into liberty, and the rights of nature confirmed by the ſanctions of the ſocial compact. In this ſituation, the faculties of the mind begin to develope themſelves; the fountains of knowledge are diſcovered, and its ſtream diffuſed; goodly converſation, and the ſtudies of humanity, exalt the citizen above the barbarian.

To CI'VILIZE, *v. a.* To reclaim from ſavageneſs and brutality; to inſtruct in the arts of regular life:

> We ſend the graces and the muſes forth
> To *civilize* and to inſtruct the North. *Waller.*

CI'VILIZER, *ſ.* He that reclaims others from a wild and ſavage life; he that teaches the rules and cuſtoms of civility:

> The *civilizers!* the diſturbers ſay;
> The robbers, the corrupters of mankind! *Philips.*

CI'VILLY, *adv.* In a manner relating to government, or to the rights or character of a member of a community; not naturally.—Men that are civil lead their lives after one common law; for that a multitude ſhould, without harmony, concur in the doing of one thing, (for this is *civilly* to live,) or ſhould manage community of life, it is not poſſible. *Hooker.*—Not criminally.—That accuſation, which is public, is either *civilly* commenced for the private ſatisfaction of the party injured; or elſe criminally, that is, for ſome public puniſhment.—Politely; complaiſantly; gently; without rudeneſs; without brutality.—I will deal *civilly* with his poems: nothing ill is to be ſpoken of the dead. *Dryden.*

> He thought them folks that loſt their way,
> And aſk'd them *civilly* to ſtay. *Prior.*

Without gay or gaudy colours.—The chambers were handſome and cheerful, and furniſhed *civilly. Bacon.*

CI'VITA, a town of Italy, in the Breſſau, on the Oglio: twenty-five miles weſt of Breſcia.

CI'VITA D'ANTINA, a town of Italy, in the kingdom of Naples, and province of Abruzzo Ultra: twelve miles ſouth of Celano.

CI'VITA AQUANA, a town of Italy, in the kingdom of Naples, and province of Abruzzo Ultra: fifteen miles eaſt of Aquila.

CI'VITA BORELLO, a town of Italy, in the kingdom of Naples, and province of Abruzzo Citra: nineteen miles north-north-eaſt of Moleſe.

CI'VITA DI CASCIA, a town of Italy, in the ſtate of the Church, and province of Umbria: five miles ſouth-weſt from Norcia.

CI'VITA CASTELLANA, a town of Italy, in the ſtate of the Church, and patrimony of St. Peter, ſituated on a mountain near the Tiber, the ſee of a biſhop, held immediately from the pope, and at preſent united with Orta: twenty four miles north of Rome.

CI'VITA DI CHIETI, or TETI, a city of Italy, in the kingdom of Naples, and capital of the province of Abruzzo Citra, the ſee of an archbiſhop. It contains four churches and nine convents, and is ſituated near the Peſcara: ſeventy-five miles north of Capua, and ninety-three north of Naples. Lat. 42. 42. N. lon. 32. 28. E. Ferro.

CI'VITA LAVINIA, a town of Italy, in the Campagna di Roma: four miles from Veletri.

CI'VITA LUPARELLA, a town of Italy, in the kingdom of Naples, and province of Abruzzo Citra: two miles north of Civita Borello.

CI'VITA MANDONIA, a town of Italy, in the kingdom of Naples, and province of Calabria Citra: fifteen miles north-north-eaſt of Biſignano.

CI'VITA A MARE, a town of Italy, in the kingdom of Naples, and province of Capitanata: thirteen miles eaſt-ſouth-eaſt of Termola.

CI'VITA NUOVA, a town of Italy, in the marquiſate of Ancona, in the road from Loretto to Fermo: ſeven miles from the former, and nine from the latter.

CI'VITA DI PENNA, a town of Italy, in the kingdom of Naples, and province of Abruzzo Ultra, the ſee of a biſhop, ſuffragan of Chieti: ten miles ſouth-eaſt of Teramo.

CI'VITA REAL, a town of Italy, in the kingdom of Naples, and province of Abruzzo Ultra: thirteen miles north-weſt of Aquila.

CI'VITA DI ST. ANGELO, a town of Italy, in the kingdom of Naples, and province of Abruzzo Ultra, ſituated on a mountain: three miles from Poto di Salino.

CI'VITA TOMASSA, a town of Italy, in the kingdom of Naples, and province of Abruzzo Ultra: ſix miles ſouth-weſt of Aquila.

CI'VITA TURCHINO, a place in Italy, about two miles north of the town of Corneto. It is an hill of an oblong

oblong form, the summit of which is one continued plain. From the quantity of medals, intaglios, fragments of inscriptions, &c. that are occasionally found here, it is believed to be the spot where the ancient and powerful city of Tarquinii once stood. On the south-east side of it runs the ridge of a hill which unites it to Corneto. This ridge is three or four miles in length, and almost entirely covered with artificial tumuli, called by the inhabitants *monti rossi*. About twelve of them have at different times been opened; and in some were found Etruscan vases of various forms; in others sacrophagi of stone, with bones in them. The interior of these tumuli consist of divers small apartments, most of them stuccoed, and ornamented in various manners, with a double row of Etruscan inscriptions running round the upper part of the walls, and under them a kind of frieze of figures in painting, very handsomely executed.

CI'VITA VECCHIA, or MALTA, a town situated on a hill in the center of the Island of Malta, strongly fortified. It is the see of a bishop, and, besides the cathedral, which is very large and handsome, it contains several other churches and convents. The town is so situated, that from it may be seen the whole island, and sometimes the coasts of Africa and Sicily.

CI'VITA VECCHIA, a seaport town of Italy, in the state of the Church, and patrimony of St. Peter. The port was enlarged and rendered commodious by Trajan; it is one of the best in Italy, and declared free by Benedict XIV. The pope's gallies lie here. The air is unhealthy, and the water not good: twenty-seven miles north-west of Rome. Lat. 42. 3. N. lon. 29. 30. E. Ferro.

CIVITA'RA, a town of Italy, in the kingdom of Naples, and province of Capitanata: two miles north-east of Dragonera.

CIVITEL'LA, a fortress of Italy, in the kingdom of Naples, and province of Abruzzo Ultra: seven miles north of Teramo.

CIVITEL'LA, a town of Italy, in the kingdom of Naples, and province of Otranto: five miles north-east of Tarento.

CIVO'LI, or CIGOLI, (Lewis), an Italian painter, whose family name was Cardi, was born at the castle of Cigoli, in Tuscany, in 1559. His *ecce homo*, which he performed as a trial of skill with Barochio and Michael Angelo da Caravaggio, was judged better than those executed by them. He excelled in designing, and was employed by the popes and princes of his time. He died at Rome in 1613.

CIVRA'C, a town of France, in the department of the Gironde: seven miles east of Libourne.

CIVRAY', or SIVRAY, a town of France, and principal place of a district in the department of the Vienne, on the Charente: eight leagues and a half south of Poitiers, and a half south-west of Montmorillon.

CIVRY', a town of France, in the department of the Eure and Loire, and chief place of a canton, in the district of Chateaudun: seven miles east-north-east of Chateaudun.

CI'US, in ancient geography, a river and town of Bithynia, which gave name to the Sinus Cianus. The town was afterwards called *Prusa*, Cius having been destroyed by Philip father of Perseus, and rebuilt by Prusias king of Bithynia. In the river, Hylas the favourite boy of Hercules was drowned. *Apollonius*.

CIZE, *s.* [perhaps from *incisa*, Lat. shaped or cut to a certain magnitude.] The quantity of any thing with regard to its external form: commonly written *size*.—If no motion can alter bodies, that is, reduce them to some other *cize* or figure, then there is none of itself to give them the *cize* and figure which they have. *Grew*.

CIZE', a valley of France, of which St. Jean-Pie-de-port is the capital.

CKEBO'E, a town of Norway: six miles south-south-east of Dronthiem.

CLACH'LAND, a small island of Scotland, near the east coast of the island of Arran.

CLACK, *s.* [*klatchen*, Germ. to rattle, to make a noise.] Any thing that makes a lasting and importunate noise: generally used in contempt for the tongue:

But still his tongue ran on,
And with its everlasting *clack*
Set all mens' ears upon the rack. *Hudibras.*

The *clack* of a mill; a bell that rings when more corn is required to be put in:

Says John, just at the hopper will I stand,
And mark the *clack* how justly it will sound. *Betterton.*

To CLACK, *v. n.* To make a chinking noise; to let the tongue run.

To CLACK, *v. a.* As to *clack wool*, is to cut off the sheep's mark, which makes it weigh less; as to *force* wool, signifies to clip off the upper and hairy part thereof; and to *bard* it, is to cut the head and neck from the rest of the fleece.

CLACKMAN'NAN, a county of Scotland, is surrounded on all sides by Perthshire, except on the south-west, where it is bounded by the river Forth, which divides it from Stirlingshire. It is about nine miles broad from north to south, and where longest from east to west about twelve miles. This is a plain fertile country towards the Forth; but the north, which is bordered by the Ochill-hills, abounds both with corn and pasture. It produces great quantities of coal, which is in high esteem. It is watered by the Devron, which runs into the Forth, and its principal towns are Aloa and Clackmannan. It carries on a good foreign trade, and has manufactures of sail-cloth and coarse linen, girdles, camblets, and plaids, for the Highland regiments; and exports salt, &c.

CLACKMAN'NAN, a town of Scotland, in the county to which it gives name, situated on a small river, about a mile from the forth: 7 miles east-south-east of Stirling.

CLAD, *part. pret.* [this participle, which is now referred to *clothe*, seems originally to have belonged to *cloden*, or some such word, like *kleeden*, Dutch.] Clothed; invested; garbed.—He hath *clad* himself with a new garment. *1 Kings.*

But virtue too, as well as vice, is *clad*
In flesh and blood. *Waller.*

CLA'DES, *s.* [*clida, cleta, cleia*, from the Brit. *clie*, and the Irish *clia*.] A wattle or hurdle; and a hurdle for penning or folding of sheep is still in some counties of England called a *cley*. *Paroch. Antiq.* p. 575.

CLÆR, *s.* A chemical term for the *bone-flour*, which is prepared from the bones of the fore part of the cranium of a calf, depurated from the fat by boiling, then calcined to whiteness, and levigated finely, afterwards moistened with water, and calcined again in an earthen pot closed, and, after cooling, reduced again to a subtil powder, which is sprinkled through a sieve upon earthen vessels, to prevent their contracting chinks.

CLA'GENFURT, a town of Germany, and capital of the duchy of Carinthia, situated on the Glan, built square, and surrounded with a good wall. It contains six churches and three convents. Here is a manufacture of cloth, and a society for the promoting of agriculture and useful arts. This city was taken in March 1797, by the French republican army, after it had defeated the Austrians, killed two hundred, and taken many prisoners: fifty miles north of Triest, and 132 south-west of Vienna. Lat. 46. 45. N. lon. 31. 57. E. Ferro.

CLA'GETT (William), an eminent and learned divine, born in 1646. He was preacher to the society of Gray's-inn; which employment he exercised until he died in 1688, being then also one of the king's chaplains. Archbishop Sharp gives him an excellent character; and bishop Burnet has ranked him among those worthy men whose lives

lives and labours contributed to rescue the church from the reproaches which the follies of others had drawn upon it. Dr. Clagett published several useful books; but his principal work is his Discourse concerning the Operations of the Holy Spirit; nor must it be forgotten that he was one of those excellent divines who made a noble stand against the designs of James II. Four volumes of his sermons were published after his death, by his brother Nicolas Clagett, archdeacon of Sudbury, father of Nicolas Clagett, afterwards bishop of Exeter.

CLAG'GON BAY, a bay of Ireland, on the coast of Galway, south of Claggon Point.

CLAG'GON POINT, a cape of Ireland, on the west coast of the county of Galway. Lat. 53. 34. N. lon. 10. 4. W. Greenwich.

To CLAIM, *v. a.* [*clamer*, Fr.] To demand of right; to require authoritatively; not to beg or accept as favour, but to exact as due.—We must know how the first ruler, from whom any one *claims*, came by his authority, before we can know who has a right to succeed him in it. *Locke.*

Poets have an undoubted right to *claim*,
If not the greatest, the most lasting name. *Congreve.*

CLAIM, *s.* A demand of any thing, as due:

Forsworn thyself! The traitor's odious name
I first return, and then disprove thy *claim*. *Dryden.*

A title to any privilege or possession in the hands of another.—Either there must have been but one sovereign over them all, or else every father of a family had been as good a prince, and had as good a *claim* to royalty, as these. *Locke.*—The phrases are commonly to *make claim*, or to *lay claim*.—If God, by positive grant, gave dominion to any man, primogeniture can *lay* no *claim* to it, unless God ordained. *Locke.*

CLAIM, [*clameum*, Lat.] in law, a challenge of interest in any thing that is in the possession of another, or at least out of a man's own possession; as claim by charter, by descent, &c. In Plow. Com. 359. Dyer, chief justice, is said to have defined claim to be, a challenge of the ownership or property that one hath not in possession, but which is detained from him by wrong. Claim is either verbal, where one doth by words claim and challenge the thing that is so out of his possession; or it is by an action brought; and sometimes it relates to lands, and sometimes to goods and chattels. Where any thing is wrongfully detained from a person, this claim is to be made; and the party making it, may thereby avoid descents of lands, disseisins, &c. and preserve his title, which otherwise would be in danger of being lost. *Co. Lit.* 250. A man who hath present right or title to enter, must make a claim; and, in case of reversions, one may make a claim where he hath right, but cannot enter on the lands; when a person dares not make an entry on land, for fear of being beaten, or other injury, he may approach as near as he can to the land, and claim the same; and that shall be sufficient to vest the seisin in him. 1 *Inst.* 250. See ENTRY.

If nothing doth hinder a man, having a right to land, from entering or making his claim, there he must do so, before he shall be said to be in possession of it, or can grant it over to another; but where the party who hath right is in possession already, and where an entry or claim cannot be made, it is otherwise. 1 *Rep.* 157. A claim will divest an estate out of another, when the party must enter into some part of the land; but if it be only to bring him into possession, he may do it in view. By claim of lands, in most cases, is intended a claim with an entry into part of the lands, or by a near approach to it. *Co. Lit.* 252. One in a reversion after an estate for years, or after a statute-merchant, staple, or elegit, may enter and make a claim to prevent a descent, or avoid a collateral warranty. And claim of a remainder by force of a condition must be upon the land, or it will not be sufficient. If a man seised of lands in right of his wife, make a feoffment in fee on condition, and the husband dieth, and then the condition is broken, and the heir enters; in this case the wife need not claim to get possession of her estate, for the law doth vest it in her without any claim. *Co. Lit.* 202.

The claim of the particular tenant shall be good for him in reversion or remainder; and of him in reversion, &c. for particular tenant; so claim of a copyholder will be good for the lord. But if tenant for years in a court of record claim the fee of his lands, it is a forfeiture of his estate. *Plowd.* 359. A claim may be made by the party himself, and sometimes by his servants or deputy; and a guardian in socage may make a claim or enter, in the name of the infant that hath right, without any commandment. *Co. Lit.* 245. Claim or entry should be made as soon as may be; and, by the common law, it is to be within a year and a day after the disseisin, &c. and if the party who hath unjustly gained the estate do afterwards occupy the land, in some cases an assise, trespass, or forcible entry, may be had against him. *Lit.* 426. 430. If a fine is levied of lands, strangers to it are to enter and make a claim within five years, or be barred; infants after their age, feme coverts after the death of their husbands, &c. have the like time. *Stat.* 1 R. III. c. 7.

Continual claim, is where a man hath right and title to enter into any lands or tenements, whereof another is seised in fee, or in fee-tail; if he who hath title to enter makes continual claim to the lands or tenements before the dying seised of him who holdeth the tenements, then though such tenant die thereof seised, and the lands or tenements descend to his heir, yet may he who hath made such continual claim, or his heir, enter into the lands or tenements so descended, by reason of the continual claim made, notwithstanding the descent. So, in case a man be disseised, and the disseisee makes continual claim to the tenements in the life of the disseisor, although the disseisor dieth seised in fee, and the land descend to his heir, yet may the disseisee enter upon the possession of the heir, notwithstanding the descent. *Litt.* 414. But such claim must always be made within the year and the day before the death of the person holding the land; for, if such tenant do not die seised within a year and a day after such claim made, and yet he that hath right dares not enter, he must make another claim within the year and the day after the first claim, and so *toties quoties*, that he may be sure his claim shall always have been made within a year and a day before the death of the tenant; and hence it is called *continual claim*. By stat. 32 H. VIII. c. 43. five years must elapse without entry or continual claim, in order that a descent on the disseisor's death should take away the entry of the disseisee, or his heir; but, after the five years, the disseisee must make continual claim as before the statute. And, by stat. 4 An. c. 16. no claim, or entry, shall be of effect to avoid a fine, unless an action shall be commenced thereon within a year, and prosecuted with effect.

Claim of liberty, is a suit or petition to the king in the court of exchequer, to have liberties and franchises confirmed there by the king's attorney-general. *Co. Ent.* 93. And *clamea admittenda in itinere per attornatum*, is an ancient writ by which the king commanded the justices in eyre to admit a person's claim by attorney who was employed in the king's service, and could not come in his own person. *Reg. Orig.* 19.

CLAIM'ABLE, *adj.* That which may be demanded as due.

CLAIM'ANT, *s.* He that demands any thing, as unjustly detained by another.

CLAIM'ER, *s.* He that makes a demand; he that requires any thing, as unjustly withheld from him.

CLAIN, a river of France, which passes by Poitiers, and runs into the Vienne, three miles south of Chatellerault.

CLAIRA', a town of France, in the department of the eastern Pyrennees: five miles north-east of Perpignan.

CLAIRA'C, a town of France, in the department of the Lot and Garonne, and chief place of a canton, in the district

district of Tonneins, advantageously situated in a valley on the Drot, and containing about 3000 inhabitants. The inhabitants raise tobacco and corn, and make a great deal of wine and brandy: one league south-east of Tonneins, and four and a half north-west of Agen.

CLAIRAU'LT (Alexis-Claude), a celebrated French mathematician and academician, was born at Paris the 13th of May 1713, and died the 17th of May 1765, at fifty-two years of age. His father, a teacher of mathematics at Paris, was his sole instructor, teaching him even the letters of the alphabet on the figures of Euclid's Elements, by which he was able to read and write at four years of age. By a similar stratagem it was that calculations were rendered familiar to him. At nine years of age he put into his hands Guisnée's Application of Algebra to Geometry; at ten he studied l'Hopital's Conic Sections; and, between twelve and thirteen, he read a memoir to the academy of sciences concerning four new geometrical curves of his own invention. About the same time he laid the first foundation of his work upon curves that have a double curvature, which he finished in 1729, at sixteen years of age. He was named joint-mechanician to the academy in 1731 at the age of eighteen, associate in 1733, and pensioner in 1738; during his connection with the academy, he had a great multitude of learned and ingenious communications inserted in their memoirs, beside several other works which he published separately; the list of which is as follows: 1. On Curves of a double Curvature; in 1730, 4to. 2. Elements of Geometry; 1741, 8vo. 3. Theory of the Figure of the Earth; 1743, 8vo. 4. Elements of Algebra; 1746, 8vo. 5. Tables of the Moon; 1754, 8vo. His papers inserted in the Memoirs of the Academy are too numerous to be particularised here; but they may be found from the year 1727, for almost every year till 1762; being upon a variety of subjects, astronomical, mathematical, optical, &c.

CLAI'RE, a town of France, in the department of the Lower Seine: ten miles north of Rouen.

CLAIREVAU'X-LES-VAUXDAIN, a town of France, in the department of Jura, and chief place of a canton, in the district of Orgelet: three leagues south-east of Lons-le-Saunier.

CLAIRVAU'X, a town of France, in the department of the Aube, and chief place of a canton, in the district of Bar-sur-Aube, which took its name from a celebrated abbey built there in the year 1115: two leagues south of Bar-sur-Aube.

CLAI'SE, a river of France, which runs into the Creuse, near La Haye.

CLAIX, a town of France, in the department of the Isere, and chief place of a canton, in the district of Grenoble: four miles south of Grenoble.

CLAM, a town of Germany, in the archduchy of Austria: one mile west of Gran.

CLAMA'RT SOUS MEADON, a village of France: one league and a half south-south-west of Paris.

To CLAM'BER, *v. n.* [probably corrupted from *climb*; as, *climber, clamber.*] To climb with difficulty, as with both hands and feet.—They were forced to *clamber* over so many rocks, and to tread upon the brink of so many precipices, that they were very often in danger of their lives. *Addison.*

CLA'MECY, a town of France, and principal place of a district, in the department of the Nyevre, at the conflux of the Buvron and the Yonne. In one of the fauxbourgs of this town the nominal bishop of Bethlehem resided, the see having been fixed here from the expulsion of the Christians out of the Holy Land; his income was small, and his diocese confined nearly to the place of his residence: eleven leagues north-north-east of Nevers, and seven south of Auxerre.

To CLAMM, *v. a.* [in some provinces to *cleam*; from clæmian, Sax. to glue together.] To clog with any glutinous matter.—A swarm of wasps got into a honey-pot, and there they cloyed and *clammed* themselves till there was no getting out again. *L'Estrange.*

CLAM'MINESS, *s.* Viscosity; viscidity; tenacity; ropiness.—A greasy pipkin will spoil the *clamminess* of the glue. *Moxon.*

CLAM'MY, *adj.* Viscous; glutinous; tenacious; adhesive; ropy.—Bodies *clammy* and cleaving, have an appetite, at once, to follow another body, and to hold to themselves. *Bacon.*

Aghast he wak'd, and starting from his bed,
Cold sweat in *clammy* drops, his limbs o'erspread. *Dryden.*

CLA'MOROUS, *adj.* Vociferous; noisy; turbulent; loud;

Then various elements against thee join'd,
In one more various animal combin'd,
And fram'd the *clam'rous* race of busy human kind. *Pope.*

CLA'MOUR, *s.* [*clamor*, Lat.] Outcry; noise; exclamation; vociferation.—The people grew exorbitant in their *clamours* for justice. *King Charles.*

Revoke thy doom,
Or whilst I can vent *clamour* from my throat,
I'll tell thee, thou do'st evil. *Shakespeare.*

It is used sometimes, but less fitly, of inanimate things:

Here the loud Arno's boist'rous *clamours* cease,
That with submissive murmurs glides in peace. *Addison.*

To CLAMOUR, *v. n.* To make outcries; to exclaim; to vociferate; to roar in turbulence.—Let them not come in multitudes, or in a tribunitious manner; for that is to *clamour* counsels, not to inform them. *Bacon.*—In Shakespeare it seems to mean, actively, to stop from noise.—*Clamour* your tongues, and not a word more. *Shakespeare.*

CLAMP, *s.* [*clamp*, Fr.] A piece of wood joined to another, as an addition of strength. A quantity of bricks. To burn a *clamp* of bricks of sixteen thousand, they allow seven ton of coals. *Mortimer.*

To CLAMP, *v. a.* When a piece of board is fitted with the grain to the end of another piece of board cross the grain, the first board is *clamped*. Thus the ends of tables are commonly *clamped* to preserve them from warping. *Moxon.*

CLAMPE'TIA, in ancient geography, a town of the Brutii, one of those which revolted from Hannibal, called *Lampetia* by Polybius. Now *Amantia*, or *Mantia*, a town of Calabria Ultra, near the bay of Euphemia.

CLAN, *s.* [probably of Scottish original; *klaan*, in the Highlands, signifies *children.*] A family; a race;

They around the flag
Of each his faction, in their several *clans*,
Swarm populous, unnumber'd. *Milton.*

A body or sect of persons, in a sense of contempt.—Partridge and the rest of his *clan* may hoot me for a cheat, if I fail in any single particular. *Swift.*—Of the origin of the Scottish clans, we have the following account from Dr. Robertson: "The nations which over-ran Europe were originally divided into many small tribes; and, when they came to parcel out the lands which they had conquered, it was natural for every chieftain to bestow a portion, in the first place, upon those of his own tribe or family. These all held their lands of him; and, as the safety of each individual depended on the general union, these small societies clung together, and were distinguished by some common appellation, either patronimical or local, long before the introduction of surnames or ensigns armorial. But when these became common, the descendants and relations of every chieftain assumed the same name and arms with him: other vassals were proud to imitate their example; and by degrees they were communicated to all those who held of the same superior. Thus

Thus clanships were formed; and, in a generation or two, that consanguinity, which was at first in a great measure imaginary, was believed to be real. An artificial union was converted into a natural one; men willingly followed a leader, whom they regarded both as the superior of their lands and the chief of their blood; and served him not only with the fidelity of vassals, but the affection of friends. In the other feudal kingdoms, we may observe such unions as we have described, imperfectly formed; but, in Scotland, whether they were the production of chance, or the effect of policy, or strengthened by their preserving their genealogies both genuine and fabulous, clanships were universal. Such a confederacy might be overcome; it could not be broken; and no change of manners or government has been able, in some parts of the kingdom, to dissolve associations which are founded upon prejudices so natural to the human mind. How formidable were nobles at the head of followers, who, counting that cause just and honourable which their chief approved, were ever ready to take the field at his command, and to sacrifice their lives in defence of his person or of his fame! Against such men a king contended with great disadvantage; and that cold service, which money purchases, or authority extorts, was not an equal match for their ardour and zeal."

CLAN'CULAR, *adj.* [*clancularius*, Lat.] Clandestine; secret; private; concealed; obscure; hidden.—Let us withdraw all supplies from our lusts, and not by any secret reserved affection give them *clancular* aids to maintain their rebellion. *Decay of Piety.*

CLANDESTI'NA, *s.* in botany. See LATHRÆA.

CLANDES'TINE, *adj.* [*clandestinus*, Lat.] Secret; hidden; private: in an ill sense:

Tho' nitrous tempests, and *clandestine* death,
Fill'd the deep caves and num'rous vaults beneath.
Blackmore.

CLANDES'TINELY, *adv.* Secretly; privately; in private; in secret.—There have been two printed papers *clandestinely* spread about, whereof no man is able to trace the original. *Swift.*

CLANG, *s.* [*clangor*, Lat.] A sharp shrill noise:

What *clangs* were heard in German skies afar,
Of arms and armies rushing to the war: *Dryden.*

Guns, and trumpets *clang*, and solemn sound
Of drums, o'ercame their groans. *Philips.*

To CLANG, *v. n.* [*clango*, Lat.] To clatter; to make a loud shrill noise:

Have I not in a pitched battle heard
Loud 'larums, neighing steeds, and trumpets *clang?*
Shakspeare.

To CLANG, *v. a.* To strike together with a noise:

The fierce Curetes trod tumultuous
Their mystic dance, and *clang'd* their sounding arms;
Industrious with the warlike din to quell
Thy infant cries. *Prior.*

CLAN'GOUR, *s.* [*clangor*, Lat.] A loud shrill sound:

With joy they view the waving ensigns fly,
And hear the trumpets *clangour* pierce the sky. *Dryden.*

CLAN'GOUS, *adj.* Making a clang.—We do not observe the cranes, and birds of long necks, have any musical, but harsh and *clangous* throats. *Brown.*

CLANK, *s.* A loud, shrill, sharp noise, made by the collision of hard and sonorous bodies.—They were joined by the melodious *clank* of marrow-bone and cleaver. *Spectator.*

To CLAP, *v. a.* [clappan, Sax. *klappen*, Dut.] To strike together with a quick motion, so as to make a noise by the collision.—Men shall *clap* their hands at him, and shall hiss him out of his place, *Job.*—Have you never seen a citizen, in a cold morning, *clapping* his sides, and walking before his shop? *Dryden.*

In flow'ry wreathes the royal virgin drest
His bending horns, and kindly *clapt* his breast. *Addison.*

To add one thing to another, implying the idea of something hasty, unexpected, or sudden.—Smooth temptations, like the sun, make a maiden lay by her veil and robe; which persecution, like the northern wind, made her hold fast, and *clap* close about her. *Taylor.*—It would be as absurd as to say, he *clapped* spurs to his horse at St. James's, and gallopped away to the Hague. *Addison.*

His shield thrown by, to mitigate the smart,
He *clapp'd* his hand upon the wounded part. *Dryden.*

Let all her ways be unconfin'd,
And *clap* your padlock on her mind. *Prior.*

To do any thing with a sudden hasty motion, or unexpectedly.—We will take our remedy at law, and *clap* an action upon you for old debts. *Arbuthnot.*

Have you observ'd a sitting hare,
List'ning, and fearful of the storm
Of horns and hounds, *clap* back her ear? *Prior.*

To celebrate or praise by clapping the hands; to applaud.—I have often heard the stationer wishing for those hands to take off his melancholy bargain, which *clapped* its performance on the stage. *Dryden.*—To infect with a venereal poison:

Let men and manners ev'ry dish adapt;
Who'd force his pepper where his guests are *clapt?* *King.*

To *clap up.* To complete suddenly, without much precaution.—Was ever match *clapt up* so suddenly. *Shakespeare.*—A peace may be *clapped up* with that suddenness, that the forces, which are now in motion, may unexpectedly fall upon his skirts. *Howel.*—To *clap up.* To imprison with little formality or delay.—Being presented to the emperor for his admirable beauty, he was known, and the prince *clapt* him *up* as his inveigler. *Sandys.*

To CLAP, *v. n.* To move nimbly with a noise:

A whirlwind rose, that with a violent blast
Shook all the doom: the doors around me *clapt.* *Dryden.*

To enter with alacrity and briskness upon any thing:

Come, a song.——
—Shall we *clap* into 't roundly, without saying we are hoarse? *Shakespeare.*

To strike the hands together in applause:

All the best men are ours; for 'tis ill hap
If they hold, when their ladies bid 'em *clap.* *Shakespeare.*

CLAP, *s.* A loud noise made by sudden collision.—Give the door such a *clap* as you go out, as will shake the whole room, and make every thing rattle in it. *Swift.*—A sudden or unexpected act or motion.—It is monstrous to me, that the south-sea should pay half their debts at one *clap. Swift.*—An explosion of thunder.—There shall be horrible *claps* of thunder, and flashes of lightning, voices and earthquakes. *Hakewill.*—An act of applause.—The actors, in the midst of an innocent old play, are often startled in the midst of unexpected *claps* or hisses. *Addison.*—A sudden or unexpected misfortune. *Obsolete.*—A vulgar phrase for a venereal infection. [from *clapoir*, Fr.]—Time, that at last matures a *clap* to pox. *Pope.*—[With falconers.] The nether part of the beak of a hawk.

CLAP-BOARD, *s.* A board cut in order to make casks or vessels; which shall contain three feet and two inches at least in length: and, for every six ton of beer exported, the same cask, or as good, or 200 of clap-boards is to be imported.

CLAP-NET. See BIRD-CATCHING, vol. iii. p. 50.

CLAP'HAM, a village of England, in the county of Surrey,

Surrey, with numerous country seats, inhabited by rich citizens: three miles south of London.

CLAP'PER, *s.* One who claps with his hands; an applauder. The tongue of a bell.—He hath a heart as sound as a bell, and his tongue is the *clapper*; for what his heart thinks his tongue speaks. *Shakespeare.*—I saw a young lady fall down the other day, and she much resembled an overturned bell without a *clapper*. *Addison.*—*Clapper* of a mill. A piece of wood shaking the hopper.

To CLAP'PERCLAW, *v. a.* To tonguebeat; to scold:

They 've always been at daggers-drawing,
And one another *clapperclawing*. *Hudibras.*

CLA'RA, [Lat. *clear, bright.*] A proper name of women.

CLA'RA (L.), a town of the island of Cuba: eighteen miles north-west of Spirito Santo.

CLA'RA, or MEL, an island in the Indian sea, near the coast of Siam, twenty-five miles long, and four wide. Lat. 11.4 N. lon. 97. 50. E. Greenwich.

CLARA'TUMBA, a town of Poland, with a celebrated abbey, in the palatinate of Cracovia: four miles east of Cracow.

CLARE, a small town in the county of Suffolk, situated on the river Stour, fourteen miles from St. Edmundsbury, and fifty-six from London. Here are the ruins of a castle and an old monastery. It has a fine large church, and a manufacture of says; the civil and spiritual courts are held at it; and it gives title of marquis to his grace the duke of Newcastle of the Pelham family, as it did to that of Holles before. The market-day is on Fridays, and the fairs on Easter Tuesday and May 26.

CLARE, a county of Ireland, bounded on the north by the county of Galway, on the east by Tipperary, on the south by Limerick and Kerry, and on the west by the sea. It contains seventy-nine parishes, about 17,400 houses, and 96,000 souls: some parts of the county are mountainous, which, however, feed a great number of cattle and sheep; while the more level grounds are very fertile, and yield good crops of corn and hay. Ennis is the capital. The principal river is the Shannon. Four members are returned to the parliament, viz. two for the county, and two for the town of Ennis.

CLARE, a river of Ireland, which runs into the Corrib: four miles north of Galway.

CLARE, an island of Ireland, near the south-west coast, of Cork, about three miles long, and one wide. Lat. 51. 21. N. lon. 9. 23. W. Greenwich.

CLARE, an island of Ireland, near the coast of Mayo, about four miles long, and one and a half wide. Lat. 53. 49. N. lon. 9. 49. W. Greenwich.

CLARE, a town of the American States, on St. Mary's bay, in Annapolis county, Nova Scotia.

CLARE-OBSCURE, *s.* [from *clarus*, bright, and *obscurus*, Lat.] Light and shade in painting:

As masters in the *clare-obscure*
With various light your eye allure;
A flaming yellow here they spread,
Draw off in blue, or charge in red;
Yet from these colours, oddly mix'd,
Your sight upon the whole is fix'd. *Prior.*

CLA'REMONT, a town of the American States, in Cheshire county, New Hampshire, on the east side of Connecticut river, in Vermont, and on the north side of Sugar river; twenty-four miles south of Dartmouth college, and 121 south-west by west of Portsmouth. It was incorporated in 1764, and contains 1435 inhabitants.

CLA'REMONT, a county of the American States, in Camden district, South Carolina, contains 2479 white inhabitants. Statesburg is the county town.

CLA'RENCE. See CHIARENZA.

CLARENCIEU'X, the second king at arms in the herald's office; so called from the duke of Clarence, to whom he first belonged; for Lionel, third son of Edward III. having, by his wife, the honour of Clare, in the county of Thomond, was afterwards declared duke of Clarence; which dukedom afterwards escheating to Edward IV. he made this earl a king at arms. His office is to marshal and dispose of the funerals of all the lower nobility, as baronets, knights, esquires, on the south side of the Trent; whence he is sometimes called *surroy*, or *south-roy*, in contradistinction to *norroy*.

CLA'RENDON (constitutions of), certain constitutions made in the reign of Henry II. A. D. 1164, in a parliament held at Clarendon; whereby the king checked the power of the pope and his clergy, and narrowed the exemption they claimed from secular jurisdiction.

CLA'RENDON (earl of). See HYDE.

CLA'RENDON. See CAPE FEAR RIVER.

CLA'RENDON, a county of the American States, and the southernmost in Camden district, South Carolina, about thirty miles long, and thirty broad.

CLA'RENDON, a town of the American States, near the center of Rutland county, Vermont, watered by Otter creek and its tributary streams; fifteen miles east of Fairhaven, and forty-four north-east of Bennington. It contains 1478 inhabitants. On the south-east side of a mountain in the westerly part of Clarendon, or in the edge of Tinmouth, is a curious cave, the mouth of which is not more than two feet and a half in diameter. In its descent, the passage makes an angle with the horizon of thirty-five or forty degrees; but continues of nearly the same diameter through its whole length, which is thirty-one feet and a half. At that distance from the mouth, it opens into a spacious room twenty feet long, twelve and a half wide, and eighteen or twenty feet high. Every part of the floor, sides, and roof, of this room, appears to be a solid rock, but very rough and uneven. The water is continually percolating through the top, and has formed stalactites of various forms; many of which are conical, and some have the appearance of massive columns. From this room there is a communication by a narrow passage to others equally curious.

CLAREN'NA, in ancient geography, a town of Vindelicia, at the confluence of the Lycus and Danube. Now Rain, on the south side of the Danube, at the confluence of the Lech.

CLA'RET, *s.* [*clairet*, Fr. from *clareo*, Lat. to be clear.] French wine, of a clear pale red colour:

The *claret* smooth, red as the lips we press
In sparkling fancy, while we drain the bowl. *Thomson.*

CLA'RET, a town of France, in the department of the Herault, and chief place of a canton, in the district of Montpellier: five leagues north of Montpellier.

CLA'RET, a town of France, in the department of the Lower Alps, and chief place of a canton, in the district of Sisteron: eleven miles north of Sisteron.

CLA'RICORD, *s.* [from *clarus* and *chorda*, Lat.] A musical instrument in form of a spinette, but more ancient. It has forty-nine or fifty keys, and seventy-strings.

CLARIFICA'TION, *s.* The act of making any thing clear from impurities.—Liquors are, many of them, at the first, thick and troubled; as muste, and wort: to know the means of accelerating *clarification*, we must know the causes of *clarification*. *Bacon.*

To CLA'RIFY, *v. a.* [*clarifier*, Fr.] To purify or clear any liquor; to separate from feculencies or impurities.—The apothecaries *clarify* their syrups by whites of eggs, beaten with the juices which they would *clarify*; which whites of eggs gather all the dregs and grosser parts of the juice to them; and after, the syrup being set on the fire, the whites of eggs themselves harden, and are taken forth. *Bacon.*—To brighten; to illuminate. *This sense is rare.*—The Christian religion is the only means that God has sanctified, to set fallen man upon his legs again, to *clarify* his reason, and to rectify his will. *South.*

To CLA'RIFY, *v. n.* To clear up; to grow bright.—Whosoever hath his mind fraught with many thoughts, his wits and understanding do *clarify* and break up in the discoursing

discoursing with another; he marshalleth his thoughts more orderly, he seeth how they look when they are turned into words. *Bacon.*

CLA'RION, *s.* [*clarin.* Span. from *clarus*, loud, Lat.] A trumpet; a wind instrument of war:

Let fuller notes th' applauding world amaze,
And the loud *clarion* labour in your praise. *Pope.*

CLA'RISSES, an order of nuns, so called from their founder St. Clare. She lived in the town of Assisa in Italy; and, having renounced the world to dedicate herself to religion, gave birth to this order, in the year 1212. After Ferdinand Cortez had conquered Mexico for the king of Spain, Isabella of Portugal, wife of the emperor Charles V. sent thither some nuns of the order of St. Clare, who made several settlements there. Near their monasteries were founded communities of Indian young women, to be instructed by the clarisses in religion, and such works as were suitable to persons of their sex. These communities are now said to be so considerable, that they usually consist of four or five hundred.

CLA'RITY, *s.* [*clarté*, Fr. *claritas*, Lat.] Brightness; splendour.—Man was not only deceivable in his integrity, but the angels of light in all their *clarity*. *Brown.*

CLARKE (Dr. Samuel), a preacher and writer of considerable eminence in the reign of Charles II. was, during the interregnum, and at the time of the ejection, minister of St. Bennet Fink in London. In November 1660, he, in the name of the presbyterian ministers, presented an address of thanks to the king for his declaration of liberty of conscience. He was one of the commissioners of the Savoy; and behaved, on that occasion, with great prudence and moderation. He sometimes attended the church as an hearer and communicant; and was much esteemed by all who knew him, for his great probity and industry. The most valuable of his numerous works are said to be his Lives of the Puritan Divines, and other persons of note, twenty-two of which are printed in his Martyrology; the rest are in his Lives of sundry eminent Persons in this latter Age, folio; and in his Marrow of Ecclesiastical History, in folio and quarto. He died in 1680. His son, Samuel Clarke, was afterwards made fellow of Pembroke-hall in Cambridge; but was ejected from his fellowship for refusing to take the engagements, as he was also from his rectory of Grendon in Buckinghamshire. He applied himself early to the study of the scriptures; and his annotations on the Bible, printed together with the sacred text, are highly commended by Dr. Owen, Mr. Baxter, and Dr. Calamy. He died in 1701, aged 75.

CLARKE (Dr. Samuel), a celebrated English divine, philosopher, and metaphysician, the son of Edward Clarke, esquire, alderman of Norwich, and for several years one of its representatives in parliament; was born there the 11th of October 1675. He was instructed in classical learning at the free-school of that city; and, in 1691, removed thence to Caius college in Cambridge; where his uncommon abilities soon began to display themselves. Though the philosophy of Des Cartes was at that time the established philosophy of the university, yet Clarke easily mastered the new system of Newton; and, in order to his first degree of arts, performed a public exercise in the schools upon a question taken from it. He greatly contributed to the establishment of the Newtonian philosophy by an excellent translation of Rohault's Physics, with notes, which he finished before he was twenty-two years of age: a book which had been for some time the system used in the university, and founded upon Cartesian principles. This was first published in 1697, and it soon after went through several other editions, all with improvements. Mr. Whiston relates, that, in the year 1697, while he was chaplain to Dr. Moore bishop of Norwich, he met with young Clarke, then wholly unknown to him, at a coffee-house in that city; where they entered into a conversation about the Cartesian philosophy, particularly Rohault's Physics, which Clarke's tutor, as he tells us, had put him upon translating. "The result of this conversation was, says Whiston, that I was greatly surprised that so young a man as Clarke then was, should know so much of those sublime discoveries, which were then almost a secret to all, but to a few particular mathematicians. Nor did I remember (continues he) above one or two at the most, whom I had then met with, that seemed to know so much of that philosophy as Mr. Clarke."

He afterwards turned his thoughts to divinity; and, having taken holy orders, in 1698 he succeeded Mr. Whiston as chaplain to Dr. Moore bishop of Norwich, who was ever after his constant friend and patron. In 1699 he published two treatises; the one on Baptism, Confirmation, and Repentance; the other, Reflections on that part of a book called Amyntor, or a Defence of Milton's Life, which relates to the writings of the primitive fathers, and the canon of the New Testament. In 1701 he published a Paraphrase upon the Gospel of St. Matthew; which was followed, in 1702, by the Paraphrases upon the Gospels of St. Mark and St Luke, and soon after by a third volume upon St. John. Mean while bishop Moore gave him the rectory of Drayton near Norwich, with a lectureship in that city. In 1704 he was appointed to preach Boyle's lecture; and the subject he chose was, the Being and Attributes of God. He succeeded so well in this, and gave so much satisfaction, that he was appointed to preach the same lecture the next year, when he chose for his subject, the Evidences of Natural and Revealed Religion. These sermons were first printed in two volumes, in 1705 and 1706; and contained some remarks on such objections as had been made by Hobbes and Spinoza, and other opposers of natural and revealed religion. In the sixth edition was added, a Discourse concerning the Connection of the Prophecies of the Old Testament, and the application of them to Christ. About this time, Mr. Whiston informs us, he discovered that Mr. Clarke (having read much of the primitive writers) began to suspect that the Athanasian doctrine of the Trinity was not the doctrine of those early ages; and it was particularly remarked of him, that he never read the Athanasian Creed at his parish church.

In 1706 he published a Letter to Mr. Dodwell, answering all the arguments in his epistolary discourse against the immortality of the soul. Bishop Hoadley observes, that in this letter he answered Mr. Dodwell in so excellent a manner, both with regard to the philosophical part, and to the opinions of some of the primitive writers, upon whom these doctrines were fixed, that it gave universal satisfaction. But this controversy did not stop here; for the celebrated Mr. Collins, coming in as a second to Dodwell, went much farther into the philosophy of the dispute, and, indeed, seemed to produce all that could be said against the immateriality of the soul, as well as the liberty of human actions. This enlarged the scene of the dispute; into which Clarke entered, and wrote with such a spirit of clearness and demonstration, as at once shewed him greatly superior to his adversaries in metaphysical and physical knowledge; making every intelligent reader rejoice that such an incident had happened to provoke and extort from him such excellent reasoning and perspicuity of expression. In the midst of these labours, Mr. Clarke found time to shew his regard to mathematical and philosophical studies, with his exact knowledge and skill in them. And his natural affection and capacity for these studies were not a little improved by the friendship of sir Isaac Newton; at whose request he translated his Optics into Latin in 1706. With this version sir Isaac was so highly pleased, that he presented him with the sum of 500l. or 100l. to each of his five children. The same year also, bishop Moore procured for him the rectory of St. Bennett's, Paul's Wharf, in London; and soon after carried him to court, and recommended him to the favour of queen Anne. She appointed him one of her chaplains in ordinary; and also presented him to the rectory of St. James's, Westminster, when it became vacant in

in 1709. Upon this occasion he took the degree of doctor of divinity, when the public exercise which he performed for it at Cambridge was highly admired.

The same year, 1709, Dr. Clarke revised and corrected Whiston's translation of the Apostolical Constitutions into English, at his earnest request. In 1712 he published a beautiful edition of Cæsar's Commentaries. And the same year, his celebrated book called the Scripture Doctrine of the Trinity. Whiston informs us, that some time before the publication of this book, there was a message sent to the author by lord Godolphin, and others of queen Anne's ministers, importing, "That the affairs of the public were with difficulty then kept in the hands of those that were for liberty; that it was therefore an unseasonable time for the publication of a book that would make a great noise and disturbance; and that therefore they desired him to forbear till a fitter opportunity should offer itself;" which message, says he, the doctor paid no regard to, but went on according to the dictates of his own conscience with the publication of his book. The ministers, however, were very right in their conjectures; for the work made noise and disturbance enough, and occasioned a great many books and pamphlets, written by himself and others. Nor were these the whole that his work occasioned; it rendered the author obnoxious to the ecclesiastical power, and his book was complained of by the lower house of convention. The doctor drew up a preface, and afterwards gave in several explanations, which seemed to satisfy the upper house; at least the affair was not brought to any issue, the members appearing desirous to prevent dissentions and divisions. In 1715 and 1716 he had a dispute with the celebrated Leibnitz, concerning the principles of natural philosophy and religion; and a collection of the papers which passed between them was published in 1717. This work was addressed to queen Caroline, then princess of Wales, who was pleased to have the controversy pass through her hands. It related chiefly to the subjects of liberty and necessity.

About the year 1718 he was presented by the lord Lechmere to the mastership of Wigston's hospital in Leicestershire. In 1724 and 1725 he published eighteen sermons, preached on several occasions. In 1727, on the death of sir Isaac Newton, he had the offer of succeeding him as master of the mint, a place worth 1500l. a year; but to this secular preferment he could not reconcile himself; and therefore absolutely refused it. In 1728 was published, a Letter from Dr. Clarke to Mr. Benjamin Hoadley, occasioned by the Controversy relating to the Proportion of Velocity and Force of Bodies in Motion; and printed in the Philosophical Transactions, No. 401. In the beginning of 1729 he published the first twelve books of Homer's Iliad: a work which bishop Hoadley calls an accurate performance; and his notes a treasury of grammatical and critical knowledge. And the same year came out his Exposition of the Church Catechism, and ten volumes of sermons; books so well known and so generally approved, that they need no recommendation. But the same year, on Sunday the 11th of May, going to preach before the judges at Serjeant's-inn, he was seized with a pain in his side, which made it impossible for him to perform his office. He was carried home, and continued under his disorder till the seventeenth of the same month, when he died, in the fifty-fourth year of his age, after long enjoying a vigorous state of health, having scarcely ever known sickness. Three years after the doctor's death, appeared the other twelve books of the Iliad, published in quarto by his son, Mr. Samuel Clarke, who says, in the preface, that his father had finished the annotations to the first three of those books, and as far as the 359th verse of the fourth; and had revised the text and version as far as verse 510 of the same book.

Dr. Clarke married Catherine, the only daughter of the reverend Mr. Lockwood, rector of Little Millingham, in the county of Norfolk, by whom he had seven children, four of whom survived him. Queen Caroline took great pleasure in the doctor's conversation and friendship, seldom missing a week in which she did not receive some proof of the greatness of his genius, and the force of his understanding. As to the character of Dr. Clarke, he is represented as remarkably humane and tender, free and affable in his conversation, and cheerful in his manner. Bishop Hare says of him, "He was a man who had all the good qualities that could meet together to recommend him. He was possessed of all the parts of learning that are valuable in a clergyman, in a degree that few possess any single one. He has joined to a good skill in the three learned languages, a great compass of the best philosophy and mathematics, as appears by his Latin works; and his English ones are such a proof of his own piety, and of his knowledge in divinity, and have done so much service to religion, as would make any other man, that was not under a suspicion of heresy, secure of the friendship of all good churchmen, especially the clergy. And to all this piety and learning was joined, a temper happy beyond expression; a sweet, easy, modest, obliging, behaviour adorned all his actions; and neither passion, vanity, insolence, or ostentation, appeared either in what he said or wrote. This is the learning, this the temper of the man, whose study of the scriptures has betrayed him into a suspicion of some heretical opinions. Bishop Hoadley, too, having remarked how great the doctor was in all branches of learning, adds, if in any one of these he had excelled only so much as he did in all, he would have been justly entitled to the character of a great man; but there is something so very extraordinary, that the same person should excel not only in those parts of knowledge which require the strongest judgment, but in those which require the greatest memory too. So that, in a very high degree, divinity and mathematics, experimental philosophy and classical learning, metaphysics and critical skill, were united in Dr. Clarke.

CLARKE (Samuel), a writer of considerable note, who was, during the interregnum, and at the time of the ejection, minister of St. Bennet Fink in London. He was one of the commissioners at the Savoy, and behaved with great decency and moderation. He was esteemed by all that knew him for his probity and industry. Died the 25th of December 1682. The most valuable of his writings are, 1. his Lives of the Puritan Divines; 2. his Martyrology; 3. his Marrow of Ecclesiastical History; and, 4. his Lives of several eminent persons.

CLARKE (William), an English divine, born at Haghmon-Abbey in Shropshire, in 1696; after a grammar education at Shrewsbury school, he was sent to St. John's college, Cambridge, of which he was elected fellow, January 1717. He was presented by archbishop Wake, in 1724, to the rectory of Buxted in Sussex, at the particular recommendation of Dr. Wotton; and, in 1738, was elected prebendary and residentiary of Chichester; and, in 1770, chancellor of that church, and vicar of Amport in Hampshire, which he did not long enjoy, dying Oct. 21, 1771. He married a daughter of the learned Dr. Wotton, by whom he left a son and daughter; the son, Edward Clarke, published some "Letters concerning the Spanish Nation," in 1763. He wrote a learned preface to Dr. Wotton's "Collection of the Welch Laws;" but his principal work, in which he introduced the famous Chichester inscription, is, "The Connection of the Roman, Saxon, and English, Coins," 1767, 4to. He resigned Buxted to his son, November 4, 1768, after having held that rectory more than thirty-four years.

CLARKE, a county of the American States, in Kentucky, between the head waters of Kentucky and Licking rivers. Its chief town is Winchester.

CLARKS'BURG, a town of the American States, in Harrison county, Virginia. It contains a court-house and jail, and stands on the east side of Monongahela river: forty miles south-west of Morgantown.

CLARKS'TOWN, a town of the American States, in Orange county, New York, on the west side of the Tappan

pan sea, two miles distant; and from New York city, twenty-nine miles. By the state census of 1796, 224 of its inhabitants are electors.

CLARKS'VILLE, the chief town of what was till lately called Tennessee county, in the state of Tennessee, belonging to the American States, pleasantly situated on the east bank of Cumberland river; and at the mouth of Red River. It contains a court-house and jail: forty-five miles north west of Nashville, 220 north-west by west of Knoxville, and 940 west by south of Philadelphia. Lat. 37. 2. N. lon. 87. 45. W. Greenwich.

CLARKS'VILLE, a small settlement of the American States in the north-west territory. It is situated on the northern bank of the Ohio, opposite Louisville, a mile below the Rapids, and 100 miles south-east of Post Vincent.

CLAR'THY, a river of Wales, in the county of Cardigan, which joins the Clarwen, at the north-west extremity of the county of Brecknock.

CLA'RUS, in ancient geography, a town of Ionia, famous for an oracle of Apollo. It was built by Manto, daughter of Tiresias, who fled from Thebes, after it had been destroyed by the Epigoni. She was so afflicted with her misfortunes, that a lake was formed with her tears, where she first founded the oracle. Apollo was from thence surnamed Clarius. *Ovid.*—An island of the Ægean, between Tenedos and Scios. *Thucydides.*

CLAR'WEN, a river of Wales, which runs into the Wye, near Rhyader Gawy.

CLA'RY, *s.* in botany. See SALVIA.

To CLASH, *v. n.* [*kletsen*, Dut. to make a noise] To make a noise by mutual collision; to strike one against another:

Three times, as of the *clashing* sound
Of arms, we heard. *Denham.*

To act with opposite power, or contrary direction.—Neither was there any queen-mother who might *clash* with his counsellors for authority. *Bacon.*—To contradict; to oppose.—The absurdity in this instance is obvious; and yet every time that *clashing* metaphors are put together, this fault is committed. *Spectator.*

To CLASH, *v. a.* To strike one thing against another, so as to produce a noise:

The nodding statue *clash'd* his arms,
And with a sullen sound, and feeble cry,
Half sunk, and half pronounc'd the word of victory.
Dryden.

CLASH, *s.* A noisy collision of two bodies:

He nobly seiz'd thee in the dire alarms
Of war and slaughter, and the *clash* of arms. *Pope.*

Opposition; contradiction:

Then from the *clashes* between popes and kings,
Debate, like sparks from flint's collision, springs. *Denh.*

CLAS'MIUM, *s.* A trivial name of a genus of fossils, of the class of the gypsums. See MINERALOGY.

CLASP, *s.* [*chespe*, Dut.] A hook to hold any thing close; as a book, or garment:

The scorpion's claws here grasp a wide extent,
And here the crab's in lesser *clasps* are bent. *Addison.*

An embrace, in contempt:

Your fair daughter,
Transported with no worse nor better guard,
But with a knave of hire, a gondolier,
To the gross *clasps* of a lascivious Moor. *Shakespeare.*

To CLASP, *v. a.* To shut with a clasp.—Sermons are the keys of the kingdom of heaven, and do open the scriptures; which being but read, remain, in comparison, still *clasped*. *Hooker.*

There Caxton slept, with Wynkin at his side;
One *clasp'd* in wood, and one in strong cow hide. *Pope.*

To catch and hold by twining.—Direct the *clasping* ivy where to climb. *Milton.*—To hold with the hands extended; to inclose between the hands.—Occasion turneth the handle of the bottle first to be received; and after the belly, which is hard to *clasp*. *Bacon.*—To embrace:

Now, now he *clasps* her to his panting breast;
Now he devours her with his eager eyes. *Smith.*

To inclose:

Boys, with womens' voices,
Strive to speak big, and *clasp* their female joints
In stiff unweildy arms against thy crown. *Shakespeare.*

CLASP'ER, *s.* The tendrils or threads of creeping plants, by which they cling to other things for support.—The tendrils or *claspers* of plants are given only to such species as have weak and infirm stalks. *Ray.*

CLASP'KNIFE, *s.* A knife which folds into the handle.

CLASS, *s.* [from *classis*, Lat.] A rank or order of persons.—Segrais has distinguished the readers of poetry, according to their capacity of judging, into three *classes*. *Dryden.*—A number of boys learning the same lesson at the school.—We shall be seized away from this lower *class* in the school of knowledge, and our conversation shall be with angels and illuminated spirits. *Watts.*—A set of beings or things; a number ranged in distribution, under some common denomination:

Whate'er of mongrel, no one *class* admits
A wit with dunces, and a dunce with wits. *Pope.*

In extensive libraries, it means the divisions or compartments into which the different books of science, history, divinity, &c. are divided or arranged.

To CLASS, *v. a.* To range according to some stated method of distribution; to range according to different ranks.—I considered that, by the *classing* and methodizing such passages, I might instruct the reader. *Arbuthnot.*

CLAS'SENDORF, a town of Bohemia, in the circle of Leitmeritz: five miles north of Kamnitz.

CLAS'SIC, or CLAS'SICAL, *adj.* [*classicus*, Lat.] Relating to antique authors; relating to literature:

Poetic fields encompass me around,
And still I seem to tread on *classic* ground. *Addison.*

Of the first order or rank.—From this standard the value of the Roman weights and coins are deduced: in the settling of which I have followed Mr. Greaves, who may be justly reckoned a *classical* author on this subject. *Arbuth.*

CLAS'SIC, *s.* [*classicus*, Lat.] An author of the first rank: usually taken for ancient authors.—The *classics* of an age that heard of none. *Pope.*

CLAS'SIS, *s.* [Lat.] Order; sort; body.—He had declared his opinion of that *classis* of men, and did all he could to hinder their growth. *Clarendon.*

CLATHROI'DES and CLATHROIDAS'TRUM, *s.* in botany. See CLATHRUS.

CLA'THRUS, *s.* in botany, a genus of fungi, instituted by Micheli. Roundish, consisting of a reticular, windowed, hollow body; the ramifications connected on every side. There are only four species recited by Linnæus; Hudson has eight species; seven species are figured by Bolton. In Dr. Withering's Botanical Arrangement, the name *trichia* is adopted from Haller; and he has eleven species, comprehending some of Linnæus's mucors, the sphærocarpus of Bulliard, and the lycoperdon rufum of Dickson.

The essential character there given is, that it grows in clusters, mostly fixed to a membranaceous base. Capsules globular or oblong; seeds escaping from its whole surface through openings made by the separations of the fibres. They are found chiefly on rotten wood.

A very curious description of the *scarlet clathrus*, is given in a letter of Mr. Thomas Flintoff, of Gainsborough, of which the following is an extract: "I have inclosed a specimen of a wonderful little plant. The stalk is about a line

a line in length, bearing at the top a round head, about the size of a rape seed, at the first very tender, and contains a liquor like milk; from that they turn to a beautiful orange colour, and after that to an olive. When mature, and fit for examination, I looked at a great many of them through the explacator; and some amongst them were just opening at the top: one of these I laid on the talc in the slider, and viewed it through the silver speculum. At the first I was much surprised to see a part of the fibres, that had got through the rupture, moving like the legs of a fly when laid on its back. I then burst it with the point of a pin, and was surprised still more, when I saw it had the appearance of a little bundle of worms entangled together, or fibres all alive. I next took the little bundles of fibres quite out, and the animal motion was then so exceeding strong as to turn it half round, first one way and then another, and two or three times it got out of the focus. Almost every fibre had a different motion; some of them twined one round another, and then untwined again, while others were bending, extending, coiling, waving, &c. The fibres had many little balls adhering to their sides, which I take to be the seeds; I observed many of these were disengaged at every motion of the fibres. I distinguished many of the fibres, and they appeared under the lens as thick as a horse-hair, and were all exactly of the same length, which was, to my apprehension, about two inches; they were smallest at each end, which, together with their vermicular motion, gave them the strongest resemblance of little live worms. I examined many of them, at various times, and always found the motion precisely the same; but strongest when recent, and on the first bursting. The seeds appeared like gunpowder finely granulated."

To CLAT'TER, *v. n.* [clatrunge, a rattle, Sax.] To make a noise by knocking two sonorous bodies frequently together:

Now the sprightly trumpet from afar
Had rous'd the neighing steeds to scour the fields,
While the fierce riders *clatter'd* on their shields. *Dryden.*

To utter a noise by being struck together.—All that night was heard an unwonted *clattering* of weapons, and of men running to and fro. *Knolles.*—To talk fast and idly.—All those airy speculations, which bettered not men's manners, were only a noise and *clattering* of words. *Decay of Piety.*

To CLAT'TER, *v. a.* To strike any thing so as to make it sound and rattle:

When all the bees are gone to settle,
You *clatter* still your brazen kettle. *Swift.*

To dispute, jar, or clamour: *a low word.*

CLAT'TER, *s.* A rattling noise made by the frequent and quick collision of sonorous bodies. A *clatter* is a *clash* often repeated with great quickness, and seems to convey the idea of a sound sharper and shriller than *rattle.*—I have seen a monkey overthrow all the dishes and plates in a kitchen, merely for the pleasure of seeing them tumble, and hearing the *clatter* they made in their fall. *Swift.*—It is used for any tumultuous and confused noise.

CLA'VA HERCULIS. See ZANTHOXYLUM.

CLAVA'RIA, *s.* in botany, a genus of fungi; one of the lowest order in the scale of vegetation, differing sometimes very little in substance from the rotten wood whence it issues. It is a smooth oblong body, of one uniform substance. Thirteen species are recited in the Systema Vegetabilium; five simple, and the rest branched. In Withering's Botanical Arrangement there are twenty species, besides many varieties. They are figured by Schæffer, Micheli, Bulliard, Bolton, Dickson, &c. In Dr. Withering's work, the essential character is, fungus oblong, upright, club-shaped; seeds emitted from every part of its surface.

CLA'VATED, *adj.* [*clavatus*, Lat.] Knobbed; set with knobs.—These appear plainly to have been *clavated* spikes of some kind of echinus ovarius. *Woodward.*

CLAU'BERGE (John), a learned professor of philosophy and divinity at Duisburg, born at Solingen in 1622. He travelled into Holland, France, and England; and in each country obtained the esteem of the learned. The elector of Brandenburg gave him public testimonies of his esteem. He died in 1665. His works were printed at Amsterdam, in 2 vols. 4to. The most celebrated of these is his treatise, entitled *Logica vetus et nova,* &c.

CLAUDE of Lorraine, a celebrated landscape painter, and a striking example of the efficacy of industry to call forth genius. Claude was born in 1600; and, being dull and heavy at school, was put apprentice to a pastry-cook; he afterwards went to Rome to seek a livelihood; but being ill-bred, and unacquainted with the language, no body cared to employ him. Chance at length threw him in the way of Augustino Trasso, who hired him to grind his colours, and to do his household drudgery, as he kept no other servant. His master, hoping to make him serviceable in some of his greatest works, taught him, by degrees, the rules of perspective, and the elements of design. Claude, thus encouraged, and not failing in application, came at length to cultivate the art with wonderful eagerness. He exerted his utmost industry to explore the true principles of painting by an incessant examination of nature, that genuine source of excellence; for which purpose he made his studies in the open fields, where he very frequently continued from sun-rise till the dusk of the evening. Hence he perfected his landscapes in such a manner, as made them superior to those of all the other artists of his day. The beauties of his paintings are derived from nature herself, which he examined with uncommon assiduity; and Sandrat relates, that Claude used to explain to him, as they walked through the fields, the causes of the different appearances of the same prospect at different hours of the day, from the reflections or refractions of light, from dews or vapours, in the evening or morning, with all the precision of a philosopher. Whatever struck his imagination, while he observed nature abroad, was so strongly impressed on his memory, that, on his return to his work, he made the happiest use of it. His skies are warm and full of lustre, and every object is properly illumined. His perspective is admirable; and in every part a delightful union and harmony excite our applause and our admiration. His invention is pleasing, his colouring delicate, and his tints have a most agreeable sweetness and variety. He frequently gave uncommon beauty to his finished trees by glazing; and, in his large compositions which he painted in fresco, he was so exact that the distinct species of every tree might readily be distinguished. His pictures are now so rare, especially such as are perfect, that no price is thought superior to their merit.

CLAUDE (John), a protestant divine, born in France in 1619. Mess. de Port Royal, using their endeavours to convert M. de Turenne to the catholic faith, presented him with a book calculated for that end, which his lady engaged Mr. Claude to answer; and his performance gave rise to the most famous controversy ever carried on in France between the catholics and protestants. On the revocation of the edict of Nantz, he retired to Holland, where he met with a kind reception, and was honoured with a considerable pension by the prince of Orange. He died in 1687; and left a son, Isaac Claude, whom he lived to see minister of the Walloon church at the Hague, and who published several excellent works of his deceased father.

CLAU'DENT, *adj.* [*claudens,* Lat.] Shutting; inclosing; confining.

CLAU'DIA, a patrician family at Rome, descended from Clausus a king of the Sabines. It gave birth to many illustrious patriots.

CLAU'DIA, a vestal virgin accused of incontinence. To shew her innocence, she offered to remove a ship which had brought the image of Vesta to Rome, and had stuck in one of the shallow places of the river. This had already baffled

baffled the efforts of a number of men; and Claudia, after addressing her prayers to the goddess, untied her girdle, and with it easily dragged after her the ship to shore, and by this action was honourably acquitted. *Val. Maximus.*

CLAUDIA'NUS, a celebrated poet in the age of Honorius and Arcadius, who seems to possess all the majesty of Virgil, without being a slave to the corrupted style which prevailed in his age. Scaliger observes, that he has supplied the poverty of his matter, by the purity of his language, the happiness of his expressions, and the melody of his numbers. As he was the favourite of Stilicho, he retired when his patron was disgraced, and passed the rest of his life in retirement, and learned ease. His poems on Rufinus and Eutropius, seem to be the best of his compositions. The best editions of his works are, that of Burman, 2 vols. 4to. Amst. 1760; and that of Gesner, 2 vols. 8vo. Lipf. 1758.

To CLAU'DICATE, *v. n.* [*claudico*, Lat.] To halt; to limp.

CLAUDICA'TION, *f.* [from *claudicatio*, Lat. to halt.] The act or habit of halting or limping, as when one leg is shorter than the other.

CLAU'DIUS, a Roman emperor. See ROME.

CLAVE, [the preterite of *cleave*.] See CLEAVE.

CLA'VELLATED, *adj.* [*clavellatus*, low Lat.] Made with burnt tartar: a chemical term.—Air, transmitted through *clavellated* ashes into an exhausted receiver, loses weight as it passes through them. *Arbuthnot.*

CLA'VER, *f.* [lapen pýnt, Sax.] A trefoil grass. This is now universally written *clover*, though not so properly. See CLOVER.

CLA'VES IN'SULÆ, a term used in the Isle of Man; where all weighty and ambiguous causes are referred to a jury of twelve, who are called *claves insulæ*, the keys of the island.

CLA'VICHORD, and CLAVICITHE'RIUM, *f.* Two musical instruments used in the 16th century. They were of the nature of the spinet, but of an oblong figure.

CLAVICLE, *f.* [*clavicula*, Lat.] The collar bone.—Some quadrupeds can bring their fore feet unto their mouths; as most that have *clavicles*, or collar bones. *Brown.*

CLAVICYMBAL'LUM, *f.* An antique musical instrument with thirty strings. Modern writers apply the name to our harpsichord.

CLAVIE'RE (Pierre), celebrated among the French revolutionists as the inventor of assignats. He was a native of Geneva, from whence he was driven into exile on the prevalence of the party he opposed. He attained great celebrity by his knowledge of the finances and resources of France; and was constantly consulted by Mirabeau, who was indebted to him for much of his reputation. Being a leading member of the jacobin club, he was introduced to Louis XVI. and was made minister of France, a promotion which he afterwards severely expiated. Pursued by the anarchists, he was thrown into those dungeons where Robespierre crowded his victims; and, having received a copy of the accusations against him, which he saw were to be supported by his deadliest foes, he put an end to his life with a dagger, in September 1793.

CLAVI'JO, a village of Spain, in Old Castile; remarkable for a victory obtained by king Ramira over the Moors: two leagues from Logronno.

CLA'VIUS (Christopher), an eminent mathematician, born at Bamberg in Germany, in 1537, and became a jesuit. They sent him to Rome, where he was considered as the Euclid of his age; and pope Gregory XIII. employed him, with other learned men, in the correction of the calendar. Clavius acquitted himself well, and defended the new calendar against Joseph Scaliger, who had attacked it with his usual malignity. The works of Clavius, of which the principal are his Arithmetic, and Commentaries upon Euclid, have been printed in five volumes, fol. He died at Rome in 1612.

CLA'VO, a town of the island of Corsica: eight miles east-south-east of Ajaccio.

CLAUS, a town of Germany, in the county of Bregentz: one mile north-north-east of Bregentz.

CLAUSE, *f.* [*clausula*, Lat.] A sentence; a single part of a discourse; a subdivision of a larger sentence; so much of a sentence as is to be construed together.—God may be glorified by obedience, and obeyed by performance of his will, although no special *clause* or sentence of scripture be in every such action set before mens' eyes to warrant it. *Hooker.*—An article, or particular stipulation.—When, after his death, they were sent both to Jews and Gentiles, we find not this clause in their commission. *South.*

CLAUSE ROLLS, in law, contain all such matters of record as were committed to close writs: these rolls are preserved in the Tower.

CLAU'SEN, a town of Germany, in the Tyrolese: six miles south-west of Brixen. This town was taken by the French republican army, in the spring of 1797, after an obstinate battle with the Austrians, in which they lost 500 prisoners.

CLAU'SEN, a town of Germany, in the circle of the Lower Rhine, and electorate of Treves; where a battle was fought in the year 1735: five miles south of Wittick.

CLAU'SENBURG. See COLOSVAR.

CLAUS'THAL, a town of Germany, in the circle of Lower Saxony, and principality of Grubenhagen, containing 800 houses: there are two churches, an house of orphans, a public school, a small garrison, and a mint for coining money; near it are silver mines: fifteen miles south of Goslar.

CLAUS'TRAL, *adj.* [from *claustrum*, Lat.] Relating to a cloister, or religious house.—*Claustral* priors are such as preside over monasteries, next to the abbot or chief governor in such religious houses. *Ayliffe.*

CLAUS'TRUM, [from *claudo*, to shut.] Any aperture which has a power of contracting itself, or of closing its orifice by any means; as the passage to the throat.

CLAU'SUM FREGIT. See the article CAPIAS, vol. iii. p. 763.

CLAU'SURE, *f.* [*clausura*, Lat.] Confinement; the act of shutting; the state of being shut.—In some monasteries the severity of the *clausure* is hard to be borne. *Geddes.*

CLAUSZ, a town of Germany, in the archduchy of Austria: seventeen miles south-south-west of Steyr.

CLAUSZ'NITZ, a town of Germany, in the circle of Upper Saxony, and circle of Erzgebirg: fourteen miles south-south-east of Freyberg.

CLAUTH'MUS, [from κλαιω, to weep.] Weeping, the shedding of tears, a concomitant of several diseases.

CLA'VUS, *f.* An ornament upon the robes of the Roman senators and knights, which was more or less broad according to the dignity of the person; hence the distinction of *tunica angusti-clavia* and *lati-clavia*.

CLA'VUS, [from *claudo*, to shut.] A surgical instrument, made to close the ulcerated aperture in the palate. A corn, or any protuberant induration which resembles the head of a nail. An hysteric affection of the head, which has the sensation of a nail having been driven into the scull.

CLAW, *f.* [clapan, Sax.] The foot of a beast or bird, armed with sharp nails; or the pincers or holders of a shell-fish:

I saw her range abroad to seek her food,
T' embrue her teeth and *claws* with lukewarm blood.
Spenser.

Sometimes a hand, spoken of in contempt.

To CLAW, *v. a.* [clapan, Sax.] To tear with nails or claws.—Look, if the wither'd elder hath not his poll *claw'd* like a parrot. *Shakespeare.*—To pull, as with the nails.—I am afraid we shall not easily *claw* off that name. *South.*—To tear or scratch in general:

They for their own opinions stand fast,
Only to have them *claw'd* and canvass'd. *Hudibras.*

To scratch or tickle.—I must laugh when I am merry, and

and *claw* no man in his humour. *Shakespeare.*—To flatter: *an obsolete sense.* To *claw off*, or *away.* To scold; to rail at.—You thank the place where you found money; but the jade fortune is to be *clawed away* for it, if you should lose it. *L'Estrange.*

CLAW'BACK, *s.* A flatterer; a sycophant; a wheedler.—The pope's *clawbacks. Jewel.*

CLAW'ED, *adj.* Furnished or armed with claws.—Among quadrupeds, of all the *clawed*, the lion is the strongest. *Grew.*

CLAW'EDOK, a river of Denbighshire, in North Wales, which runs into the Cloyd, four mile north of Ruthin.

CLAY, *s.* [*clai*, Welsh; *kley*, Dut.] Unctuous and tenacious earth, such as will mould into various forms. See MINERALOGY, HUSBANDRY, POTTERY, and PORCELAIN.

Deep Acheron,
Whose troubled eddies, thick with ooze and *clay*,
Are whirld aloft. *Dryden.*

In poetry. Earth in general; the terrestrial element:

Why should our *clay*
Over our spirits so much sway? *Donne.*

To CLAY, *v. a.* To cover with clay; to manure with clay.—This manuring lasts fifty years: then the ground must be *clayed* again. *Mortimer.*

CLAY, a lake of Ireland, in the county of Armagh: seven miles south of Armagh.

CLAY, a small town on the north coast of the county of Norfolk, having an harbour. It has large saltworks, from whence salt is sent to Holland and the Baltic, as well as to the coast of England: it is twenty-eight miles from Lynn.

CLAY-COLD, *adj.* Lifeless; cold as the unanimated earth:

I wash'd his *clay-cold* corse with holy drops,
And saw him laid in hallow'd ground. *Rowe.*

CLAY-PIT, *s.* A pit where clay is dug.

CLAYE, a town of France, in the department of the Seine and Loire, and chief place of a canton, in the district of Meaux: two leagues and a half west of Meaux, and five east of Paris.

CLAYES, *s.* [*claye*, Fr. in fortification.] Wattles made with stakes interwove with osiers, to cover the lodgments.

CLAYET'TE (La), a town of France, in the department of the Saone and Loire, and chief place of a canton, in the district of Marcigny: three leagues and a half east-north-east of Marcigny.

CLAY'EY, *adj.* Consisting of clay; abounding with clay.—Some in a lax or sandy, some in heavy or *clayey*, soil *Derham.*

CLAY'ISH, *adj.* Partaking of the nature of clay; containing particles of clay.—Small beer proves an unwholesome drink; perhaps, by being brewed with a thick, muddish, and *clayish*, water, which the brewers covet. *Harvey.*

CLAY'MARL, *s.* A whitish, smooth chalky, clay.—*Claymarl* resembles clay, and is near a-kin to it; but is more fat, and sometimes mixed with chalk-stones. *Mort.*

CLAY'TON (Dr. Robert), a prelate of great learning, of distinguished worth and probity, and a respectable member of the Royal and Antiquarian Societies at London, was advanced to the bishopric of Killala in Ireland, January, 23, 1729; translated to the see of Cork, December 19, 1735; to that of Clogher, August, 26, 1745; and died much lamented, February 25, 1758. His publications are, 1. A Letter in the Philosophical Transactions, No. 461. p. 813. giving an account of a Frenchman seventy years old, (at Inishanan, in his diocese of Corke,) who gave suck to a child. 2. Chronology of the Hebrew Bible vindicated, &c. 1751, 4to. 3. An impartial Inquiry into the Time of the coming of the Messiah, 1751, 8vo. 4. Essay on Spirit, 1751, 8vo. 5. Vindication of the Histories of the Old and New Testament, in answer to the Objections of the late lord Bolingbroke; in two Letters to a young Nobleman, 1752, 8vo, reprinted in 1753. 6. A Defence of the Essay on Spirit, 1753, 8vo. 7. A Journal from Grand Cairo to Mount Sinai, and back again, translated from a manuscript written by the prefetto of Egypt, in company with some missionaries *de propagandâ fide* at Grand Cairo; to which are added, Remarks on the Origin of Hieroglyphics, and the Mythology of the ancient Heathens, 1753, 8vo. two editions, 4to. and 8vo. It was soon after this publication that his lordship became (in March 1754) a fellow of the Society of Antiquaries. 8. Thoughts on Self-love, Innate Ideas, Free-will, Taste, Sentiments, Liberty, and Necessity, &c. occasioned by reading Mr. Hume's works, and the short treatise written in French by lord Bolingbroke on Compassion, 1754, 8vo. 9. A Vindication of the Histories of the Old and New Testament, part 2. adorned with several explanatory cuts, 1754, 8vo. 10. Letters between the bishop of Clogher and Mr. William Penn, concerning Baptism, 1755, 8vo. 11. A Speech made in the House of Lords in Ireland, on Monday, February 2, 1756, for omitting the Nicene and Athanasian Creeds out of the Liturgy, 1756, 8vo. 12. A Vindication, part iii. 1758, 8vo. The three parts of the Vindication, with the Essay on Spirit, were reprinted by Mr. Bowyer, in 1 vol. 8vo. 1759; with some additional notes, and an index of texts of scripture illustrated or explained.

CLAYTO'NIA, *s.* [from Mr. *John Clayton*, who collected plants chiefly in Virginia, and sent them to Gronovius, who published them in his Flora Virginica.] In botany, a genus of the class pentandria, order monogynia, natural order succulentæ. The generic characters are—Calyx: perianthium bivalve, ovate, tranverse at the base. Corolla: petals five, obcordate, with claws, emarginate. Stamina: filaments five, subulate, recurve, a little shorter than the corolla, each inserted into the claw of each petal; antheræ oblong, incumbent. Pistillum: germ roundish; style simple, the length of the stamens; stigma trifid. Pericarpium: capsule roundish, three-celled, three-valved, elastic. Seeds: three, round.—*Essential Character.* Calyx, two-valved; corolla, five petalled; stigma, trifid; capsule, three-valved, one-celled, three-seeded.

Species. 1. Claytonica Virginica, or Virginian Claytonia: leaves linear-lanceolate; petals entire. This has a small tuberous root, which sends out slender stalks in the spring, about three inches high, having each two or three succulent narrow leaves about two or three inches long, of a deep green colour. At the top of the stalk four or five flowers are produced in a loose bunch; petals spreading, white spotted, with red on their inside: the flowers appear in April, and the seeds ripen in June. It grows naturally in Virginia, whence it was sent by Mr. Clayton, and cultivated by Mr. Miller before the year 1759. The leaves are linear, and the calyxes obtuse. There is a variety with lanceolate leaves, and acutish calyxes.

2. Claytonia Sibirica, or Siberian Clatonia: leaves ovate. This is a low plant, seldom rising more than two or three inches high. The root is tuberous, as in the other; flowers red.

Propagation and Culture. The plants are both propagated by seeds, and also from offsets sent out from the roots; the seeds should be sown upon a shady border of light earth, or in pots filled with the like mould, soon after they are ripe; for, if they are kept out of the ground till the spring, the plants will not come up till the next year; whereas those which are sown early in the autumn, will grow the following spring, so that a whole year is gained. When the plants come up, they will require no other care but to keep them clean from weeds; and, in the autumn, if some old tanners' bark is spread over the surface of the ground, it will secure the roots from being injured by frost; but in mild winters they will not require protection. The best time to transplant the roots is about Michaelmas, when they are inactive; but, as they are small, if

if great care is not taken in opening the ground, the roots may be buried and loſt; for, being of a dark colour, they are not eaſily diſtinguiſhed from the ground. See PORTULACARIA.

CLAZO'MENÆ, or CLAZOMENA, in ancient geography, a city of Ionia, on the coaſt of the Ægean ſea, between Smyrna and Chios. It was founded in the year of Rome 98, by the Ionians, and gave birth to Anaxagoras and other illuſtrious men.

CLEAN, *adj.* [*glan*, Welſh; clæne, Sax.] Free from dirt or filth; as, *clean* water.—They make *clean* the outſide of the cup and of the platter, but within they are full of extortion and exceſs. *Matthew.*—Free from moral impurity; chaſte; innocent; guiltleſs. Create in me a *clean* heart, O God! *Pſalms.*—Elegant; neat; not unwieldy; not encumbered with any thing uſeleſs or diſproportioned. The timber and wood are in ſome trees more *clean*, in ſome more knotty. *Bacon.*

Yet thy waiſt is ſtraight and *clean*
As Cupid's ſhaft, or Hermes' rod. *Waller.*

Not foul with any loathſome diſeaſe; not leprous.—If the plague be ſomewhat dark, and ſpread not in the ſkin, the prieſt ſhall pronounce him *clean*. *Leviticus.*—Dextrous, not bungling, feat: as, a *clean* trick; a *clean* leap; a *clean* boxer.

CLEAN, *adv.* Quite; perfectly; fully; completely. *This ſenſe is now little uſed.* Without miſcarriage; in a dextrous manner:

Pope came off *clean* with Homer; but they ſay,
Broome went before, and kindly ſwept the way. *Henley.*

To CLEAN, *v. a.* to free from dirt or filth:

Their tribes adjuſted, *clean'd* their vig'rous wings,
And many a circle, many a ſhort eſſay,
Wheel'd round and round. *Thomſon.*

CLEAN LOUGH, a lake of Ireland, in the county of Leitrim: ten miles eaſt-ſouth-eaſt of Sligo.

CLEAN'LILY, *adv.* In a cleanly manner.

CLEAN'LINESS, *ſ.* Freedom from dirt or filth.—I ſhall ſpeak nothing of the extent of this city, the *cleanlineſs* of its ſtreets, nor the beauties of its piazza. *Addiſon.*—Neatneſs of dreſs; purity; the quality contrary to negligence and naſtineſs:

From whence the tender ſkin aſſumes
A ſweetneſs above all perfumes;
From whence a *cleanlineſs* remains,
Incapable of outward ſtains. *Swift.*

CLEAN'LY, *adj.* Free from dirtineſs; careful to avoid filth; pure in the perſon.—An ant is a very *cleanly* inſect, and throws out of her neſt all the ſmall remains of the corn on which ſhe feeds. *Addiſon.*—That which makes cleanlineſs:

In our fantaſtic climes, the fair
With *cleanly* powder dry their hair. *Prior.*

Pure; innocent; immaculate.—Perhaps human nature meets few more ſweetly reliſhing and *cleanly* joys, than thoſe that derive from ſucceſsful trials. *Glanville.*—Nice; addreſsful: artful:

Through his fine handling, and his *cleanly* play,
All thoſe royal ſigns had ſtole away. *Spenſer.*

CLEAN'LY, *adv.* Elegantly; neatly; without naſtineſs.—If I do grow great, I'll leave ſack, and live *cleanly*, as a nobleman ſhould. *Shakeſpeare.*

CLEAN'NESS, *ſ.* Neatneſs; freedom from filth. Eaſy exactneſs; juſtneſs; natural, unlaboured correctneſs.—He minded only the clearneſs of his ſatire, and the *cleanneſs* of expreſſion. *Dryden.*—Purity; innocence.—The *cleanneſs* and purity of one's mind is never better proved, than in diſcovering its own faults at firſt view. *Pope.*

To CLEANSE, *v. a.* [clænſian, Saxon.] To free from filth or dirt, by waſhing or rubbing:

Cleanſe the pale corpſe with a religious hand
From the polluting weed and common ſand. *Prior.*

To purify from guilt.—The blueneſs of a wound *cleanſeth* away evil. *Proverbs.*

Not all her od'rous tears can *cleanſe* her crime,
The plant alone deforms the happy clime. *Dryden.*

To free from noxious humours by purgation:

Canſt thou not miniſter to a mind diſeas'd,
And, with ſome ſweet oblivious antidote,
Cleanſe the ſtuff'd boſom of that perilous ſtuff
Which weighs upon the heart? *Shakeſpeare.*

To free from leproſy.—Shew thyſelf to the prieſt, and offer for thy *cleanſing* thoſe things which Moſes commanded. *Mark.*—To ſcour; to rid of all offenſive things. This river the Jews proferred the pope to *cleanſe*, ſo they might have what they found. *Addiſon.*

CLEAN'SER, *ſ.* [clænſere, Sax.] That which has the quality of evacuating any foul humours, or digeſting a ſore; a detergent.—If there happens an impoſthume, honey, and even honey of roſes, taken inwardly, is a good *cleanſer*. *Arbuthnot.*

CLEAN'THES, a ſtoic philoſopher, ſucceſſor of Zeno. He was ſo poor, that to maintain himſelf, he uſed to draw out water for a gardener in the night, and ſtudy in the day time. Cicero calls him the father of the ſtoics; and in reſpect to his virtues, the Roman ſenate raiſed a ſtatue to him in Aſſos. It ſaid that he ſtarved himſelf in his 90th year, before Chriſt 240. *Strabo.*

CLEAR, *adj.* [*clair*, Fr. *klaer*, Dutch; *clarus*, Lat.] Bright; tranſpicuous; pellucid; tranſparent; luminous; without opacity or cloudineſs; not nebulous; not opaceous; not dark:

The ſtream is ſo tranſparent, pure, and *clear*,
That had the ſelf-enamoured youth gaz'd here,
He but the bottom, not his face, had ſeen. *Denham.*

Perſpicacious; ſharp:

Michael from Adam's eyes the film remov'd,
Which that falſe fruit, that promis'd *clearer* ſight,
Had bred. *Milton.*

Cheerful; not clouded with care or anger.

Sternly he pronounc'd
The rigid interdiction, which reſounds
Yet dreadful in mine ear, though in my choice
Not to incur; but ſoon his *clear* aſpect
Return'd, and gracious purpoſe thus renew'd. *Milton.*

Free from clouds: ſerene.

And the *clear* ſun on his wide watery glaſs
Gaz'd hot. *Milton.*

Without mixture; pure; unmingled; perſpicuous; not hard to be underſtood; not ambiguous.—We pretend to give a *clear* account how thunder and lightning is produced. *Temple.*—Indiſputable; evident; undeniable:

Remain'd to our almighty foe
Clear victory; to our part loſs, and rout
Through all the empyrean. *Milton.*

Apparent; manifeſt; not hid; not dark.—Unto God, who underſtandeth all their ſecret cogitations, they are *clear* and manifeſt. *Hooker.*—Quick to underſtand; prompt; acute:

Mother of ſcience, now I feel thy power
Within me *clear*, not only to diſcern
Things in their cauſes, but to trace the ways
Of higheſt agents, deem'd however wiſe. *Milton.*

Unſpotted; guiltleſs; irreproachable.—Repentance ſo altereth

altereth and changeth a man through the mercy of God, be he never so defiled, that it maketh him pure and *clear.* *Whitgifte.*

Statesman, yet friend to truth, in soul sincere,
In action faithful, and in honour *clear.* *Pope.*

Unprepossessed; not preoccupied; impartial.—Leucippe, of whom one look, in a *clear* judgment, would have been more acceptable than all her kindness so prodigally bestowed. *Sidney.*—Free from distress, prosecution, or imputed guilt:

The cruel corp'ral whisper'd in my ear,
Five pounds, if rightly tipt, would set me *clear.* *Gay.*

Free from deductions or incumbrances.—Hope, if the success happens to fail, is *clear* gain as long as it lasts. *Collier.*

I often wish'd that I had *clear,*
For life, six hundred pounds a year. *Swift.*

Unencumbered; without let or hindrance; vacant; unobstructed.—A *clear* stage is left for Jupiter to display his omnipotence, and turn the fate of armies alone. *Pope.*—Out of debt. Unentangled; at a safe distance from any danger or enemy.—It requires care for a man with a double design to keep *clear* of clashing with his own reasonings. *L'Estrange.*—Canorous; sounding distinctly, plainly, articulately.—I much approved of my friend's insisting upon the qualifications of a good aspect and a *clear* voice. *Addison.*

Hark! the numbers soft and *clear*
Gently steal upon the ear;
Now louder and yet louder rise,
And fill with spreading sounds the skies. *Pope.*

Free; guiltless; with *from.*—I am *clear from* the blood of this woman. *Susanna.*—Sometimes with *of.*—The air is *clearer of* gross and damp exhalations. *Temple.*—Used of persons. Distinguishing; judicious; intelligible: this is scarcely used but in conversation.

CLEAR, *adv.* Plainly; not obscurely:

Now *clear* I understand
What oft my steddiest thoughts have search'd in vain. *Milton.*

Clean; quite; completely. *A low word.*—He put his mouth to her ear, and, under pretext of a whisper, bit it *clear off. L'Estrange.*

CLEAR, *s.* A term used by builders for the inside of a house; the space within from wall to wall.

To CLEAR, *v. a.* To make bright, by removing opaceous bodies; to brighten:

Like Boreas in his race, when rushing forth,
He sweeps the skies, and *clears* the cloudy north. *Dryden.*

To free from obscurity, perplexity or ambiguity.—By mystical terms, and ambiguous phrases, he darkens what he should *clear* up. *Boyle.*

Many knotty points there are,
Which all discuss, but few can *clear.* *Prior.*

To purge from the imputation of guilt; to justify; to vindicate; to defend: often with *from* before the thing.—I will appeal to the reader, and am sure he will *clear* me *from* partiality. *Dryden.*

To *clear* herself,
For sending him no aid, she came from Egypt. *Dryden.*

To cleanse: with *of,* or *from:*

My hands are of your colour; but I shame
To wear a heart so white:
A little water *clears* us *of* this deed. *Shakespeare.*

To remove any encumbrance, or embarrassment.—A statue lies hid in a block of marble; and the art of the statuary only *clears* away the superfluous matter, and removes the rubbish. *Addison.*—To free from any thing offensive or noxious.—Augustus, to establish the dominion of the seas, rigged out a powerful navy to *clear* it of the pirates of Malta. *Arbuthnot.*

To *clear* the palace from the foe, succeed
The weary living, and revenge the dead. *Dryden.*

To clarify; as, to *clear* liquors. To gain without deduction.—He *clears* but two hundred thousand crowns a year, after having defrayed all the charges of working. *Addison.*—To confer judgment or knowledge.—Our common prints would *clear* up their understandings, and animate their minds with virtue. *Addison.*

To CLEAR *a ship,* at the custom-house, is to obtain the liberty of sailing, or of selling a cargo, by first satisfying the customs.

To CLEAR. *v. n.* To grow bright; to recover transparency.—So foul a sky *clears* not without a storm. *Shakespeare.*—Sometimes with *up.*—The mist, that hung about my mind, *clears up. Addison.*

Take heart, nor of the laws of fate complain;
Tho' now 'tis cloudy, 'twill *clear up* again. *Norris.*

To be disengaged from encumbrances, distress, or entanglements.—He that *clears* at once, will relapse; for finding himself out of straits, he will revert to his customs: but he that *cleareth* by degrees, induceth a habit of frugality, and gaineth as well upon his mind as upon his estate. *Bacon.*

CLEAR'ANCE, *s.* A certificate that a ship has been cleared at the custom-house.

CLEAR'CHUS, a tyrant of Heraclea in Pontus, who was killed by Chion and Leonidas, Plato's pupils, during the celebration of the festivals of Bacchus, after the enjoyment of the sovereign power during twelve years. *Justin.*—The second tyrant of Heraclea of that name, died before Christ 288.—A Lacedæmonian sent to quiet the Byzantines. He was recalled, but refused to obey, and fled to Cyrus the younger, who made him captain of 13,000 Greek soldiers. He obtained a victory over Artaxerxes, who was so enraged at the defeat, that when Clearchus fell into his hands, by the treachery of Tissaphernes, he put him instantly to death. *Diodorus.*

CLEAR'ER, *s.* Brightner; purifier; enlightner.—Gold is a wonderful *clearer* of the understanding: it dissipates every doubt and scruple in an instant. *Addison.*

CLEAR'LY, *adv.* Brightly luminously.—Mysteries of grace and salvation, which were but darkly disclosed unto them, have unto us more *clearly* shined. *Hooker.*—Plainly; evidently; without obscurity or ambiguity.—Christianity first *clearly* proved this noble and important truth to the world. *Rogers.*—With discernment; acutely; without embarrassment or perplexity of mind.—There is almost no man but sees *clearlier* and sharper the vices in a speaker than the virtues. *Ben Johnson.*—Without entanglement or distraction of affairs.—He that doth not divide, will never enter into business; and he that divideth too much, will never come out of it *clearly. Bacon.*—Without by-ends; without sinister views; honestly.—When you are examining these matters, do not take into consideration any sensual or worldly interest; but deal *clearly* and impartially with yourselves. *Tillotson.*—Without deduction or cost. Without reserve; without evasion; without subterfuge.—By a certain day they should *clearly* relinquish unto the king all their lands and possessions. *Davies.*

CLEAR'NESS, *s.* Transparency; brightness.—Glass in the furnace grows to a greater magnitude, and refines to a greater *clearness,* only as the breath within is more powerful, and the heat more intense. *Bacon.*—Splendour; —Love, more clear than yourself, with the *clearness,* lays a night of sorrow upon me. *Sidney.*—Distinctness; perspicuity.—If he chances to think right, he does not know how to convey his thoughts to another with *clearness* and perspicuity. *Addison.*—Sincerity; honesty; plain dealing.

—When

—When the case required dissimulation, if they used it, the former opinion spread abroad, of their good faith and *clearness* of dealing, made them almost invincible. *Bacon.* Freedom from imputation.—I require a *clearness*. *Shakes.*

CLEARSIGHT'ED, *adj.* Perspicuous; discerning; judicious:

Clearsighted reason wisdom's judgment leads;
And sense, her vassal, in her footsteps treads. *Denham.*

To CLEAR'STARCH, *v. a.* To stiffen with starch.—He took his present lodging at the mansion-house of a taylor's widow, who washes, and can *clearstarch* his bands. *Addison.*

CLEAT, *s.* [sea term,] a piece of wood fastened on the yard-arm of a ship, to keep the ropes from sliding off the yard; also pieces of wood to fasten any ropes with, or fasten any thing to.

To CLEAVE, *v. n.* pret. I *clave.* [cleoƿan, Sax. *kleven*, Dutch.] To adhere; to stick; to hold to.—When the dust groweth into hardness, and the clouds *cleave* fast together. *Job.*

The thin chameleon, fed with air, receives
The colour of the thing to which he *cleaves.* *Dryden.*

To unite aptly; to fit:

New honours come upon him,
Like our strange garments, *cleave* not to their mould,
But with the aid of use. *Shakespeare.*

To unite in concord and interest; to adhere.—The apostles did conform the Christians according to the pattern of the Jews, and made them *cleave* the better. *Hooker.* —The men of Judah *clave* unto their king. *Samuel.*—To be concomitant to; to be united with.—We cannot imagine, that, in breeding or begetting faith, his grace doth *cleave* to the one, and forsake the other. *Hooker.*

To CLEAVE, *v. a.* preter. I *clove*, I *clave*, I *cleft*; part. pass. *cloven, or cleft.* [cleoƿan, Sax. *kloven*, Dutch.] To divide with violence; to split; to part forcibly into pieces.—The fountains of it are said to have been *cloven*, or burst open. *Burnet.*

Or had the sun
Elected to the earth a nearer seat,
His beams had *cleft* the hill, the valley dry'd. *Blackmore.*

Not half so swift the trembling doves can fly,
When the fierce eagle *cleaves* the liquid sky. *Pope.*

To divide: to part naturally.—And every beast that parteth the hoof, and *cleaveth* the cleft into two claws. *Deuteronomy.*

To CLEAVE, *v. n.* To put asunder.—The ground *clave* asunder that was under them. *Numbers.*

He cut the *cleaving* sky,
And in a moment vanish'd from her eye. *Pope.*

To suffer division.—It *cleaves* with a glossy polite substance, not plane, but with some little unevenness. *Newton.*

CLEA'VER, *s.* a butcher's instrument to cut animals into joints.—You gentlemen keep a parcel of roaring bullies about me day and night, with huzzas and hunting horns, and ringing the changes on butchers *cleavers.* *Arbuthnot.*

CLEA'VERS, *s.* in botany. See GALIUM APARINE.

CLEBUCZ', a town of European Turkey, in the province of Dalmatia: eleven miles south-south-east of Mostar.

CLE'BURG, or KLE'BURG, a town of Germany, in the circle of the Upper Rhine, in the duchy of Deux Ponts, with a castle. It gives name to a branch of the palatine family: twenty-eight miles south-south-west Deux Ponts.

CLE'BURY, a small town in Shropshire, distant from London 132 miles, 13 from Bridgenorth, eight from Bewdley, and eight from Tenbury. The market is on Wednesdays; fairs April 21, Trinity Monday, and October 27. Clebury is situated near Clee-hill, on the north side of the Temd. Here is a free-school founded by Sir Lacon William Child, who left 3500l. for supporting it, and a considerable salary to the master, who is obliged to instruct all such youths of the town as chuse to attend. It is called North-Clebury and Clebury-Mortimer, to distinguish it from Clebury on the borders of Worcestershire. It had a castle, built in 1160.

CLECHE, *s.* a kind of cross, charged with another cross of the same figure, but of the colour of the field. See HERALDRY.

CLE'CY, a town of France, in the department of the Calvados, and chief place of a canton, in the district of Falaise; containing about 1700 inhabitants: three leagues and a half west Falaise.

CLEDA'GH, a river of Wales, which runs into the Usk, in Monmouthshire.

CLEDA'GH, a river of Wales, which runs into the Neath, five miles north of Neath, in Glamorganshire.

CLEDA'GH, a river of Wales, which runs into the Neath, at Neath, in Glamorganshire.

CLEDA'GH, a river of Wales, which runs into the Muthvey, two miles east of Langadok, in Caermarthenshire.

CLEDA'GH, a river of Wales, which runs into the Clethy, in Pembrokeshire.

CLEDAGNVA'GH, a river of England, which runs into the Usk, above a mile west Abergavenny.

CLE'DEN, a town of France, in the department of Finisterre, and chief place of a canton, in the district of Pontcroix: two leagues west of Pontcroix.

CLE'DEN, a town of France, in the department of Finisterre, and chief place of a canton, in the district of Carhaix: five miles south-west of Carhaix.

CLE'DER, a town of France, in the department of Finisterre, and chief place of a canton, in the district of Lesneven: one league and a half west of St. Pol-de-Leon.

CLEDGE, *s.* among miners, the stratum of fuller's earth.

CLEDHE'WEN, a river of Wales, which runs into the Dungledy, in Pembrokeshire.

CLEEN'ISH, an island of Ireland, in Lake Erne, three miles from Enniskillen.

CLEES (Les), or Les ESCLEES, a town of Swisserland, in the canton of Berne, situated on the Orbe; on the road to France. It had a castle, which was demolished by the Swiss in 1475: eight miles south-west of Yverdun.

CLEES, *s.* The two parts of the foot of beasts which are cloven footed. *Skinner.* It is a provincial word, and probably corrupted from *claws.*

CLEF, *s.* [*clef*, Fr. a key.] A mark or letter on any line at the beginning of a piece of music, which explains and gives name to all the rest of the notes; hence it is called the clef, or key, because hereby we know the names of all the other lines and spaces. See the article MUSIC.

CLEF'MONT, a town of France, in the department of the Upper Marne, and chief place of a canton, in the district of Bourmont: seventeen miles south of Bourmont.

CLEFS, a town of France, in the department of the Mayne and Loire, and chief place of a canton, in the district of Baugé: two leagues north of Baugé.

CLEFT, *part. pass.* Divided; parted asunder:

I never did on *cleft* Parnassus dream,
Nor taste the sacred Heliconian stream. *Dryden.*

CLEFT, *s.* a space made by the separation of parts; a crack: a crevice.—The cascades seem to break through the *clefts* and cracks of rocks. *Addison.*—In farriery, *clefts* appear on the bought of the pasterns, and are caused by a sharp and malignant humour, which frets the skin; and it is accompanied with pain, and a noisome stench. For the cure, See FARRIERY.

To CLEFT'GRAFT, *v. a.* To engraft by cleaving the stock of a tree, and inserting a branch.—Filberts may be *cleftgrafted* on the common nut. *Mortimer.*

CLEG'HORN

CLEG'HORN (George), born at Granton, near Edinburgh, in December 1716. His father died in 1719, and left a widow and five children. George who was the youngest son, was sent to the university of Edinburgh, where, to a singular proficiency in the languages, he added a considerable stock of mathematical knowledge. In 1731, he resolved to study physic and surgery, and had the advantage of being placed under the late Dr. Alexander Monro, a name that will be revered in that university as long as science shall be cherished and cultivated. For five years he continued to profit by the instruction and example of his excellent master, assisting at the dissections in the anatomical theatre; at the same time he attended lectures in botany, materia medica, chemistry, and the theory and practice of medicine; and by extraordinary diligence he attracted the notice of all his preceptors. On Dr. Fothergill's arrival from England at this university, in 1773, Dr. Cleghorn was introduced to his acquaintance, and soon became his inseparable companion. Their moments of relaxation were spent in a select society of fellow-students, of which Fothergill, Russel, and Cuming, were associates; a society since incorporated under the name of The Royal Medical Society of Edinburgh.

Early in 1736, when young Cleghorn had scarcely entered into his twentieth year, he was appointed surgeon in the 22d regiment of foot, then stationed in Minorca, under the command of general St. Clair. During a residence of thirteen years in that island, whatever time could be spared from attending the duties of his station, he employed either in investigating the nature of epidemic diseases, or in gratifying the passion he early imbibed for anatomy, frequently dissecting human bodies, and those of apes, which he procured from Barbary, and comparing their structure with the descriptions of Galen and Vesalius. In 1749 he left Minorca, and went to Ireland with the 22d regiment; and in autumn 1750 he came to London, and, during his publication of "The Diseases of Minorca," attended Dr. Hunter's anatomical lectures. In this work Dr. Cleghorn recommends acescent vegetables in low, remittent, and putrid, fevers, and the early and copious exhibition of bark, which had been interdicted from mistaken facts, deduced from false theories. In 1751 he settled in Dublin; and, in imitation of Monro and Hunter, gave annual courses of anatomy. A few years after his coming to Dublin he was admitted into the university as lecturer in anatomy. In 1784, the college of physicians elected him an honorary member; and from lecturer in anatomy he was made professor; and had likewise the honour of being one of the original members of the Irish academy for promoting arts and sciences, which is now established by royal authority. In 1777, when the Royal Medical Society was established at Paris, he was nominated a fellow of it. He died universally and sincerely regretted by all who knew him, in December 1789.

CLEGUEREC', a town of France, in the department of the Morbihan, and chief place of a canton, in the district of Pontivy: two leagues north-west of Pontivy.

CLEIDOMASTOIDE'US, [from κλειδωμα, the clavicle, and μαστοειδεως, the mastoideus muscle.] A muscle, which arises in the clavicle, and is inserted into the mastoid process. See ANATOMY.

CLEISA'GRA, [from κλεις, the clavicle, and αγρα, a prey.] The gout in the articulation of the clavicles.

CLE'LAND (John), son of colonel Cleland, that celebrated fictitious member of the Spectator's Club, whom Steele describes under the name of Will. Honeycombe. He was early in life sent as consul to Smyrna, where, perhaps, he first imbibed those loose principles which, in his Memoirs of a Woman of Pleasure, are so dangerously exemplified. On his return from Smyrna, he went to the East Indies; but, quarrelling with some of the members of the presidency of Bombay, he made a precipitate retreat from the East, with little or no benefit to his fortunes. Being without profession, or any settled means of subsistence, he soon fell into difficulties; a prison and its miseries were the consequences. In this situation, one of those booksellers, who disgrace the profession, offered him a temporary relief for writing the work above alluded to, which brought a stigma on his name, that time can never obliterate. The sum given for the copy was twenty guineas; the sum received for the sale has been estimated at no less than 10,000l. For this publication he was called before the privy council; and the circumstance of his distress being known, as well as his being a man of respectable family, John earl Granville, the then president, nobly rescued him from the like temptation, by getting him a pension of 100l. a-year, which he enjoyed to his death, and which had so much the desired effect, that, except the Memoirs of a Coxcomb, which has some smack of dissipated manners, and the Man of Honour, written as an amende honorable for his former exceptionable book, he dedicated the rest of his life to political and philosophical studies. He died January 23, 1789, at the advanced age of eighty-two.

CLE'MA, *s.* in antiquity, a twig of the vine, which served as a badge of the centurion's office.

CLE'MATIS, *s.* [from κλημα, a tendril; because it climbs trees, by means of its pliant twigs, like those of the vine.] In botany, a genus of the class polyandria, order polygynia, natural order multisiliquæ. The generic characters are—Calyx: none. Corolla: petals four, oblong, lax. Stamina: filaments very many, subulate, shorter than the corolla; antheræ growing to the side of the filaments. Pistillum: germs very many, roundish, compressed, ending in subulate styles, longer than the stamens; stigmas simple. Pericarpium: none; receptacle headed, small. Seeds: very many, roundish, compressed, furnished with the style, in various forms.—*Essential Character.* Calyx, none; petals, four, sometimes five, or even six; seeds, having a tail.

Species. 1. Clematis cirrhosa, or evergreen virgin's bower: leaves simple; stem climbing by opposite tendrils; peduncles one-flowered, lateral. This has a climbing stalk, rising to the height of eight or ten feet, sending out branches from every joint, whereby it becomes a very thick bushy plant; leaves sometimes single, sometimes double, frequently ternate, serrate. According to Linnæus, they are usually simple, petioled, ovate, several together from the same joint; they keep their verdure all the year; the tendrils come out opposite to the leaves; the flowers are produced from the side of the branches, they are large, of an herbaceous colour, and under each is a remote, hemispheric, minute, calycle: they appear at the end of December, or beginning of January. It grows naturally in Spain, where it was observed by Clusius in 1565. In 1596 it was cultivated by Gerarde, who calls it *traveller's joy of Candia.* Johnson names it better, *Spanish traveller's joy*; and Parkinson, *Spanish wild climer.*

2. Clematis viticella, or purple virgin's bower: leaves compound and decompound; leaflets ovate, sublobed, quite entire. Stems very slender and weak, having many joints, whence come out side branches, which are again divided into smaller. If these be supported, they will rise to the height of eight or ten feet; the leaves branch out into many divisions, each having a slender foot-stalk, with three oval entire leaflets; four foot-stalks generally arise from the same joint, two on each side; the two lower have three of these divisions, so that they are composed of nine leaflets; but the two upper have only two opposite leaves on each, and between these arise three slender peduncles, each supporting one flower. According to Linnæus, the lower leaves are cordate, the middle three-lobed, the upper pinnate, the floral leaves ovate; petals deciduous, deltoid, very obtuse, thinner on the sides; they are of a dark worn-out purple, or blue, or bright purple, or red. It grows naturally in the woods of Spain and Italy; and was cultivated in 1569 by Mr. Hugh Morgan. Gerarde calls it "blue or red-flowering ladies bower," from its aptness to make bowers or arbours in gardens. There are four varieties cultivated in the nurseries.

ries. 1. Single blue. 2. Single purple. 3. Single red. 4. Double purple. They flower in June and July, but the seeds seldom ripen in England. The last continues to the end of August. Miller's variety, C. alpino, rises only three or four feet high; the leaves have nine leaflets, three on each foot-stalk; the flowers come out at the joints of the stem, are white, and make no great appearance. It flowers in May, and grows naturally on the mountains of Italy: he received it from Monte Baldo.

3. Clematis viorna, or leathery-flowered virgin's bower: leaves compound and decompound; some of the leaflets trifid. Stems many, slender, sarmentose, round, striated, prostrate, or climbing; flowers solitary, nodding, coriaceous, ribbed on the outside, never opening, except at the end, where the petals are bent back; they are of a greenish purple on the outside, and very pale green within; the stamens scarcely emerge from the corolla; seeds broadish, flat, at first green, then brown; tail bent in and plumose, of a brownish green colour. Native of Carolina and Virginia. It is in Banister's catalogue of the plants of Virginia sent over in the year 1680. In 1732 it was cultivated by James Sherard, M. D. at Eltham; and Miller received the seeds from both countries. It flowers from June to September; and, if the autumn prove warm, the seeds will ripen.

4. Clematis crispa, or curled virgin's bower: leaves simple and ternate; leaflets entire and three-lobed. This has weak stalks, which rise near four feet high, and by their claspers fasten themselves to neighbouring plants; the flowers come out singly from the sides of the branches upon short peduncles, having one or two pair of leaves on them, which are oblong and sharp-pointed; the corolla is purple, the inside is curled, and has many longitudinal furrows. Thunberg describes the stem as striated, flexuose, and smooth; the leaves as five-nerved, petioled, ovate, acute, and smooth; and the flowers as growing in a compound, trichotomous, panicle. Native of Carolina, whence Mr. Miller received the seeds in 1726. It was cultivated in the Eltham garden at the same time. It is also a native of Florida and Japan. It flowers in July, and the seed ripens in September.

5. Clematis Orientalis, or Oriental virgin's bower: leaves compound; leaflets gashed, angular, lobed, wedge-form; petals villose on the inside. This also has weak climbing stalks, rising to the height of seven or eight feet when supported; the leaves consist of nine leaflets, which are angular and sharp pointed. According to the description of Dillenius, they resemble the upper leaves of smallage in shape, but they are glaucous on both sides, and have such soft and slender hairs on them as are not easily either seen or felt; the petioles and ends of the twigs have also the same delicate pubescence; flowers drooping; petals bent back, finally flat, villose within, of a yellowish green colour, with a tinge of russet on the upper part or outside; stamens collected into an oblong purple head, with oblong purple antheræ yellow at the edge. It flowers from July to October; and was discovered by Tournefort in the Levant, whence he sent the seeds to the royal garden at Paris.

6. Clematis hexapetala, or six-petalled virgin's bower: leaves compound; leaflets ovate, serrate; peduncles two-leaved; corolla spreading, six-petalled. Flowers yellowish, dioecous. Native of New Zealand; found in Charlotte Sound, November 1774.

7. Clematis Virginiana, or Virginian virgin's bower: leaves ternate; leaflets cordate, somewhat lobed and angular, climbing; flowers dioecous. Stems climbing, very high. The female flowers have stamens, but the antheræ are destitute of pollen. Loureiro asserts that the flowers are hermaphrodite; and that the seeds are six in number, of an ovate-oblong shape, with a straight hairy tail, about the same length with the stamens. Native of North America; also of Japan and Cochinchina; cultivated in 1767 by Mr. James Gordon; flowers from June to August.

8. Clematis florida, or large-flowered virgin's bower: leaves decompound; leaflets binate and ternate; petals ovate. Stem striated, purple, smooth. Native of Japan; introduced about 1776 by John Fothergill, M. D. flowers most part of the year.

9. Clematis Japonica, or Japan virgin's bower: leaves ternate; leaflets elliptic-ovate, serrate; flowers cylindric. Stem, filiform, striated, purple, villose; flowers from the joints, peduncled, solitary, purple. This differs from clematis Virginiana in having the leaflets not cordate, but drawn to a point towards both ends; the flowers cylindric not ovate, and peduncled. Native of Japan.

10. Clematis dioica, or trifoliate virgin's bower, or climber: leaves ternate, quite entire; flowers dioecous. This has slender tough climbing stalks, rising to the height of ten or twelve feet; leaves trifoliate, coming out on each side the stalk; the leaflets are large, ovate, and entire, having three or five longitudinal nerves; flowers white, and composed of four narrow petals which are reflected, but the stamens all stand erect. There are about eighty seeds disposed in a head; they are obtusely three-cornered and compressed, with a very long tail, fringed with many white hairs. Native of the West Indies, and also of Cochinchina; climbing very high without tendrils. It was sent to Mr. Miller from Jamaica, by Dr. Houstoun.

11. Clematis vitalba, or common virgin's bower, wild climber, or traveller's joy: leaves pinnate; leaflets cordate, climbing. This shrub climbs as high as twenty feet by means of the twisted petioles; the younger stems are slightly hirsute, flexible, and purple; the old ones are the thickness of the finger, deeply grooved, and of a whitish colour: there is little beauty in this sort. It is a native of North America.

12. Clematis flammula, or sweet-scented virgin's bower: lower leaves pinnate, laciniate; upper, simple, quite entire, lanceolate. This is rather creeping than climbing; it is lower and more tender than the foregoing. Native of the south of France, Italy, the Grisons, &c. flowers from July to October.

13. Clematis maritima: leaves pinnate, linear; stems simple, hexagonal. Stem erect, perennial. Found near Montpellier, Nice, and Venice.

14. Clematis recta, or upright virgin's bower: leaves pinnate; leaflets ovate-lanceolate, quite entire; stem erect; flowers four and five-petalled. Perennial; stems herbaceous, annual, round, erect, scarcely branched, from three to five feet high, firm, ending in a panicle at the top. Linnæus remarks, that the umbels of flowers are upright and stiff. The flowers come out in June, and the seeds ripen in September. Native of France, Swisserland, Silesia, Austria, Carniola, Hungary, and Tartary; cultivated in 1597 by Gerarde. The variety, which Mr. Miller makes a species, under the name of *clematis hyspanica*, differs only in having but two or three pairs of leaflets, which are narrower and stand farther asunder; shorter stalks, and larger flowers. This plant, as well as most of the other species, is acrid, corrosive, and inflames the skin, whence the name *flammula* in Bauhin. It is recommended by baron Stoerck in inveterate syphilitic diseases, in ulcers, cancers, and severe head-achs. It acts as a diuretic or diaphoretic. The character of *clematis* rests wholly on Stoerck's authority. He used an extract of the leaves; but he chiefly recommends an infusion of the fresh leaves, two or three drams to a pint of boiling water, four ounces to be taken three times a-day, whilst the powdered leaves are applied as an escharotic to the ulcers. It may be used also for raising blisters, where cantharides cannot be obtained.

15. Clematis integrifolia, or entire-leaved virgin's bower, or Hungarian climber: leaves simple, ovate-lanceolate; flowers drooping. Perennial; stems several, annual, a foot and a half high or more, striated, erect, terminated by a nodding flower, and sometimes branched in the upper axils. Native of Germany, Austria, Carniola, and Hungary. It flowers in July, or from June to August; was

was cultivated in 1596 by Gerarde; and is not uncommon now in the nurseries about London.

16. Clematis calycina, or Minorca virgins's bower: calycine involucre approximating; leaves ternate, the intermediate one three-parted. Native of Minorca; introduced in 1783 by Monf. Thouin; flowers in February.

17. Clematis Americana, or South American virgin's bower, or climber: leaves ternate; leaflets cordate-acuminate, quite entire; flowers corymbed. This has strong climbing stalks, which fasten themselves by their claspers to the neighbouring trees, whereby they are supported, and rise to the height of twenty feet or more; at each joint are trifoliate leaves, heart-shaped, pointed, and entire; the flowers come out on long, naked, branching, axillary peduncles; they are white, and collected into roundish bunches; these are succeeded by seeds shaped like those of the common sort, but have long curling beards to each, which are finely feathered. It was sent to Mr. Miller from Campeachy by Dr. Houstoun.

18. Clematis Chinensis, or Chinese virgin's bower: leaves quinate-pinnate; leaflets lanceolate. Stems four-cornered, weak, so as to want support, scarcely climbing; flowers small; petals linear-lanceolate, dark purple, the inner edge painted with a tomentose line. It was sent from China by Bladh. Loureiro has described a plant under the name of *clematis sinensis*, which is common in many parts of the Chinese empire, and seems to be different from Retzius's; the stems are round, very long, scandent, and branched; leaves quinate; leaflets ovate-lanceolate, quite entire, and subsessile, which Retzius's are not; flower red purple, on many-flowered axillary peduncles: corolla spreading; seeds three to five. He adds, that he has found three plants in Chinese books under this name; the first, which he has examined, with quinate leaves; the second, with ternate; and the third, with simple three-lobed leaves; all having a large scandent stem.

19. Clematis ochroleuca, or yellow-flowered virgin's bower: leaves simple, ovate, pubescent, quite entire; flowers erect. This is a low unbranched erect plant, single, with a pale yellow flower. Native of North America, where it was observed first by Banister; cultivated in 1767 by Mr. James Gordon; flowers in June and July.

20. Clematis trifolia, or three-flowered virgin's bower: leaves ternate; leaflets ovate, serrate; serratures mucronate; peduncles three-flowered. Branches striated, smooth. Native of the isle of Bourbon. Its proper place is between the sixth and seventh species.

21. Clematis minor, or small virgin's bower: leaves quinate; leaflets conical, three-nerved; peduncles very long. Stem suffruticose, round, slender, not very long, scandent, branched; flowers white, axillary, several together; styles four, hairy, a little longer than the corolla. Native of the suburbs of Canton in China.

Propagation and Culture. The first sort retains its leaves all the year, which renders it valuable. This was formerly preserved in green-houses in winter, supposing it too tender to live in the open air in England; but now it is generally planted in the full ground, where the plants thrive much better than in pots, and produce plenty of flowers, which they never did when they were more tenderly treated; nor have the plants suffered from severe frosts; for those which have been growing in the open air at Chelsea, more than fifty years, have resisted the greatest cold without covering. This sort does not produce seeds in England, it is therefore propagated by layers, and also from cuttings. If it be propagated by layers, it must be done in the beginning of October, when the shoots of the same year only should be chosen for this purpose; for the older branches do not put out roots in less than two years; whereas the tender shoots will make good roots in one year; these must be pegged down. If the shoots have two inches of earth over them, it will be better than a greater depth; but, then, a little old tanners' bark should be spread over the surface of the ground to keep out the frost; for the plants generally begin flowering about Christmas, and at the same time they are putting out roots, which being but just formed, may be injured by severe frosts; these layers will have strong roots by the following autumn, when they may be taken from the old plant, and transplanted where they are designed to remain. When it is propagated by cuttings, they should be planted in March, in pots filled with good kitchen-garden earth, and plunged into a very moderate hot-bed, observing to shade them from the sun in the day-time, and to water them gently two or three times a-week, and in less than two months they will have taken root, when they should be gradually inured to the open air. The following summer they may be placed in any part of the garden till Michaelmas, and then they should be turned out of the pots and planted in the full ground, either where they are designed to remain, or into a nursery-bed, to grow a year longer to get strength, before they are placed out for good.

All the varieties of purple virgin's bower are propagated by laying down their branches; for, although the single flowers sometimes produce seeds in England, yet as these seeds, when sown, generally remain a whole year in the ground before they vegetate, the other, being the more expeditious method of increasing these plants, is generally practised; but, in order to succeed, these layers should be laid down at a different season from the former sort; for, when they are laid in the autumn, their shoots are become tough, so as rarely to put out roots under two years; and, after lying so long in the ground, not one in three of them will have made good roots; so that many have supposed these plants were difficult to propagate; but, since they have altered their season of doing it, they have found these layers have succeeded as well as those of other plants. The best time for laying down the branches is in the beginning of July, soon after they have made their first shoots, for it is these young branches of the same year which freely take root; but, as these are very tender, there should be great care taken not to break them in the operation; therefore those branches from which these shoots were produced, should be brought down to the ground, and fastened to prevent their rising; then the young shoots should be laid into the earth, with their tops raised upright, three or four inches above ground; and, after the layers are placed down, if the surface of the ground be covered with moss, rotten tanners' bark, or other decayed mulch, it will prevent the ground from drying, so that the layers will not require watering above three or four times, which should not be at less than five or six days interval; for, when these layers have too much wet, the tender shoots frequently rot; or, when the young fibres are newly put out, they are so tender as to perish by having much wet; where the method here directed is practised, the layers will more certainly take root, than by any other yet practised. As most of these plants have climbing branches, they should be always planted where they may be supported, otherwise the branches will fall to the ground and appear unsightly; so that unless they are properly disposed, instead of being ornaments to a garden, they will become the reverse. Where there are arbours or seats, with trellis work round them, these plants are very proper to train up against it; or, where any walls or other fences require to be covered from the sight, these plants are very proper for the purpose; but they are by no means proper for open borders, nor do they answer the expectation, when they are intermixed with shrubs; for, unless their branches have room to extend, they will not be productive of many flowers. The sort with double flowers is the most beautiful, and that should be preferred to those with single flowers, of which a few only should be planted for variety. They are all equally hardy, and are seldom injured by frost, excepting in very severe winters, when sometimes the very tender shoots are killed; but, if these are cut off in the spring, the stems will put out new shoots. See ATRAGENE,

GENE, BANISTERIA, BAUHINIA, BIGNONIA, CISSAMPELOS, OPHIOXYLUM, PASSIFLORA, PAULLINIA, PLUMERIA, STRYCHNOS, and VINCA.

CLEMA'TITIS, *s.* in botany. See ARISTOLOCHIA, BAUHINIA, CLEMATIS, and EUPATORIUM.

CLE'MENCET (Charles), born at Painblanc in the diocese of Autun, entered of the congregation of St. Maur in 1722, at the age of eighteen. After having taught rhetoric at Pont-le-Voy, he was called to Paris in the monastery of the white-cloak friars, where he died in 1778. Blessed with a happy memory, and a disposition to industry, he continued to write till his death. The fruits of his application are, 1. *L'art de verifier les dates*, 1750, 4to. reprinted, with very great alterations and additions, 1770, fol. The historical part contains the sum and substance of universal history from the birth of Christ to our times; and it is executed with the utmost attention to chronological precision and learning. 2. General History of Port-Royal, 10 vols. 12mo. and several other works of less importance.

CLE'MENCY, *s.* [*clemence*, Fr. *clementia*, Lat.] Mercy; remission of severity; willingness to spare; tenderness in punishing.—I have stated the true notion of *clemency*, mercy, compassion, good-nature, humanity, or whatever else it may be called, so far as is consistent with wisdom. *Addison.*—Mildness; softness:

Then in the *clemency* of upward air
We'll scour our spots, and the dire thunder scar. *Dryden.*

CLEMENCY is not only the privilege, the honour, and the duty, of a prince, but it is also his security, and better than all his garrisons, forts, and guards, to preserve himself and his dominions in safety: it is the brightest jewel in a monarch's crown. As meekness moderates anger, so clemency moderates punishment. That prince is therefore truly royal who masters himself, looks upon all injuries as below him, and governs by equity and reason, not by passion. Clemency is profitable for all; wears well in private persons, but is much more beneficial in princes. To place the advantages and amiabilities of clemency in their true light, we have selected the following examples from ancient history:

Avidius Cassius having revolted from the emperor Marcus Aurelius, and attempted to seize the government, the empress Faustina, in a letter which she wrote to her husband, pressed him to pursue the accomplices of Cassius with the utmost severity. But the emperor, hearkening only to the impulse of his own good-nature, returned her the following answer: "I have read your letter, my dear Faustina, wherein you advise me to treat the accomplices of Cassius with the utmost severity, which you think they well deserve. This I look upon as a pledge of the love you bear to your husband and children: but give me leave, my dear Faustina, to spare the children of Cassius, his son-in-law, and his wife; and to write to the senate in their behalf. Nothing can more recommend a Roman emperor to the esteem of the world, than CLEMENCY; this placed Cæsar among the gods; this consecrated Augustus; this procured to your father the title of Pius. I am grieved even for the death of Cassius; and wish it had been in my power to save him. Be therefore satisfied, and do not abandon yourself to revenge. Marcus Aurelius Antonius is protected by the gods." Some of his friends openly blaming his clemency, and taking the liberty to tell him that Cassius would not have been so generous, had fortune proved favourable to him, the emperor immediately replied, "We have not lived nor served the gods so ill as to think they would favour Cassius." He added, "The misfortunes of some of his predecessors were entirely owing to their own ill conduct and cruelties, and that no good prince had ever been overcome or slain by an usurper. Nero, Caligula, and Domitian, (said he,) deserved the doom that overtook them: neither Otho nor Vitellius were equal to the empire; and the downfall of Galba was occasioned by his avarice, an unpardonable fault in a prince." *Vulcat. Gall.* p. 32.

When Seleucus was informed of the resolution Demetrius had taken of resigning himself his prisoner, he was exceedingly pleased, and having given the necessary directions for the reception of so great a person, he could not help, even in the presence of his whole court, breaking out into these words: "It is not the fortune of Demetrius which has thus provided for his safety, but mine, which hath been watchful for my glory. I thank her more for this, than for all the favours she hath done me, because I esteem an act of CLEMENCY more honourable than any victory." Accordingly, after he had provided for his own security, he did all that could be thought of to make confinement easy to Demetrius. He ordered him royal entertainments within doors, a fine stable of horses, and the use of a noble park without. To give him a relish for these pleasures, hopes were cherished, and promises of liberty intermixed; and Seleucus seemed inclined to have done much more for him, had he not been overruled by the insinuations of his ministers. *Plut. in Demet.*

Diodorus Siculus takes occasion, from the thirty tyrants of Athens, whose immoderate ambition induced them to treat their country with the utmost excessive cruelties, to observe how unfortunate it is for persons in power to want a sense of honour, and to disregard either the present opinion, or the judgment posterity will form of their conduct; for, from the contempt of reputation, the transition is too common to that of virtue itself. They may, perhaps, by the awe of their power, suppress, for some time, the public voice, and impose a forced silence upon censure; but the more constraint they lay upon it during their lives, the more liberal will it be after their deaths of complaints and reproaches, and the more infamy and imputation will be affixed to their memories. The power of the thirty was of a short duration; their guilt immortal, which will be remembered with abhorrence throughout all ages, whilst their names are recorded in history only to render them odious, and to make their crimes detestable. He applies the same reflection to the Lacedemonians, who, after having made themselves masters of Greece by a wise and moderate conduct, fell from that glory through the severity, haughtiness, and injustice, with which they treated their allies. Diodorus concludes his reflection with a maxim very true, though very little known. "The greatness and majesty of princes," says he, (and the same may be said of all persons in high authority,) "can be supported only by CLEMENCY and justice, with regard to their subjects; as, on the contrary, they are ruined and destroyed by a cruel and oppressive government, which never fails to draw upon them the hatred of their people."

Leonidas, the Lacedemonian, having with three hundred men only, disputed the pass of Thermopylæ against the whole army of Xerxes, and being killed in that engagement, Xerxes, by the advice of Mardonius, one of his generals, caused his dead body to be hung upon a gallows, making thereby the intended dishonour of his enemy his own immortal shame. But some time after, Xerxes being defeated, and Mardonius slain, one of the principal citizens of Ægina came and addressed himself to Pausanias, desiring him to avenge the indignity that Mardonius and Xerxes had shewn to Leonidas, by treating Mardonius's body after the same manner. As a farther motive for doing so, he added, that, by thus satisfying the manes of those who were killed at Thermopylæ, he would be sure to immortalize his own name throughout all Greece, and make his memory precious to the latest posterity. "Carry thy base counsels elsewhere," replied Pausanias; "thou must have a very wrong notion of true glory to imagine, that the way for me to acquire it is to resemble the barbarians. If the esteem of the people of Ægina is not to be purchased but by such a proceeding, I shall be content with preserving that of the

Lacedemonians, only amongst whom the base and ungenerous pleasure of revenge is never put in competition with that of shewing CLEMENCY and moderation to their enemies, especially after their death. *Herodot.* lib. 9. c. 77, 78.

Deucetius, according to Diodorus, was chief over the people who were properly called Sicilians. Having united them all into one body, he became very powerful, and formed several great enterprizes. It was he who built the city Palica, near the temple of the gods, called Palici. This city was famous on account of some wonders which are related of it; and still more for the sacred nature of the oaths which were there taken, the violation whereof was said to be always followed by a sudden and exemplary punishment. This was a secure asylum for all persons who were oppressed by superior power; and especially for slaves who were unjustly abused, or cruelly treated, by their masters. They continued in safety in this temple, till certain arbiters and mediators had made their peace; and there was not a single instance of a master's having ever forfeited the promise he had made to pardon his slaves. This Deucetius, after having been successful on a great many occasions, and gained several victories, particularly over the Syracusians, saw his fortune change on a sudden by the loss of a battle, and was abandoned by the greatest part of his forces. In the consternation and despondency into which so general and sudden a desertion threw him, he formed such a resolution as despair only could suggest. He withdrew in the night to Syracuse, advanced as far as the great square in the city, and there falling prostrate at the foot of the altar, he abandoned his life and dominions to the mercy of the Syracusians; that is, to his professed enemies. The singularity of this spectacle drew great numbers of people to it. The magistrates immediately convened the people, and debated on the affair. They first heard the orators, whose business was generally to address the people by their speeches; and these animated them prodigiously against Deucetius, as a public enemy, whom Providence seemed to throw in their way, to revenge and punish, by his death, all the injuries he had done the republic. A speech in this stile struck all the virtuous part of the assembly with horror. The most ancient and the wisest of the senators represented, "That they were not to consider what punishment Deucetius deserved, but how it behoved the Syracusians to behave on that occasion; that they ought not to look upon him any longer as an enemy, but as a suppliant, a character by which his person became sacred and inviolable. There was a goddess (Nemesis) who took vengeance of crimes, especially of cruelty and impiety, and who doubtless would not suffer that to go unpunished; that, besides the baseness and inhumanity there is in insulting the unfortunate, and in crushing those who are already under one's foot, it was worthy the grandeur and goodness natural to the Syracusians, to exert their CLEMENCY even to those who least deserved it." All the people came into this opinion, and with one consent spared Deucetius's life. He was ordered to reside in Corinth; and the Syracusians engaged to furnish Deucetius with all things necessary for his subsisting honourably there. What reader, who compares these two different opinions, does not perceive which of them was the noblest and most generous! *Diod.* p. 67-70.

The Athenians having made war upon the Syracusians, the army of the former, under the command of Nicias and Demosthenes, was totally defeated, and the generals obliged to surrender at discretion. The victors having entered their capital in triumph, the next day a council was held to deliberate what was to be done with the prisoners. Diocles, one of the leaders of the greatest authority among the people, proposed, that all the Athenians who were born of free parents, and all such Sicilians as had joined with them, should be imprisoned, and be maintained on bread and water only; that the slaves, and all the Attics, should be publicly sold; and that the two Athenian generals should be first scourged with rods, and then put to death. This last article exceedingly disgusted all wise and compassionate Syracusians. Hermocrates, who was very famous for his probity and justice, attempted to make some remonstrances to the people, but they would not hear him; and the shouts which echoed from all sides prevented him from continuing his speech. At that instant, an ancient man, venerable for his great age and gravity, who in this war had lost two sons, the only heirs to his name and estate, made his servants carry him to the tribunal for harangues; and the instant he appeared, a profound silence was made. "You here behold (says he) an unfortunate father, who has felt more than any other Syracusian the fatal effects of this war, by the death of two sons, who formed all the consolation, and were the only supports of my old age. I cannot, indeed, forbear admiring their courage and felicity in sacrificing to their country's welfare a life which they would one day have been deprived of by the common course of nature; but then, I cannot but be sensibly affected with the cruel wound which their death hath made in my heart; nor forbear hating and despising the Athenians, the authors of this unhappy war, as the murderers of my children. But, however, I cannot conceal one circumstance, which is, that I am less sensible for my private afflictions, than for the honour of my country; and I see it exposed to eternal infamy, by the barbarous advice which is now given you. The Athenians, indeed, merit the worst kind of treatment that could be inflicted on them, for so unjustly declaring war against us; but have not the gods, the just avengers of crimes, punished them, and avenged us sufficiently? When their generals laid down their arms, and surrendered, did not they do this in hopes of having their lives spared? And if we put them to death, will it be possible for us to avoid the just reproach of our having violated the law of nations, and dishonoured our victory by unheard-of cruelty? What! will you suffer your glory to be thus sullied in the face of the whole world, and have it said, that a nation who first dedicated a temple to CLEMENCY, had not found any in yours? Surely, victories and triumphs do not give immortal glory to a city; but the exercising mercy towards a vanquished enemy, the using moderation in the greatest prosperity, and the fearing to offend the gods, by a haughty and insolent pride. You, doubtless, have not forgotten that this Nicias, whose fate you are going to pronounce, was the very man who pleaded your cause in the assembly of the Athenians; and who employed all his credit, and the whole power of his eloquence, to dissuade his country from embarking in this war. Should you, therefore, pronounce sentence of death on this worthy general, would it be a just reward for the zeal he shewed for your interest? With regard to myself, death would be less grievous to me, than the sight of so horrid an injustice committed by my countrymen and fellow-citizens." *Diod.* l. 13. p. 149.

CLE'MENCY, is iconologically described, by a beautiful virgin, crowned with a crown of gold, over which is seen a radiant sun, holding in her arms a pelican. In Rome she was esteemed as a goddess, and the Roman senate ordered a temple to be dedicated to her after the death of Julius Cæsar. The poets describe her as the guardian of the world; and the Roman painters represented her holding a branch of laurel and a spear, to shew that gentleness and piety belonged principally to victorious warriors.

CLE'MENS (Romanus), bishop of Rome, where he is said to have been born, and to have been fellow-labourer with St. Peter and St. Paul. We have nothing remaining of his works that is clearly genuine, excepting one epistle, written to quiet some disturbances in the church of Corinth; which, next to holy writ, is esteemed one of the most valuable remains of ecclesiastical antiquity.

CLE'MENS (Alexandrinus), so called to distinguish him from the former, was an eminent father of the church, who

who flourished at the end of the second and beginning of the third centuries. He was the scholar of Pantænus, and the instructor of Origen. The best edition of his works is that in 2 vols. folio, published in 1715, by archbishop Potter.

CLE'MENT, [*clemens*, Lat.] Meek, gentle, courteous; also a proper name of men.

CLE'MENT V. the first pope who made a public sale of indulgences. He transplanted the holy see to Avignon in France, greatly contributed to the suppression of the knights templars, and was author of a compilation of the decrees of the general councils of Vienna, stiled *Clementines*. He died in 1314.

CLE'MENT VII. (Julius de Medicis), pope, memorable for his refusing to divorce Catharine of Arragon from our Henry VIII. and for the bull he published upon the king's marriage with Anne Boleyn; which, according to the Romish authors, lost him England. He died in 1534.

CLE'MENT XIV. (Francis Laurentius Ganganelli), born at St. Angelo, in the duchy of Urbino, in October 1705, and elected pope in 1769; at which time the see of Rome was involved in a dangerous contest with the house of Bourbon. His reign was troubled with the collision of parties on the affairs of the Jesuits; and it is said that his latter days were embittered by the apprehensions of poison. Hence he often complained of the heavy burden which he was obliged to bear; and regretted, with great sensibility, the loss of that tranquillity which he enjoyed in his retirement when only a simple Franciscan. He was, however, fortunate in having an opportunity, by a single act, to distinguish a short administration of five years in such a manner, as will ever prevent its sinking into oblivion. This act was the suppression of the order of the Jesuits. His death happened in the seventieth year of his age. By whatever species of poison the life of the enlightened Ganganelli was abridged, it is now pretty generally supposed that his death was not natural. It is well known that, at the moment of signing the famous bull of *motu proprio*, which pronounced the extinction of the society of the Jesuits, Clement hesitated, and, from a kind of presentiment, said, "I am well aware that I am going to sign my death warrant; but that is of no consequence." His dissolution ensued fourteen months afterward, and the Jesuits and their partisans dared to celebrate it as a triumph. The majority of the cardinals never pardoned him for having put his name to this bull; for the Jesuits ever were the surest props, the most dexterous champions, and the most devoted adherents, of the holy see. Ganganelli was a man of a virtuous character, possessed of considerable abilities, and died much regretted by his subjects.

CLEMEN'TI, a town of European Turkey, in the province of Albania: forty-four miles north of Dulcigno.

CLEMEN'TINE, *s.* A term used among the Augustins, who apply it to a person who, after having been nine years a superior, ceases to be so, and becomes a private monk, under the command of a superior. The word has its rise hence, that pope Clement, by a bull, prohibited any superior among the Augustins from continuing above nine years in his office. Clementines, in the canon law, are the constitutions of pope Clement V. and the canons of the council of Vienne.

CLEMO'NT, a town of France, in the department of the Loiret: four leagues south-west of Gien.

CLEMO'NT, a town of France, in the department of the Upper Marne: four leagues east of Chaumont.

CLE'NARD (Nicholas), a celebrated grammarian in the sixteenth century, born at Diest; and, after having taught humanity at Louvain, travelled into France, Spain, Portugal, and Africa. He wrote in Latin, 1. Letters relating to his Travels, which are very curious and scarce. 2. A Greek Grammar, which has been revised and corrected by many grammarians; and other works. He died at Grenoble, in 1542.

CLENCH. See CLINCH.

CLENZE (Lower), a town of Germany, in the circle of Lower Saxony, and principality of Luneburg Zell: eight miles south-west of Luckow.

CLEOBIS and BITON, in fabulous history, two youths, sons of Cydippe, the priestess of Juno, at Argos. When oxen could not be procured to draw their mother's chariot to the temple of Juno, they put themselves under the yoke, and drew it forty-five stadia to the temple, amidst the acclamations of the multitude, who congratulated the mother on account of the piety of her sons. Cydippe entreated the goddess to reward the piety of her sons with the best gift that could be granted to a mortal. They went to rest and awoke no more; and, by this, the goddess shewed that death is the only true happy event that can happen to a man. The Argives raised them statues at Delphi. *Val. Maximus.*

CLEOBULI'NA, a daughter of Cleobulus, remarkable for her genius, learning, judgment, and courage. She composed ænigmas, some of which have been preserved. One of them runs thus: A father had twelve children, and these twelve children had each thirty white sons and thirty black daughters, who are immortal, though they die every day. In this there is no need of an Œdipus to discover that there are twelve months in the year, and that every month consists of thirty days, and of the same number of nights. *Laert.*

CLEOBU'LUS, one of the seven wise men of Greece, son of Evagoras of Lindus, famous for the beautiful shape of his body. He wrote some verses, and died in the 70th year of his age, before Christ 514. *Plutarch.*

CLEOM'BROTUS, son of Pausanias, king of Sparta, after his brother Agesipolis I. He made war against the Bœotians; and, lest he should be suspected of treacherous communications with Epaminondas, he gave that general battle at Leuctra, in a very disadvantageous place. He was killed in the engagement, and his army destroyed, before Christ 371. *Xenophon.*—A son-in-law of Leonidas king of Sparta, who, for a while, usurped the kingdom, after the expulsion of his father-in-law. When Leonidas was recalled, Cleombrotus was banished; and his wife, Chelonis, who had accompanied her father, now accompanied her husband in his exile. *Pausanias.*

CLEO'ME, *s.* [from κλειω, to close or shut up.] In botany, a genus of the class tetradynamia, order siliquosa, natural order putamineæ. The generic characters are—Calyx: perianthium four-leaved, very small, spreading; the lower leaflet gaping more than the rest; deciduous. Corolla: four-petalled; all the petals ascending, spreading; the nearest intermediate ones smaller than the others; nectareous glands three, roundish, one at each division, except one at the calyx. Stamina: filaments six, (sometimes twelve or twenty-four,) subulate, declining; antheræ lateral, ascending. Pistillum: style simple, germ oblong, declining, the length of the stamens; stigmas thickish, rising. Pericarpium: silique long, cylindric, placed on the style, one-celled, two-valved. Seeds: very many, roundish.—*Essential Character.* Nectareous glands three, at each sinus of the calyx, except the lowest; petals all ascending; silique one-celled, two-valved.

Species. 1. Cleome fruticosa, or shrubby cleome: flowers gynandrous, four stamened; leaves simple; stem shrubby. Stem frutescent, round, branching. Native of India.

2. Cleome heptaphylla, or seven-leaved cleome: flowers gynandrous; leaves with about seven leaflets; stem prickly. Stem herbaceous, from three to five feet high. It is an annual plant, and was sent to Mr. Miller by Dr. Houstoun from Jamaica, where he found it growing in great plenty. It must have been cultivated, therefore, by Mr. Miller before 1748. It flowers in June and July, and is supposed to be a native also of the East Indies; Miller adds Egypt.

3. Cleome pentaphylla, or five-leaved cleome: flowers gynandrous; leaves quinate; stem unarmed. This is an annual, elegant, but fetid, plant, upright, either wholly smooth,

ſmooth, or with a few hairs at the bottom; the ſtem round and branching. According to Loureiro, the ſtem is unarmed, ſimple, two feet high, of a duſky red colour, with diffuſed branches. Native of both Indies, Cochinchina, &c. Mr. Miller ſays, that it grows naturally in Aſia, Africa, and America; that he received the ſeeds from Aleppo, the coaſt of Guinea, and in the earth which came from the Weſt Indies with other plants. It was cultivated in 1640 by Parkinſon; and flowers in June and July.

4. Cleome triphylla, or three-leaved cleome: flowers gynandrous; leaves ternate; ſtem unarmed. This is an annual plant which riſes two feet high, ſending out many ſide branches, with leaves, having one large ſpear-ſhaped lobe in the middle, and two very ſmall ones on the ſide; theſe ſit cloſe to the branches. The flowers come out ſingly from the ſide of the branches, upon long peduncles; they have four large fleſh-coloured petals, and ſix ſtamens, which ſtand out beyond the petals; when the flowers fade, the germ which ſits upon the ſtyle becomes a taper pod four inches long. That this and the foregoing, ſays Linnæus, were originally the offspring of the ſame plant, is evident, from the floral leaves in all being ſeſſile; from the flowers being gynandrous, and having ſix ſtamens; the petals aſcending; the ſiliques pedicelled; and their habit the ſame: they are therefore hardly diſtinct ſpecies. Sent to Mr. Miller from Jamaica, by Dr. Houſtoun, in the year 1730.

5. Cleome juncea, or ruſhy cleome: leafleſs; flowers gynandrous, eight-ſtamened, corymbs lateral, genitals elongated, ſilique, linear, tomentoſe; ſtem ſhrubby. Stem from a foot to two feet in height, hardly the thickneſs of gooſe-quill; branches rigid like ſpines, commonly ending ſharply, greeniſh, round, ſpreading, ſmoothiſh: leaves ſcarcely any, but rather minute ſcales coming out here and there on the ſtem and branches; flowers in a corymb; common peduncle very ſhort; partial peduncles filiform, from half an inch to an inch in length, round, ſomewhat woolly, yellowiſh; ſeeds blackiſh, orbiculate, ſomewhat compreſſed, in a double row, and each, as it were, in its proper cell. Native of the Cape of Good Hope, and found there near the Black River by Sparrman.

6. Cleome polygama: upper flowers four-ſtamened, male; leaves ternate; leaflets ſeſſile, ſomewhat prickly on the edge. Stem erect, ſomewhat gloſſy, a little branched, ſimple, and ſeldom riſes above twenty or twenty-five inches. Native of Jamaica, in moiſt bottoms.

7. Cleome chelidonii: flowers many-ſtamened; leaflets in fives or ſevens, wedge-form, rugged; racemes terminating; ſiliques filiform. This ſpecies has certainly a great affinity to chelidonium, were it not for the digitate leaves, more than two leaves to the calyx, and five petals to the corolla. Koenig found it near Tanſchaur, in the Eaſt Indies.

8. Cleome felina, or cat's-tongue cleome: flowers many-ſtamened, axillary, ſolitary, peduncled; leaves ternate, wedge-form, ſtrigoſe; ſiliques, linear, compreſſed. The whole herb, together with the calyx, is ſtrigoſe. It is ſingular with its hiſpid leaves; the hairs very much dilated at the baſe, very ſtiff, preſſed cloſe to the leaves, pointing cloſe to the extremity, ſo as exactly to reſemble a cat's tongue. Found in Ceylon by Koenig.

9. Cleome icoſandra: flowers icoſi-tetrandrous; leaves quinate. Stem herbaceous, annual, two feet high, erect, round, unarmed, ſtriated, viſcid-hairy; branches aſcending. Native of the Eaſt Indies and Cochinchina.

10. Cleome viſcoſa, or viſcid cleome: flowers twelve-ſtamened; leaves quinate and ternate. Stem erect, a foot high, ſimple, round, ſtriated, villoſe, viſcid, often red; leaves all quinate, except the uppermoſt, which are ternate; both theſe and the flowers are ſmaller than in the foregoing ſpecies; the lower petals are more divaricated; it has from ten to fifteen ſtamens. It is an annual plant, native of the iſland of Ceylon, whence the ſeeds were brought to Holland, and ſent to Mr. Miller, by Boerhaave, in 1739.

11. Cleome dodecandra, or twelve ſtamened cleome: flowers twelve-ſtamened; leaves ternate. Native of both Indies; annual.

12. Cleome gigantea, or gigantic cleome: flowers ſix-ſtamened; leaves in ſevens; ſtem unarmed. Stem two and even four yards in height, round, pubeſcent, erect, evergreen. This beautiful plant has a very burning taſte and ſtinking ſmell. Native of South America.

13. Cleome aculeata, or prickly cleome: flowers ſix-ſtamened; leaves ternate, quite entire; ſtipules ſpineſcent. Obſerved in America by Zuega.

14. Cleome ſpinoſa, or thorny cleome: flowers ſix-ſtamened; leaves in ſevens and fives; ſtem thorny. Root annual; ſtem herbaceous, a fathom high, upright, branched, hirſute, round, with prickles at the baſe of the branchlets; according to Linnæus divaricate; leaves ſmoothiſh; ſtipules in pairs, permanent, and hardening into thorns; ſtamens longer than the flower, but not gynandrous. Native of the Weſt Indies. Sent to Mr. Miller from the Havannah, in the year 1731, by Dr. Houſtoun.

15. Cleome ſerrata, or ſerrate-leaved cleome: flowers ſix-ſtamened; leaves ternate; leaflets linear-lanceolate, ſerrate. This is an annual upright plant, two feet in height; a native of Carthagena, in South America, in moiſt woods.

16. Cleome ornithopodioides, or bird's-foot cleome: flowers ſix-ſtamened; leaves ternate; leaflets oval-lanceolate. Stem round, ſtraight, from a foot to two feet in height, pale green, with ſhort ſtiffiſh rough hairs; leaves ſtrong-ſmelling, on a rough petiole half an inch in length; leaflets commonly bent back, of a pale glaucous hue on both ſides, ſmooth in appearance, but roughiſh to the touch, having numerous ſhort hairs along the edge; ſcarcely perceptible, except in the younger leaves; from the axils of theſe there are other ſmaller ones; from the upper axils come out ſingly ſmall yellow flowers, on ſlender peduncles ſpreading horizontally; ſtamens ſix, bent in; antheræ ſmall, ſaffron-coloured; ſilique ſubhirſute, appearing jointed when ripe, like the legume of ornithopus, whence the trivial name. It is an annual plant, flowering in June and July; a native of the Levant, and was cultivated in 1732 by James Sherard, M. D.

17. Cleome violacea, or violet-coloured cleome: flowers ſix-ſtamened; leaves ternate and ſolitary; leaflets lanceolate linear, quite entire. Native of Portugal; annual; flowering in June and July.

18. Cleome Arabica, or Arabian cleome; flowers ſix-ſtamened; leaves ternate, lanceolate, obtuſe; ſiliques fuſiform, viſcid-ſcabrous. This is an annual viſcid and ſcabrous plant, two feet high. Native of Arabia.

19. Cleome monophylla: flowers ſix-ſtamened; leaves ſimple, ovate-lanceolate, petioled. This is an annual plant, with an herbaceous ſtalk a foot and a half high.

20. Cleome Capenſis, or Cape cleome: flowers ſix-ſtamened; leaves ſimple, ſeſſile, linear-lanceolate; ſtem angular. Stem ſimple, ſtiff, and upright, reſembling that of epilobium; leaves like thoſe of broom, ſtiff, ſtraight, and ſmooth. It is thus deſcribed by Bergius, if his plant be the ſame with Linnæus's: ſtem herbaceous, erect, round, ſtriated, ſmooth, more than a foot high; branches alternate, ſimple, long, upright; leaves alternate, linear, obtuſe, fleſhy; flowers in thin racemes, on alternate, one-flowered, pedicels; leaflets of the calyx ovate, ſharpiſh, equal, permanent; petals wedge-ſhaped, blunt, narrowed gradually downwards, upright, equal, ſeveral times longer than the calyx, purple-fleſh-coloured, with linear, ſhort, yellowiſh, claws; ſeed-veſſel a cordate capſule, two-celled, two-valved. Native of India and the Cape of Good Hope.

21. Cleome procumbens: flowers ſix-ſtamened; leaves ſimple, lanceolate, petioled; ſtems procumbent. Stem herbaceous, ſix inches high, ſuffruteſcent, branched, ſmooth; branches ſomewhat erect, ſubdivided, ſmooth; leaves alternate, ſmall, acute, ſmooth; flowers axillary, peduncled, ſolitary. Native of Jamaica and Hiſpaniola, in dry ſand; flowering in November.

22. Cleome

22. Cleome tenella, or tender cleome: flowers six-stamened; leaves ternate, filiform, linear. A plant of a span in height, branching, erect. Found by Koenig abundantly in dry sandy soil, in the East Indies. It is an annual plant, as most of the others are.

23. Cleome filifolia: flowers six-stamened; leaves lower, septenate; upper ternate. Stem erect, weak, herbaceous, a foot high, branched, striated, towards the top dotted with raised, minute, scattered, dots.

Propagation and Culture. Most of these plants are natives of very warm countries, and will not thrive in England without artificial heat; therefore their seeds must be sown upon a good hot-bed in the spring, and, when the plants are fit to remove, they should be planted in separate small pots, filled with fresh light earth, and plunged into a fresh hot-bed, observing to shade them until they have taken fresh root; after which they should have air admitted to them every day in proportion to the warmth of the season, and their waterings should be frequently repeated, but not given in too great plenty; when the plants have filled these small pots with their roots, they should be put into larger, and plunged again into a hot-bed to bring them forward; and, in July, when they are too tall to remain longer in the hot-bed, they should be removed into an airy glass-case, where they may be screened from cold and wet, but in warm weather may enjoy the free air. With this management the plants will flower soon after, and perfect their seeds in autumn.

CLEOME'DES, in fabulous history, a famous athlete of Astypalæa, above Crete. In a combat at Olympia, he killed one of his antagonists by a blow with his fist. On account of this accidental murder, he was deprived of the victory, and he became delirious. In his return to Astypalæa, he entered a school, and pulled down the pillars which supported the roof, and crushed to death sixty boys. He was pursued with stones, and he fled for shelter into a tomb, whose doors he so strongly secured, that his pursuers were obliged to break them for access. When the tomb was opened, Cleomedes could not be found either dead or alive. The oracle of Delphi was consulted, and gave this answer: *Ultimus heroum Cleomedes Astypalæus.* Upon this they offered sacrifices to him as a god. *Pausanias.*

CLEOME'NES I. king of Sparta, conquered the Argives, and burnt 5000 of them by setting fire to a grove where they had fled, and freed Athens from the tyranny of the Pisistratidæ. By bribing the oracle, he pronounced Demaratus, his colleague on the throne, illegitimate, because he refused to punish the people of Ægina, who had deserted the Greeks. He killed himself in a fit of madness, before Christ 491. *Herodotus.*—The second succeeded his brother Agesipolis II. He reigned sixty-one years in the greatest tranquillity, and was father to Acrotatus and Cleonymus, and was succeeded by Areus I. son of Acrotatus. *Pausanias.*—The third succeeded his father Leonidas. He was of an enterprizing spirit, and resolved to restore the ancient discipline of Lycurgus in its full force, by banishing luxury and intemperance. He killed the Ephori, and removed by poison his royal colleague Eurydamides, and made his own brother, Euclidas, king, against the laws of the state, which forbade more than one of the same family to sit on the throne. He made war against the Achæans, and attempted to destroy their league. Aratus, the general of the Achæans, who supposed himself inferior to his enemy, called Antigonus to his assistance; and Cleomenes, when he had fought the unfortunate battle of Sellasia, before Christ 222, retired into Egypt, to the court of Ptolemy Evergetes, where his wife and children had gone before him. Ptolemy received him with great cordiality; but his successor, weak and suspicious, soon expressed his jealousy of this noble stranger, and imprisoned him. Cleomenes killed himself, and his body was fleaed, and exposed on a cross, before Christ 219. *Polybius.*

CLE'ON, an Athenian, who, though originally a tanner, became general of the armies of the state by his intrigues and eloquence. He took Thoron in Thrace, and was killed at Amphipolis, in a battle with Brasidas the Spartan general, before Christ 432. *Thucydides.*—A general of Messenia, who disputed with Aristodemus for the sovereignty. A poet who wrote a poem on the Argonauts. An orator of Halicarnassus, who composed an oration for Lysander, in which he intimated the propriety of making the kingdom of Sparta elective. *C. Nepos.*—A Magnesian who wrote some commentaries, in which he speaks of portentous events, &c. *Pausanias.*

CLEO'NÆ, a village of Peloponnesus, between Corinth and Argos. Hercules killed the lion of Nemæa in its neighbourhood. *Ovid.*

CLEO'NIA, *s.* [probably adopted by Linnæus from the *cleonicium* of Pliny, and κλεωνικιον of Dioscorides.] In botany, a genus of the class didynamia, order gymnospermia, natural order verticillatæ. The generic characters are—Calyx: perianthium one-leafed, tubular, angular, two-lipped; upper lip flattish, broad, three-toothed; lower two-parted, short. Corolla: one-petalled, ringent; upper lip straight, bifid, keeled; lower trifid; the middle segment two-lobed, the side ones spreading. Stamina: filaments four, forked at the end; the two lower longest; antheræ sitting on the outer apex of the filaments, crossed in pairs. Pistillum: germ four-parted; style filiform, the length of the stamens; stigmas four, setaceous, equal. Pericarpium: none; calyx closed with hairs. Seeds: four, nearly columnar, smooth. This genus differs from all others of this order in having four stigmas.—*Essential Character.* Filaments forked, with an anther at one of the tips; stigma four-cleft.

There is but one species, viz. Cleonia lusitanica, or sweet-scented cleonia. The stem is erect, brachiate, in the lower part hairy; seeds roundish, turgidly lens-shaped, mucronate at the base, rufescent, with a white navel shaped like the letter *y*, lodged in the ventricose striated calyx, closed at the mouth with a white nap. It differs little from prunella, except in its four-cleft stigma, and laciniate bractes. It is an annual plant, native of Spain and Portugal; cultivated by Mr. Miller in 1756.

Sow the seeds in the autumn, and the plants will come up the following spring. When they are fit to transplant, they may be removed to a border, where they will flower and produce seeds. They do not take much room, and they require little culture. Seeds sown in the spring frequently lie a whole year before they vegetate.

CLEOPA'TRA, the celebrated queen of Egypt, daughter of Ptolemy Auletes, and sister and wife to Ptolemy Dionysius, famous for her beauty and her cunning. She admitted Cæsar to her arms, to influence him to give her the kingdom, in preference to her brother, who had expelled her, and had a son by him called Cæsarion. As she had supported Brutus, Antony, in his expedition to Parthia, summoned her to appear before him. She dressed herself in the most magnificent apparel, and appeared before her judge in the most captivating attire. Her artifice succeeded; Antony became enamoured of her, and publicly married her, forgetful of his connections with Octavia, the sister of Augustus. He gave her the greatest part of the eastern provinces of the Roman empire. This behaviour was the cause of a rupture between Augustus and Antony; and these two celebrated Romans met at Actium, where Cleopatra, by flying with sixty sail, ruined the interest of Antony, and he was defeated. Cleopatra had retired to Egypt, where soon after Antony followed her. Antony stabbed himself upon the false information that Cleopatra was dead; and, as his wound was not mortal, he was carried to the queen, who drew him by a cord from one of the windows of the monument, where she had retired. Antony soon after died of his wounds; and Cleopatra, after she had received pressing invitations from Augustus, and even pretended declarations of love, destroyed herself by the bite of an asp, not to fall into the conqueror's hands. She had previously attempted to stab herself,

herself, and had once made a resolution to starve herself. Cleopatra was a voluptuous and extravagant woman; and, in one of the feasts she gave to Antony at Alexandria, she melted pearls into her drink. She was fond of appearing dressed as the goddess Isis; and she advised Antony to make war against the richest nations to support her debaucheries. Her beauty has been greatly commended; and it is said that she could give audience to the ambassadors of seven different nations, and speak their various languages as fluently as her own. In Antony's absence, she repaired the public library of Alexandria, with the addition of that of Pergamus. Two treatises, *de medicamine faciei epistolæ eroticæ*, and *de morbis mulierum*, have been falsely attributed to her; and she died before Christ thirty years, after a reign of twenty-four years. In her death ended the race of the Ptolemies in Egypt; after which that country became a Roman province.

CLEOPA'TRA, the grand-daughter of Attalus, betrothed to Philip of Macedonia, after he had divorced Olympias. When Philip was murdered by Pausanias, Cleopatra was seized by order of Olympias, and put to death. *Justin.*—A sister of Alexander the Great, who married Perdiccas, and was killed by Antigonus, as she attempted to fly to Ptolemy in Egypt. *Diodorus.*—A daughter of Idas and Marpessa, daughter of Evenus, king of Ætolia. She married Meleager, son of king Œneus. *Homer.*—A daughter of Ptolemy Philometor, who married Alexander Bala, and afterwards Nicanor. She killed Seleucus, Nicanor's son, because he ascended the throne without her consent. She was suspected of preparing poison for Antiochus her son, and compelled to drink it herself, before Christ 120. A wife and sister of Ptolemy Evergetes, who raised her son Alexander, a minor, to the throne of Egypt, in preference to his elder brother Ptolemy Lathurus, whose interest the people favoured. As Alexander was odious, Cleopatra suffered Lathurus to ascend the throne, on condition, however, that he should repudiate his sister and wife, called Cleopatra, and marry Seleuca, his younger sister. She afterwards raised her favourite, Alexander, to the throne; but her cruelties were so odious, that he fled to avoid her tyranny. Cleopatra laid snares for him; and, when Alexander heard it, he put her to death. *Justin.*

CLEOPA'TRIS, in ancient geography, a town of Egypt, on the Arabian gulf; now said to be Suez, situated at the bottom of the gulf of the Red Sea.

CLEOSTRA'TUS, a celebrated astronomer born in Tenedos, was, according to Pliny, the first who discovered the signs of the zodiac. He also corrected the errors of the Grecian year about the 306th before Christ.

To CLEPE, *v. a.* [clýpian, Sax.] To call. *Obsolete.*—They *clepe* us drunkards. *Hamlet.*—He *clepeth* a calf, cauf. *Love's Labour lost.*

Three crabbed months had sowr'd themselves to death,
Ere I could make thee open thy white hand,
And *clepe* thyself my love. *Shakespeare.*

CLEP'SYDRA, *s.* [from κλεπτω, to conceal, and ὑδωρ, water.] The water-clock; an instrument to measure time by the dropping of water contained in it through a hole. For its construction, see the article HOROLOGY. A chemical vessel used in the same manner. Also an instrument made like it, for conveying fumigations to the uterus in hysterical cases.

CLERC (John le), a celebrated writer and universal scholar, born at Geneva in 1657. After he had passed through the usual course of study at Geneva, and had lost his father in 1676, he went to France in 1678; but, returning the year following, he was ordained with the general applause of all his examiners. In 1682, le Clerc visited England, with a view to learning the language. He preached several times in the French churches in London; and, after visiting most of the men of learning, he returned to Holland within the year, where he at length settled. He preached before a synod held at Rotterdam by the remonstrants in 1684; and was admitted professor of philosophy, polite literature, and the Hebrew tongue, in their school at Amsterdam. The remainder of his life was spent in the compilation of his works, and of the controversies he was engaged in; but these would lead into too extensive a detail. He continued to read regular lectures; and he drew up and published his Logic, Ontology, Pneumatology, and Natural Philosophy. He published *Ars Critica*; a Commentary on the Old Testament; a Compendium of Universal History; an Ecclesiastical History of the two first Centuries; a French Translation of the New Testament, &c. In 1686, he began, jointly with M. de la Crose, his *Bibliotheque Universelle et Historique*, in imitation of other literary journals; which was continued to the year 1693, inclusive, in 26 vols. In 1703, he began his *Bibliotheque Choisie*, and continued it to 1714, and thence commenced another work on the same plan called *Bibliotheque Ancienne et Moderne*, which he continued to the year 1728; all of them justly deemed excellent stores of useful knowledge. In 1728, he was seized with a palsy and fever; and, after spending the last six years of his life with little or no understanding, died in 1736.

CLERC (John le), called Chevalier, an eminent historical painter, born at Nanci in 1587, but studied in Italy, where he resided for twenty years; and was a disciple of Carlo Venetiano, under whom he worked a long time, and whose stile he so effectually studied and imitated, that several of the pictures which were finished by le Clerc, were taken for the work of Venetiano. He was highly esteemed at Venice for his extraordinary merit; and, as a token of public respect, he was made a knight of St. Mark. His freedom of hand was remarkable; and his colouring invariably shewed it to be the work of a master. He died in 1633.

CLERC (Sebastian le), engraver and designer in ordinary to the French king, was born at Metz in 1637. After having learnt to design, he applied himself to mathematics, and was engineer to the marshal de la Ferté. He went to Paris in 1665, where he applied himself to engraving with such success, that M. Colbert gave him a pension of 600 crowns. In 1672, he was admitted into the royal academy of painting and sculpture; and, in 1680, was made professor of geometry and perspective in the same academy. He published, besides a great number of designs and prints, 1. A Treatise on Theoretical and Practical Geometry. 2. A Treatise on Architecture, and other works; and died in 1714. He was an excellent artist, but chiefly in the petit stile. His genius seldom exceeds the dimensions of six inches. Within those limits he could draw up 20,000 men with great dexterity. No artist, except Callot and Della Bella, could touch a small figure with so much spirit. His most esteemed prints are, 1. The Passion of our Saviour, on thirty-six small plates, lengthwise, from his own compositions. The best impressions are without the borders. 2. The Miracle of the Feeding Five Thousand, a middling-sized plate, lengthwise. In the first impressions, which are very rare, a town appears in the back-ground; in place of which a mountain is substituted in the common ones. 3. The Elevation of the large Stones used in building the Front of the Louvre, a large plate, lengthwise. The first impressions are without the date 1677, which was afterwards added. 4. The Academy of the Sciences, a middling-sized plate, lengthwise. The first impressions are before the skeleton of the stag and tortise were added. The second impressions are before the shadow was enlarged at the bottom, towards the right-hand side of the print. Both these impressions are very scarce. The first is rarely met with. This print was copied as a frontispiece for Chambers's Dictionary. 5. The May of the Gobelins, a middling-sized plate, lengthwise. The first impression is before the woman was introduced, who covers the wheel of the coach. 6. The Four Conquests, large plates, lengthwise, representing the taking of Tournay, the taking of Doway, the defeat of the

the comte de Marsin, and the Swisserland alliance. 7. The Battles of Alexander, from Le Brun, six small long plates, including the title, which represents the picture-gallery at the Gobelins. The first impressions of the tent of Darius, which plate makes part of this set, is distinguished by the shoulder of the woman, who is seated in the front, being without the shadow, which was afterwards added; for which reason they are called the *prints with the naked shoulder*. 8. The Entry of Alexander into Babylon, a middling-sized plate, lengthwise. In the first impressions, the face of Alexander is seen in profile; in the second, it is a three-quarter face, and therefore called the *print with the head turned*.

CLERC (George-Louis le), count Buffon, a naturalist and writer of great eminence, was the son of a counsellor of the parliament of Dijon, at whose seat at Montbard in Burgundy he was born, September 7, 1707. He studied at Dijon; and his father intended him for the profession of the law, but his decided inclination for the sciences frustrated this purpose. Though of an active frame of body, and an ardent temperament, his earliest passion was for astronomy, and its basis geometry; and Euclid's Elements was his constant pocket companion. At the age of twenty he travelled into Italy, where the objects of his curiosity were less the productions of art than the phenomena of nature, to the study of which he devoted all his faculties. The art of writing was, however, an object of his constant and sedulous attention; for he thought that truth appeared to the best advantage under the decorations of eloquence. He succeeded at twenty-one to a handsome property; and, after concluding his travels with a visit to England, he commenced a life of ease and literature, divided between Paris and his estate at Montbard. His first publication was a translation from the English of Hales's Vegetable Statics, in 1735; followed in 1740 by a translation from the Latin, of Newton's Fluxions. He was appointed, in 1739, superintendant of the royal garden and cabinet, which, as he came to be known, he enriched with the productions of all the parts of the world. To the advantages of situation he enjoyed, he added the essential quality of industry, and is said to have passed fourteen hours every day in study. This, however, must have been in his intervals of country retirement, since he was fond of society, and was by no means insensible to the attractions of the fair sex. Of his great application, however, he gave a convincing proof by the publication of his celebrated work, "Natural History, general and particular," which commenced in 1749; and at its completion, in 1767, reached to 15 vols. 4to. or 31 vols. 12mo. To this were afterwards added supplements amounting to several more volumes. In the purely anatomical part of this work he had the assistance of d'Aubenton; the rest was wholly his own composition. In this great performance, the author takes a range circumscribed only by the bounds of nature herself. He begins with a theory of the earth, which, with the other planets, he supposes to have been originally a mass of liquefied matter, dashed out of the body of the sun by the violent illapse of a comet. He then covers it with ocean, from which he forms strata by deposition, and mountains by the flux and reflux of the tide. Subterraneous fires, eruptions, and earthquakes, effect other changes; and the world we now inhabit is but the ruins of a former world. It is needless to follow him through speculations of this sort, which ingenuity may make plausible, but which can never rise even to probability, since nothing is so unlikely as that the human faculties should be able to arrive at the solution of so mighty a problem as the creation of a habitable globe. Buffon's theory of the earth will sink into oblivion, as so many others have done; but his grand views and striking descriptions of its present state, will remain as brilliant displays of eloquence, combined with extensive information. Proceeding to the population of the earth with living creatures, he considers the analogies between vegetable and animal life, and again plunges into hypothetical theory in order to explain the mystery of animal generation. He conceives certain living organic molecules, of the same nature with organized beings, and existing equally in animal and vegetable matter; these, in the process of nutrition, are received into internal moulds, of which animal and vegetable bodies are framed, where they are assimilated into the same substance as the parts to which they go, and thus nourish them. When this nutritive matter superabounds, it is detached from all parts of the body, and deposited in a fluid form in one or more reservoirs. This constitutes a prolific matter, which is ready to produce a new animal, or vegetable, of the same species, when it meets with a proper matrix. The supposed seminal animalculæ are only these organic particles, which are similar in both sexes, but must unite in order to produce a new animal by way of generation. Of this theory it is difficult to form any clear conception; and it has, moreover, been disproved by physiologists of eminence. Its fate will, therefore, be that of the writer's planetary theory; and, in this case also, his fame will ultimately depend only upon his narrations of fact, and the conclusions deduced from them by a large and comprehensive mind.

His natural history of animals properly commences with that of man, the undoubted head of the class. To his history from the cradle to the grave, the opening and maturation of his bodily and mental powers, the nature of his senses, and the several varieties of the human species, he devotes a large space, full of curious discussions. M. d'Aubenton contributed much to this part of the work. He then treats on the nature of brute animals in general; and he draws a strong line of distinction between them and men, by denying them a soul, and a memory properly so called, and making all their actions to spring from external impressions. The class of quadrupeds alone occupies all the remainder of this first work. Either from the pride of following a plan of his own, or from a contempt of the petty distinctions on which the arrangements of many systematic naturalists are founded, Buffon rejects all the received principles of classification, and throws his subjects into groups laxly formed from general points of resemblance. This method doubtless enables him to take large and noble views of nature, and to pursue the plans of her own economy, which disregards and confounds all the artificial limits attempted to be established by the spirit of system. At the same time it is evident, that no class of beings but one so little numerous as that of quadrupeds, could be accurately treated of by a writer in so loose a method. In this matter, as in most other particulars, Buffon is a direct, and probably an intentional, contrast to Linnæus, with whom system is the leading object, constituting both his strength and his weakness. We shall not follow our naturalist through the divisions of his extensive work, of which the arrangement certainly is not the valuable part. It is in the detail of facts, and in the strain of enlarged and philosophic observation resulting from them, that the peculiar merit of Buffon consists. A few remarks on these may serve to characterize him.

No writer ever expended so much eloquence in the description of animal life. The historian of a great empire could not assume a stile of higher tone, than he has done in painting the manners and habits of the lion, the horse, the elephant, and others of his favourites. Perhaps he has violated good taste in thus rising above the level of his subject; and it cannot be doubted that this passion for high painting has sometimes made him stray from the limits of simple truth, into the regions of fancy. Yet he abounds in particular and minute observation, often the result of his own experience; and scarcely any student of nature can boast of having added more to the stock of authenticated fact than he. But he was occasionally warped by attachment to theory, as well as by the pursuit of eloquence. On various topics he had formed general theorems, which he was inclined to support against exceptions,

ceptions, by denying or neglecting the instances produced on the other side. Further, he not unfrequently gives the mere inferences from his opinions as if they were known and tried facts: thus dangerously confounding hypothesis with that experience which is the only true basis of all natural knowledge. He often attributes more to the operation of certain causes, such as change of climate, domestication, and the like, than sober reason can warrant; and even, according to the tenor of his argument, sometimes ascribes opposite effects to the very same cause. These blemishes materially lessen the confidence with which his work can be used as authority, and later enquirers are continually detecting errors in his statements. Yet the great mass of matter will probably always remain unimpeached; and certainly no writer has ever done so much to render natural history entertaining, and to elevate its rank among the objects on which the human intellect is employed. In one point, however, he will by many be thought to have derogated from the true dignity and value of his subject. He is everywhere the enemy of the doctrine of final causes; and substitutes, to a designing and benevolent author, the fortuitous operations of a certain unconscious nature, which as often exhibits examples of blunder and defect as of skilful and happy contrivance. It cannot be denied, that those who have made final causes the professed objects of their search, have often displayed more piety than philosophy; and in their zeal to collect proofs have dwelt upon circumstances either extremely trifling, or such as are overbalanced by contrary facts. Yet studiously to overlook so beautiful a part of the economy of things as the adaptation of means to ends, is surely as inconsistent with the philosophical as the religious spirit. The fault is aggravated in Buffon by the pleasure he occasionally takes in declaiming upon the defects of nature, in a strain which would seem to impute malignity of intention to the Author of being, and which he appears to have derived from the shallow philosophy of his predecessor Pliny. The moral reader of Buffon will likewise be frequently offended with the grossness of his descriptions in all points relative to sex; in which he not only indulges in anatomical plainness of language, but, what is much worse, adopts a studied sensualism, the object of which is to exalt the value of sexual gratifications, and make a propensity to them one of the indications of nobleness of nature. This impurity of sentiment is, however, in some degree national, and has infected some of the first French writers of the age, who have dangerously exhibited it in their estimates of human characters.

To proceed with the account of Buffon's publications. In 1771 his History of Birds began to appear. In the composition of this work he made great use of the labours of M. Gueneau de Montbeillard, who was the principal writer of the first two volumes in quarto. The four subsequent ones were the joint production of both writers. The three last were written by Buffon himself, with the assistance of the abbé Bexon in forming the nomenclature, and drawing up the descriptions. This work, compleated in 1783, is a worthy sequel of the History of Quadrupeds, though from the much greater number of species of birds, the want of a systematic arrangement is more sensible.

In 1774, he began to publish a Supplement to his Natural History, consisting of the History of Minerals. The first volume of this work contains his remarkable invention of a burning-glass, composed of a number of plane mirrors, so disposed as to throw all their reflexions of the solar beams on the same spot. He constructed an instrument of this kind, consisting of 360 plane mirrors, each capable of being separately adjusted by a screw, with which he kindled wood at the distance of 210 feet, thus realising what has been related of Archimedes at the siege of Syracuse. These supplemental volumes, of which the fifth, quarto, appeared in 1779, contain many curious and valuable experiments, as well as much theory, rather too lax for the rigour of modern science. The concluding volume may be considered as a kind of philosophical romance. It is on the Epochas of Nature, or those great changes in the state of the earth which the author supposes would successively result from his hypothesis of its original formation out of the body of the sun. Of these he enumerates seven, six of them previous to the creation of man. It is needless to remark how much sport of the fancy there must be in the establishment and description of these epochas; but, as a critic has observed, (Monthly Rev. iv. 61,) "in the reveries of Buffon there is entertainment, and always instruction, of some kind or other." These are the principal works of this great author, which have been published together in thirty-five vols. 4to. and sixty-two vols. 12mo. They are received among the standard and classic books of the nation, and new editions of them are at this time under publication. Buffon was a member of the French academy, and was perpetual treasurer of the academy of sciences. He wisely stood apart from the intrigues and parties which so disgracefully occupied most of the French literati of his time; and, probably for the preservation of his tranquillity, he made a point never to reply to the attacks upon his works, though some of his antagonists could by no means be deemed unworthy of his notice. In 1771 his estate of Buffon was erected into a comté; and thus the decoration of rank, to which he was by no means indifferent, was added to the superior dignity he had acquired as one of the most distinguished members of the republic of letters.

Buffon had a fine person, of which he appeared not a little vain. He was particularly fond of having his hair in exact order, and even in his old age employed the friseur twice or thrice a-day. He loved fine clothes, and thought it incumbent on his rank to appear in lace before the peasantry of Montbard on Sundays. He sat long at table, and was pleased with trifling gossiping conversation. Like many of his countrymen, he was indelicate in his pleasantries, and often obliged women to quit the room. His practice, with respect to female connections, was at least as lax as his principles. During the life of his wife he was guilty of frequent infidelities; and in his amours he did not scruple the debauching of young girls, and then employing means to procure abortion. One of his mistresses, a peasant's daughter, obtained the chief influence over him in his advanced age. He was very accessible to adulation, and with singular naiveté would praise himself. "The works of eminent geniuses," said he, "are few; they are those of Newton, Bacon, Leibnitz, Montesquieu, and my own. Newton," continued he, "may have discovered an important principle, but he spent his life in frivolous calculations, and was no master of style." He thought higher of Leibnitz than of Bacon. He spoke of Montesquieu's genius, but thought his style too studied, and wanting evolution: "This, however, (said he,) was a natural consequence of his frame of body. I knew him well; he was almost blind, and very impatient. If he had not clipt his ideas into short sentences, he would have lost his period before the amanuensis had taken it down."

Convinced of the importance of religion in maintaining the due subordinations of society, he always paid it external respect, and regularly performed its public duties; and thus he flattered himself that he avoided sharing in the mischievous attacks which Voltaire, Diderot, and others, had made upon religion, though by his writings he was perpetually sapping its foundations. He was very regular in the distribution of his time, and passed a life of great industry. Composing was a difficult task to him, and his writings passed through a number of revisals before they were made public. Indeed style was one of the capital objects of his admiration. He could not bear the least deviation from accuracy and propriety in the use of language, and hence was a severe censor of poetry, which he had attempted in his youth, but soon quitted for prose.

A nice

A nice and just regard to his fame made him destroy every paper which he thought useless or unfinished, so that he left behind him none of the rubbish which crowds the desks of so many great authors, and furnishes matter for posthumous degradation. In reading his writings to others, of which he was fond, if he discovered that the hearer was the least embarrassed about the meaning of a passage, he directly altered it; and he paid ready attention to every critical remark. When he had made many corrections in a manuscript, he employed an amanuensis to transcribe it, and then he would correct it again. He told M. de Sechelles, that the *Etudes de la Nature* were written over eighteen times. He spoke with rapture of the pleasures derived from literature; and he preferred the books, to the conversation, of learned men, the latter of which, he said, had almost always disappointed him. Hence he himself rarely attempted more than to trifle in company. He maintained a correspondence with several persons of rank and eminence, among whom one of the greatest in every view was the late empress of Russia, who ably criticised some of his opinions, and favoured with great zeal in her dominions his researches in natural history. Notwithstanding great sufferings from the stone and gravel, he prolonged his life to his eighty-first year, dying on April 16th, 1788, in the full possession of his senses, His funeral at St. Medard's was attended by a great concourse of academicians, and persons of rank and literary distinction. He left one son, who fell a victim to the atrocities under Robespierre.

CLE'REVAUX, a town of France, in the department of the Aveiron, and chief place of a canton, in the district of Rhodez: eight miles north-west of Rhodez.

CLERFF, or CLERVAUX, a town of the Netherlands, in the duchy of Luxemberg: ten miles north of Luxemburg.

CLERGOU'X, a town of France in the department of the Correze, and chief place of a canton, in the district of Tulle: six miles north-east of Tulle.

CLER'GY, *s.* [*clergé*, Fr. *clerus*, Lat. κληρος, Gr.] That venerable body of clerks or ecclesiastics, who are *de clero Domini*, of our Lord's lot or share, as the tribe of Levi was in Judæa; and are separate from the noise and bustle of the world, that they may have leisure to spend their time in the duties of the Christian religion. The clergy were formerly divided into regular and secular; those being regular which lived under certain rules, and of some religious order, and were called men of religion, or the religious; such as abbots, priors, monks, &c. The secular were those that lived not under any certain rules of the religious arders; as bishops, deans, parsons, &c. Now, the word *clergy* comprehends all persons in holy orders, and in ecclesiastical offices, viz. archbishops, bishops, deans, and chapters, archdeacons, rural deans, parsons, (who are either rectors or vicars,) and curates.

The clergy have several privileges allowed them by our municipal laws, and had formerly much greater, which were abridged at the time of the reformation, on account of the ill use the then clergy had endeavoured to make of them; for the laws having exempted them from almost every personal duty, they attempted a total exemption from every secular tie. The personal exemptions, however, for the most part continue: a clergyman cannot be compelled to serve on a jury, nor to appear at a court-leet, or view of frank-pledge, which almost every other person is obliged to do; but, if a layman is summoned on a jury, and before the trial takes orders, he shall, notwithstanding, appear and be sworn. 4 *Leon.* 190. A clergyman cannot be chosen to any temporal office, as bailiff, reeve, constable, or the like, in regard of his own continual attendance on the sacred function. *Finch. L.* 88. During his attendance on divine service he is privileged from arrests in civil suits; for a reasonable time, *eundo, redeundo, & morando*, to perform service. Stats. 50 *E.* III. c. 51. 1 *R.* II. c. 16. In cases of felony he shall have *benefit of his clergy*, without being branded; and may likewise have it more than once. Clergymen also have certain disabilities; it was long doubted how far they were capable of sitting as members of the house of commons; but a bill has just passed the two houses to make the law clear upon the subject; yet, as it had not received the royal assent when this article went to press, (June 26, 1801,) we cannot with propriety insert any of its enactments.

By stat. 21 H. VIII. c. 13. the rector is not to reside out of his parish for a month together, on penalty of ten pounds a month. Several actions have been lately brought upon this act, and verdicts obtained; but a bill is now pending in parliament to relieve the clergy from the inconvenience of it, or at least to qualify its rigour under peculiar circumstances. By the same act the clergy are not, in general, allowed to take any lands or tenements to farm, on pain of ten pounds per month, and total avoidance of the lease, unless where they have not sufficient glebe, and the land is taken for the necessary expences of their household; nor, on like penalty, to keep any tanhouse or brewhouse; nor may they engage in any trade, or sell merchandize, on forfeiture of treble value. Yet it appears that a clergyman may trade so as to become a bankrupt: in the London Gazette, May 21, 1801, the name of the reverend sir Henry Clerke, *miller*, is among the bankrupts. See the article BANKRUPT, vol. ii. p. 682, and *Cowp.* 745.

By the statute called *articuli cleri*, 9 *E.* II. stat. 1. c. 3. if any person lay violent hands on a clerk, the amends for the peace broken shall be before the king, that is, by indictment, and the assailment may also be sued before the bishop, that excommunication or bodily penance may be imposed; which, if the offender will redeem by money, it may be sued for before the bishop. 4 *Comm.* 217.

Although the clergy claimed an exemption from all secular jurisdiction, yet Mat. Paris tells us, that soon after William I. had conquered Harold, he subjected the bishoprics and abbeys who held *per baroniam*, that they should be no longer free from military service; and for that purpose he in an arbitrary manner registered how many soldiers every bishopric and abbey should provide, and send to him and his successors in time of war; and, having placed these registers of ecclesiastical servitude in his treasury, those who were aggrieved, departed out of the realm; but the clergy were not, till then, exempted from all secular service; because, by the laws of Edgar, they were bound to obey the secular magistrate in three cases, viz. upon any expedition to the wars, and to contribute to the building and repairing of bridges, and of castles for the defence of the kingdom. It is probable that, by expedition to the wars, it was not at that time intended they should personally serve, but contribute towards the charge; one they must do, as appears by the petition to the king, anno 1267, viz. *Ut omnes clerici tenentes per baroniam vel feudum laicum, personaliter armati procederent contra regis adversarios, vel tantum servitium in expeditione regis invenirent, quantum pertineret ad tantam terram vel tenementum.* But their answer was, that they ought not to fight with the military but with the spiritual sword, that is, with prayers and tears; that they were to maintain peace and not war, and that their baronies were founded on charity; for which reason they ought not to perform any military service.

That the clergy had greater privileges and exemptions at common law than the laity, is certain; for they are confirmed to them by Magna Charta, and other ancient statutes; but these privileges are in a great measure lost, the clergy being included under general words in later statutes; so that clergymen are liable to all public charges imposed by act of parliament, where they are not particularly excepted as above stated. Their bodies are not to be taken upon statutes-merchant or staple, &c. for the writ to take the body of the conusor is *si laicus sit*; and, if the sheriff, or any other officer, arrest a clergyman upon any such process, it is said an action of false imprisonment lies

lies against him that does it, or the clergyman arrested may have a supersedeas out of chancery. 2 *Inst.* 4. In action of trespass, account, &c. against a person in holy orders, wherein process of capias lies, if the sheriff return that the defendant is *clericus beneficiatus nullam habens laicum feodum ubi summoneri potest*; in this case the plaintiff cannot have a capias to arrest his body; but the writ ought to issue to the bishop to compel him to appear; but, on execution had against such clergyman, a sequestration shall be had of the profits of his benefice. 2 *Inst.* 4. *Degge* 257.

Benefit of Clergy, being a circumstance of no small curiosity as well as use, we have here abridged judge Blackstone's learned Commentaries upon this usage of law, together with such additions as seemed requisite. These are comprised under the following heads: 1. Its original, and various changes. 2. To whom it is now to be allowed. 3. In what cases. 4. The consequences of allowing it.

1. The benefit of clergy had its original from the pious regard paid by Christian princes to the church in its infant state; and the ill use which some ecclesiastics made of that pious regard. The exemptions which they granted to the church were principally of two kinds: 1. Exemption of places, consecrated to religious duties, from criminal arrests, which was the foundation of sanctuaries. 2. Exemption of the persons of clergymen from criminal process before the secular judge, in a few particular cases; which was the true original and meaning of this *privilegium clericale*. In England, however, a total exemption of the clergy from secular jurisdiction could never be thoroughly effected, though often endeavoured by the clergy. Stat. *Westm.* 1. 3 *E.* I. c. 2. and, therefore, though the ancient *privilegium clericale* was in some capital cases, yet it was not universally allowed. And in those particular cases, the use was for the bishop or ordinary to demand his clerks to be remitted out of the king's courts as soon as they were indicted; concerning the allowance of which demand there was for many years a great uncertainty; (2 *Hal. P. C.* 377;) till at length it was finally settled, in the reign of Henry VI. that the prisoner should first be arraigned, and might either then claim his benefit of clergy, by way of declinatory plea, or, after conviction, by way of arresting judgment. This latter way is most usually practised, as it is more to the satisfaction of the court to have the crime previously ascertained by confession, or the verdict of a jury; and also it is more advantageous to the prisoner himself, who may possibly be acquitted, and so need not the benefit of his clergy at all.

Originally the law was held, that no man should be admitted to the privilege of clergy, but such as had the *habitum et tonsuram clericalem*. 2 *Hal. P. C.* 372. but, in process of time, a much wider and more comprehensive criterion was established; every one that could read, (a mark of great learning in those days of ignorance and superstition,) being accounted a clerk, or *clericus*, and allowed the benefit of clerkship, though neither initiated in holy orders, nor trimmed with the clerical tonsure. But when learning, by means of the invention of printing, and other concurrent causes, began to be more generally disseminated than formerly; and reading was no longer a competent proof of clerkship, or being in holy orders; it was found that as many laymen as divines were admitted to the *privilegium clericale*; and therefore, by stat. 4 Hen. VII. c. 13. a distinction was once more drawn between mere lay-scholars, and clerks that were really in orders. And, though it was thought reasonable still to mitigate the severity of the law with regard to the former, yet they were not put upon the same footing with actual clergy; being subjected to a slight degree of punishment, and not allowed to claim the clerical privilege more than once. Accordingly the statute directs, that no person, once admitted to the benefit of clergy, shall be admitted thereto a second time, unless he produces his orders; and, in order to distinguish their persons, all laymen who are allowed this privilege shall be burnt with a hot iron in the brawn of the left thumb. This distinction between learned laymen, and real clerks in orders, was abolished for a time by the stats. 28 H. VIII. c. 1. and 32 H. VIII. c. 3. but it is held (Hob. 294. 2 Hal. P. C. 375.) to have been virtually restored by stat. 1 Edw. VI. c. 12. which statute also enacts, that lords of parliament, and peers of the realm, having place and voice in parliament, may have the benefit of their peerage, equivalent to that of clergy, for the first offence, (although they cannot read, and without being burnt in the hand,) for all offences then clergyable to commoners; and also for the crimes of house-breaking, highway-robbery, horse-stealing, and robbing of churches.

After this burning, the laity, and before it the real clergy, were discharged from the sentence of the law in the king's court, and delivered over to the ordinary, to be dealt with according to the ecclesiastical canons. Whereupon the ordinary proceeded to make a purgation of the offender by a new canonical trial, by the oath of the offender and that of twelve compurgators, although he had been previously convicted by his country, or, perhaps, by his own confession. But this purgation opening a door to a scandalous prostitution of oaths, and other abuses, it was enacted, by stat. 18 Eliz. c. 7. that, for the avoiding of such perjuries and abuses, after the offender has been allowed his clergy, he shall not be delivered to the ordinary as formerly; but, upon such allowance, and burning in the hand, he shall forthwith be enlarged and delivered out of prison; with proviso that the judge may, if he thinks fit, continue the offender in jail for any time not exceeding a year. And thus the law continued for above a century unaltered, except only that the stat. 21 Jac. I. c. 6. allowed, that women convicted of simple larcenies, under the value of ten shillings, should (not properly have the benefit of clergy, for they were not called upon to read, but) be burned in the hand, whipped, put in the stocks, or imprisoned for any time not exceeding a year. And a similar indulgence, by stats. 3 & 4 W. & M. c. 9. & 24. was extended to women guilty of any clergyable felony whatsoever, who were allowed to claim the benefit of the statute once, in like manner as men might claim the benefit of clergy, and to be discharged upon being burned in the hand, and imprisoned for any time not exceeding a year. The punishment of burning in the hand was changed by stat. 10 & 11 W. III. c. 23. into burning in the left cheek, near the nose; but this provision was repealed by stat. 5 An. c. 6. and, till that period, all women, all peers of parliament, and peeresses, and all male commoners who could read, were discharged in all clergyable felonies; the males absolutely, if clerks in orders; and other commoners, both male and female, upon branding; and peers and peeresses without branding, for the first offence; yet all liable, (except peers and peeresses,) at the discretion of the judge, to imprisonment, not exceeding a year. And those men who could not read, if under the degree of peerage, were hanged.

But, by the said stat. 5 An. c. 6. it was enacted, that the benefit of clergy should be granted to all those who were entitled to ask it, without requiring them to read. And it was further enacted by the same statute, that when any person is convicted of any theft or larceny, and burnt in the hand for the same, according to the ancient law, he shall also, at the discretion of the judge, be committed to the house of correction, or public work-house, to be there kept to hard labour for any time not less than six months, and not exceeding two years; with a power of inflicting a double confinement in case of the party's escape from the first. And, by stats. 4 Geo. I. c. 11. 6 Geo. I. c. 23. when any persons shall be convicted of any larceny, either grand or petit, or any felonious stealing or taking of money or goods, either from the person or the house of another, or in any other manner, and who, by the law, shall be entitled to the benefit of clergy, and liable only to burning in the hand, or whipping, the court may, instead thereof, direct such offenders to be trans-

ported; and, by the stat. 19 Geo. III. c. 74. offenders liable to transportation, may, in lieu thereof, be employed, if males, (except in the case of petty larceny,) in hard labour, for the benefit of some public navigation, and in all cases might be confined to hard labour in certain penitentiary houses, then in contemplation to be erected; but this latter plan of the penitentiary houses was never carried into execution. By the same stat. 19 Geo. III. c. 74. instead of burning in the hand, the court, in all clergyable felonies, may impose a pecuniary fine, or (except in the case of manslaughter) may order the offender to be once, or oftener, but not more than thrice, either publicly or privately whipped; and, in the latter case, certain provisions are added to prevent collusions or abuse. The offender so fined or whipped, to be equally liable to subsequent detainer or imprisonment.

2. All clerks in orders are without any branding, and of course without any transportation, fine, or whipping, (for those are only substituted in lieu of the other,) to be admitted to this privilege, or benefit of clergy, and immediately discharged; and this as often as they offend. 2 *Hal. P. C.* 375. All lords of parliament, and peers of the realm, having place and voice in parliament, by stat. 1 E. VI. c. 12. (which is likewise held to extend to peeresses, *Duchess of Kingston's case*, 11 State Trials, 198.) shall be discharged in all clergyable and other felonies, provided for by the act, without any burning in the hand, or imprisonment, or other punishment substituted in its stead, in the same manner as real clerks convict; but this only for the first offence. All the commons of the realm, not in orders, whether male or female, shall, for the first offence, be discharged of the capital punishment of felonies, within the benefit of clergy, upon being burnt in the hand, whipped, or fined, or suffering the discretionary imprisonment before stated; or, in case of larceny, upon being transported for seven years, if the court shall think proper. It is a privilege peculiar only to the clergy, that sentence of death can never be passed upon them for any number of manslaughters, bigamies, simple larcenies, or other clergyable offences; but a layman, even a peer, may be ousted of clergy, and will be subject to the judgment of death, upon a second conviction of a clergyable offence. Thus, if a layman has once been convicted of manslaughter, upon production of the conviction, he may afterwards suffer death for bigamy, or any other clergyable felony; which would not therefore be a capital crime to another person not so circumstanced.

It has been said that Jews, and other infidels and heretics, were not capable of the benefit of clergy, till after the stat. 5 An. c. 6. as being under a legal incapacity for orders; 2 *Hawk. P. C.* c. 33. *Fost.* 306. but it does not seem that this was ever ruled for law, since the re-introduction of the Jews into England, in the time of the usurpation by Cromwell; for, if that were the case, the Jews are still in the same predicament, which every day's experience contradicts; the stat. of An. having made no alteration in this respect, it only dispensing with the necessity of reading. 4 *Comm.* 373. But a person having once had benefit of clergy, shall not be ousted of his clergy, by the bare mark in his hand, or by a parol averment, without the record testifying it, or a transcript thereof, according to the following statutes. By stat. 34 & 35 H. VIII. c. 14. the clerk of the crown, or of the peace, or of assise, shall certify a transcript briefly of the tenor of the indictment, outlawry, or conviction, and attainder, into the king's-bench in forty days; and the clerk of the crown, when the judges of assise, or justices of the peace, write to him for the names of such persons, shall certify the same, with the causes of the conviction or attainder.

Another method is given by the stat. 3 W. & M. c. 9. which enacts, that the clerk of the crown, clerk of the peace, or clerk of assise, where a person admitted to clergy under that act shall be convicted, shall, at the request of the prosecutor, or any other on the king's behalf, certify a transcript briefly and in few words, containing the effect and tenor of the indictment and conviction, of his having the benefit of clergy, and the addition of the party, and the certainty of the felony and conviction, to the judges where such person shall be indicted for any subsequent offence. Also it seems, that if the party deny that he is the same person, issue must be joined upon it; and it must be found upon trial that he is the same person, before he can be ousted of clergy. Against the defendant's prayer of clergy, the prosecutor may file a counter-plea; alleging some fact, which in law deprives the defendant of the privilege he claims. It is a good counter-plea to the prayer of clergy, that the offender is not entitled to the benefit of the statute, because he was before convicted of an offence, and thereupon prayed the benefit of the statute, which was allowed to him; alleging the truth of the fact, and praying the judgment of the court, that he may die according to law; which fact is to be tried by the record in pursuance of the stat. 34 & 35 H. VIII. c. 14. above-stated. Divers other counter-pleas also, by which an offender may be deprived of clergy, may be framed from a consideration of the persons to whom it is allowed or denied by the common law; and of the circumstances under which that allowance or denial of it has been placed by divers statutes. The use of this counter-plea, however, had long become obsolete and out of practice, no traces of it appearing in any of the books since Staunforde's time, who was chief justice of K. B. temp. Eliz. But the daring practices of some money-coiners occasioned its revival; and, in the case of R. *v.* Marston Rothwell, and Mary Child, convicted for coining at the Old Bailey, in September sessions, 1783, before judge Ashurst, a counter-plea of record was filed on the part of the prosecution, alleging that the convicts had been before allowed the benefit of the statute, &c. And they were thereby ousted of their clergy. *Leach's Hawk. P. C.* 2. c. 33.

3. Privilege of clergy was not indulged at common law, either in high treason, or in petit larceny, nor in any mere misdemeanors; and therefore it may be laid down for a rule, that it was only allowable in petit treasons, and capital felonies; which, for the most part, became legally entitled to this indulgence by the stat. *de clero*, 25 E. III. c. 4. which provides, "that clerks convict for treasons or felonies, touching other persons than the king himself, shall have the privilege of holy church." But yet it was not allowable in all felonies whatsoever; for, in some it was denied even by the common law, viz. *insidiatio viarum*, or lying in wait for one on the highway; *depopulatio agrorum*, or destroying and ravaging a country; 2 *Hal. P. C.* 333. but in these two cases it was expressly remedied, by stat. 4 H. IV. c. 2. as to clerks only;) and *combustio domorum*, or *arson*, the burning of houses; 1 *Hal. P. C.* 346. all which are a kind of hostile acts, and in some degree border on treason. And further, all these identical crimes, together with petit treason, and very many other acts of felony, are ousted of clergy by particular acts of parliament. All the statutes for excluding clergy, are, in fact, nothing else but the restoring of the law to the same rigour of capital punishment in the first offence, that was exerted before the *privilegium clericale* was at all indulged; and so tender is the law of inflicting capital punishment, in the first instance, for any inferior felony, that, notwithstanding, by the marine law, as declared in stat. 28 H. VIII. c. 15. benefit of clergy is not allowed in any case whatever; yet, when offences are committed within the admiralty jurisdiction, which would be clergyable if committed by land, the constant course is to acquit and discharge the prisoner. *Moor* 756. *Fost.* 288.

As there is no necessity that the ordinary should demand the benefit of the clergy for a clerk, so neither is there any that the prisoner himself should demand it, where it sufficiently appears to the court that he hath a right to it, in respect of his being in orders, &c. In which case, if the prisoner does not demand it, it is left to the discretion of the judge, either to allow, or not to allow, it

ſt him. Clergy may be demanded after judgment given againſt a perſon, whether of death, &c. and even under the gallows, if there be a proper judge there, who has power to allow it. 2 *Hawk. P. C.* c. 33. It may be obſerved, that in all felonies, whether new created or by common law, clergy is now allowable, unleſs taken away by expreſs words of an act of parliament. 2 *Hal. P. C.* 330. That where clergy is taken away from the principal, it is not of courſe taken away from the acceſſory, unleſs he be alſo particularly included in the words of the ſtatute. And, where clergy is taken away expreſsly by any ſtatute, the offence muſt be laid in the indictment to be againſt that very ſtatute, and the words of it, or the offender ſhall have his clergy. *Kel.* 104. *H. P. C.* 231. That when the benefit of clergy is taken away from the offence, (as in caſe of murder, robbery, rape, &c.) a principal in the ſecond degree, being preſent aiding and abetting the crime, is excluded from his clergy equally with him that is principal in the firſt degree; but where it is only taken away from the perſon committing the offence, (as in the caſe of ſtabbing, or larceny in a dwelling-houſe, or privately ſtealing from the perſon,) his aiders and abettors are not excluded, as ſuch ſtatutes are to be taken literally. 2 *Hal. P. C.* 529. *Foſter* 356, 7.

4. The conſequences are ſuch as affect the preſent intereſt and future credit and capacity of the party, as having been once a felon, but now purged from that guilt by the privilege of clergy, which operates as a kind of ſtatute pardon. By this conviction the offender forfeits all his goods to the king, which being once veſted in the crown, ſhall not afterwards be reſtored to the offender. 2 *Hal. P. C.* 388. After conviction, and till he receives the judgment of the law by branding, or ſome of its ſubſtitutes, or elſe is pardoned by the king, he is, to all intents and purpoſes, a felon, and ſubject to all the diſabilities and other incidents of a felon. 3 *P. Wms.* 487. After burning, or its ſubſtitute, or pardon, he is diſcharged for ever of that and all other clergyable felonies before committed; but not of felonies from which benefit of clergy is excluded; and this by ſtats. 8 Eliz. c. 4. and 18 Eliz. c. 7. By the burning, or its ſubſtitute, or the pardon of it, he is reſtored to all capacities and credits, and the poſſeſſion of his lands, as if he had never been convicted. 2 *Hal. P. C.* 389. What is ſaid with regard to the advantages of commoners and laymen, ſubſequent to the burning in the hand, is equally applicable to all peers and clergymen, although never branded at all, or ſubjected to other puniſhment in its ſtead. 2 *Hal. P. C.* 390. It is holden, that after a man is admitted to his clergy, it is actionable to call him felon; becauſe his offence being pardoned by the ſtatute, all the infamy, and other conſequences of it, are diſcharged. 2 *Hawk. P. C.* c. 33. As to what felonies are within, and what without, clergy, ſee the article FELONS.

Clerico infra ſacros ordines conſtituto, non eligendo in officium. A writ directed to thoſe who have thruſt a bailiwick, or other office, upon one in holy orders, charging them to releaſe him.

Clerico capto per ſtatutum mercatorum, &c. A writ for the delivery of a clerk out of priſon, who is taken and impriſoned upon the breach of a ſtatute-merchant.

Clerico convicto commiſſo gaolæ in defectu ordinarii deliberando. An ancient writ that lay for the delivery of a clerk to his ordinary, that was formerly convicted of felony, by reaſon his ordinary did not challenge him according to the privileges of clerks.

"An ounce of *mother-wit* is worth a pound of CLERGY." This proverb is Scottiſh; in Engliſh we ſay, The greateſt clerks (or ſcholars) are not always the wiſeſt men. The meaning is, that natural abilities, without learning, are by much to be preferred to learning without a good natural genius; for the latter can at beſt but produce a learned pedant. The Latins ſay, *Merus ſcholaſticus, merus aſinus,* i. e. A mere ſcholar, a mere aſs.

CLER'GYABLE, *adj.* The epithet given to felonies within the benefit of clergy.—The priſoner, if convicted of a *clergyable* felony, is entitled equally to his clergy after as before conviction. *Blackſtone.*

CLER'GYMAN, *ſ.* A perſon in holy orders; a man ſet apart for miniſtration of holy things; not a laic.—It ſeems to be in the power of a reaſonable *clergyman* to make the moſt ignorant man comprehend his duty. *Swift.*

CLE'RICAL, *adj.* [*clericus*, Lat.] Relative to the clergy: as, a *clerical* man, a man in orders.

CLERIEU'X, a town of France, in the department of the Drome, and chief place of a canton, in the diſtrict of Romans: five miles north-weſt of Romans.

CLERI'NCE, a town of Poland, in the palatinate of Braclaw: forty-four miles ſouth-ſouth-weſt of Braclaw.

CLERK, *ſ.* [clepic, Sax. *clericus*, Lat.] The law term for a clergyman, and by which all of them who have not taken a degree, are deſignated in deeds, &c. Paſquier obſerves, the officers of the counts *(comites)* were anciently created under the title of *clerks of accompts*; and ſecretaries of ſtate were called *clerks of the ſecret.* So *clericus domini regis*, in the time of Edward I. was Engliſhed, *the king's ſecretary*, or *clerk of his council.* The term was applied indifferently to all who made any profeſſion of learning, or who knew how to manage the pen; though originally it was appropriated to eccleſiaſtics only. The reaſon of this ſeems to have been, that, as the clergy, in the early ages, engroſſed almoſt every other branch of learning, ſo were they peculiarly remarkable for their proficiency in the ſtudy of the law. *Nullus clericus niſi cauſidicus*, is the character given of them ſoon after the conqueſt by William of Malmſbury. The judges therefore were uſually created out of the ſacred order; and all the inferior offices were ſupplied by the lower clergy, which has occaſioned their ſucceſſors to be denominated *clerks* to this day. This term is likewiſe applied to perſons employed to keep the books in mercantile and trading concerns, as well as in many of the courts and ſeparate departments of the law; and of which *clerks* we may notice the following, viz.

Clerk of the Acts.—An officer in the navy-office, whoſe buſineſs it is to record all orders, contracts, bills, warrants, &c. tranſacted by the lord high admiral, or lords commiſſioners of the admiralty, and commiſſioners of the navy. Stat. 22 & 23 *Car.* II.

Clerk of Affidavits.—In the court of chancery, is an officer that files all affidavits made uſe of in that court.

Clerk of the Aſſize.—An officer who writes all things judicially done by the juſtices of aſſize in their circuits. This officer is aſſociated to the judge in commiſſions of aſſize, to take aſſizes, &c. Clerk of the aſſize ſhall not be counſel with any perſon on the circuit. Stat. 33 *Hen.* VIII. c. 24. To certify the names of felons convict, how puniſhed for concealing, &c. any indictment, recognizance, fine, or forfeiture. Stats. 22 & 23 *Car.* II. c. 22. 3 *Geo.* I. c. 15. To take but two ſhillings for drawing an indictment, and nothing if defective. 10 & 11 *W.* III. c. 23. Fineable for falſely recording appearances of perſons returned on a jury. 3 *Geo.* II. c. 25.

Clerk of the Bails.—An officer belonging to the court of King's-bench. He files the bail-pieces taken in that court, and attends for that purpoſe.

Clerk of the Cheque.—An officer in the king's court, ſo called becauſe he hath the cheque and controlment of the yeomen of the guard, and all other ordinary yeomen belonging either to the king, queen, or prince; giving leave, or allowing their abſence in attendance, or diminiſhing their wages for the ſame; he alſo, by himſelf, or deputy, takes the view of thoſe that are to watch in the court, and hath the ſetting of the watch. Stat. 33 H. VIII. c. 12. Alſo there is an officer of the ſame name in the king's dock-yards at Plymouth, Deptford, Woolwich, Chatham, &c.

Clerk Controller of the King's Houſe, (whereof there are two.)—An officer in the king's court, that hath authority to allow or diſallow charges and demands of purſuivants, meſſengers

messengers of the green cloth, &c. He hath likewise the oversight of all defects and miscarriages of any of the inferior offices; and hath a right to sit in the counting-house, with the superior officers, viz. the lord steward, treasurer, controller, and cofferer of the household, for correcting any disorders. Stat. 33 *H.* VIII. c. 12.

Clerk of the Crown.—An officer in the King's-bench, whose function is to frame, read, and record, all indictments against offenders there arraigned or indicted of any public crime; and, when divers persons are jointly indicted, the clerk of the crown shall take but one fee, viz. two shillings for them all. Stat. 2 *H.* IV. c. 10. He is otherwise termed clerk of the crown-office, and exhibits informations, by order of the court, for divers offences.

Clerk of the Crown in Chancery.—An officer in that court who continually attends the lord chancellor in person or by deputy; he writes and prepares for the great seal, special matters of state by commission, or the like, either immediately from his majesty's orders, or by order of his council, as well ordinary as extraordinary, viz. commissions of lieutenancy, of justices of assize, oyer and terminer, jail delivery, and of the peace, with their writs of association, &c. Also all general pardons, at the king's coronation; or in parliament, where he sits in the lords' house in parliament time; and into his office the writs of parliament, with the names of knights and burgesses elected thereupon, are to be returned and filed. He hath likewise the making out of all special pardons; and writs of execution upon bonds of statute-staple forfeited; which was annexed to this offence in the reign of queen Mary, in consideration of his chargeable attendance.

Clerk of the Declarations.—An officer of the court of King's-bench, who files all declarations in causes there depending, after they are ingrossed, &c.

Clerk of the Deliveries.—An officer in the Tower of London, who exercises his office in taking of indentures for all stores, ammunition, &c. issued from thence.

Clerk of the Errors, in the court of common pleas, transcribes and certifies into the King's-bench the tenor of the records of the cause or action upon which the writ of error, made by the cursitor, is brought there to be heard and determined. The clerk of the errors in the King's-bench likewise transcribes and certifies the records of causes, in that court, into the exchequer, if the cause of action were by bill; if, by original, the lord chief justice certifies the record into the house of peers in parliament, by taking the transcript from the clerk of the errors, and delivering it to the lord chancellor, there to be determined, according to the stats. 27 Eliz. c. 8. and 31 Eliz. c. 1. The clerk of the errors in the exchequer also transcribes the records, certified thither out of the King's-bench, and prepares them for judgment in the court of exchequer chamber, to be given by the justices of common pleas, and barons there. Stats. 16 *Car.* II. 20 *Car.* II. c. 4.

Clerk of the Essoins.—An officer belonging to the court of common pleas, who keeps the essoin rolls; and the essoin roll is a record of that court; he has the providing of parchment, and cutting it out into rolls, marking the numbers thereon; and the delivery out of all the rolls to every officer of the court, the receiving of them again when they are written, and the binding and making up the whole bundles of every term, which he doth as servant of the chief justice. The chief justice of the common pleas is at the charge of the parchment of all the rolls, for which he is allowed; as is also the chief justice of the court of King's-bench, besides the penny for the seal of every writ of privilege and outlawry, the seventh penny taken for the seal of every writ in court under the green wax, or petit seal; the said lord chief justices having annexed to their offices or places, the custody of the said seals belonging to each court.

Clerk of the Estreats.—A clerk or officer belonging to the exchequer, who every term receives the estreats out of the lord treasurer's remembrancer's office, and writes them out to be levied for the king; and he makes schedules of such sums estreated as are to be discharged.

Clerk of the Hanaper, or *Hamper.*—An officer in chancery, whose office is to receive all the money due to the king, for the seals of charters, patents, commissions, and writs; as also fees due to the officers for enrolling and examining the same. He is obliged to attendance on the lord chancellor daily in the term time, and at all times of sealing, having with him leather bags, wherein are put all charters, &c. After they are sealed, those bags, being sealed up with the lord chancellors's private seal, are delivered to the controller of the hanaper, who, upon receipt of them, enters the effect of them in a book, &c. This hanaper represents what the Romans termed *fiscum*, which contained the emperor's treasure; and the exchequer was anciently so called, because *in eo reconderentur hanapi & scutræ cæteraque vasa quæ in censum & tributum persolvi solebant*; or it may be for that the yearly tribute which princes received was in hampers or large vessels full of money. There being an arrear of 10,590l. 12s. 11d. of several ancient fees and salaries, &c. payable out of this office; and there being a remainder of 13,698l. 1s. 11d. of the six-penny stamp duty on writs granted for relief of the suitors of the court of chancery; it was enacted, by the stat. 23 G. II. c. 25. that thereout the 10,590l. 12s. 11d. should be paid to the creditors of this office. That the said duty should be made perpetual; and thereout 3000l. per annum should be paid to the clerk of the hanaper, that the residue of the 13,698l. 1s. 11d. should be laid out in government securities, and the interest paid to the clerk of the hanaper, who should pay 1,200l. to the master of the rolls; and that, in case the revenue of this office so augmented, should be more than sufficient to pay all fees, salaries, &c. the clerk should account for the surplus.

Clerk of the Inrolments.—An officer of the common pleas, that inrols and exemplifies all fines and recoveries, and returns writs of entry, summons, and seisin, &c.

Clerk of the Juries.—An officer belonging to the court of common pleas, who makes out the writs of habeas corpora and distringas, for the appearance of juries, either in that court, or at the assizes, after the jury or panel is returned upon the venire facias; he also enters into the rolls the awarding of these writs; and makes all the continuances, from the going out of the habeas corpora until the verdict is given.

Clerk of the Market.—An officer of the king's house, to whom it belongs to take charge of the king's measures, and keep the standards of them, which are examples of all measures throughout the land; as of ells, yards, quarts, gallons, &c. and of weights, bushels, &c. and to see that all weights and measures in every place be answerable to the said standard. Touching this officer's duty, there are divers statutes, as 13 R. II. c. 4. and 16 R. II. c. 3. by which every clerk of the market is to have weights and measures with him when he makes essay of weights, &c. marked according to the standard; and to seal weights and measures, under penalties. The stat 16 Car. I. c. 19. enacts, that clerks of the market of the king's or prince's household, shall only execute their offices within the verge; and head officers are to act in corporations, &c. The clerks of markets have generally power to hold a court, to which end they may issue out process to sheriffs and bailiffs to bring a jury before them; and give a charge, take presentments of such as keep or use false weights and measures, and may set a fine upon the offenders, &c. But if they take any other fee or reward than what is allowed by statute, &c. or impose any fines without legal trial, or otherwise misdemean themselves, they shall forfeit five pounds for the first offence, ten pounds for the second, and twenty pounds for the third offence, on conviction before a justice of peace, &c. The court of the clerk of the market is incident to every fair and market in the kingdom, to punish misdemeanors therein, as a court of

pie powder is to determine all disputes relating to private or civil property. It is the most inferior court of criminal jurisdiction in the kingdom. 4 *Comm.* 275.

Clerk Marshal of the King's House.—An officer that attends the marshal in his court, and records all his proceedings.

Clerk of the Nichils, or *Nihils.*—An officer of the court of exchequer, who makes a roll of all such sums as are nihiled by the sheriffs upon their estreats of green wax; and delivers the same into the remembrancer's office, to have execution done upon it for the king. Stat. 5 *R.* II. c. 13. Nihils are issues by way of fine or amercement.

Clerk of the Ordnance.—An officer in the Tower who registers all orders touching the king's ordnance.

Clerk of the Outlawries.—An officer belonging to the court of common pleas, being the servant or deputy to the king's attorney-general, for making out writs of capias utlagatum, after outlawry, the king's attorney's name being to every one of those writs.

Clerk of the Paper Office.—An officer in the court of King's-bench that makes up the paper-books of special pleadings and demurrers in that court.

Clerk of the Papers.—An officer in the common pleas, who hath the custody of the papers of the warden of the fleet, enters commitments and discharges of prisoners, delivers out day-rules, &c.

Clerk of a Parish.—Is the lowest officer of the church. They were formerly clerks in orders, and their business was at first to officiate at the altar, for which they had a competent maintenance by offerings; but now they are laymen, and have certain fees with the parson, on christenings, marriages, burials, &c. besides wages, for their maintenance. They are to be twenty years of age at least, and known to be of honest conversation, sufficient for their reading, singing, &c. And their business consists chiefly in responses to the minister, reading lessons, singing psalms, &c. In the large parishes of London some of them have deputies, to dispatch the business of their places, which are more gainful than common rectories. The law looks upon them as officers for life; they are regarded by the common law as persons who have freeholds in their offices; and, therefore, though they may be punished, yet they cannot be deprived, by ecclesiastical censures. 1 *Comm.* 395. And they are generally appointed by the minister, unless there is a custom for the parishioners or churchwardens to choose them; in which case the canon cannot abrogate such custom; and, when chosen, it is to be signified to, and they are to be sworn into their office, by the archdeacon. *Cro. Car.* 589. And, if such custom appears, the court of King's-bench will grant a mandamus to the archdeacon to swear him in, for the establishment of the custom turns it into a temporal or civil right. 1 *Comm.* 395. He may make a deputy without licence of the ordinary; and cannot sue in the spiritual court for fees, as being a temporal officer. 2 *Strange* 1108.

Clerk of the Parliament Rolls.—An officer who records all things done in the high court of parliament, and ingrosseth them in parchment rolls, for their better preservation to posterity: of these officers there are two, one in the lords' house, and another in the house of commons.

Clerk of the Patents, or of the letters patent under the great seal of England.—An office erected 18 Jac. I. for the custody of all patents granted by the crown.

Clerk of the Peace.—An officer belonging to the sessions of the peace; his duty is to read indictments, inrol the proceedings, and draw the process; he keeps the counterpart of the indenture of armour; records the proclamation of rates for servants wages; has the custody of the register-book of licences given to badgers of corn; of persons licensed to kill game, &c. Also he certifies into the King's-bench transcripts of indictments, outlawries, attainders, and convictions, had before the justices of peace, within the time limited. The custos rotulorum of the county hath the appointment of the clerk of the peace, who may execute his office by deputy, to be approved of by the custos rotulorum to hold the office during good behaviour. Stats. 37 *H.* VIII. c. 1. 1 *W.* & *M.* c. 21. By stat. 22 Geo. II. c. 46. no clerk of the peace, or his deputy, shall act as solicitor, attorney, or agent, at the sessions where he acts as clerk or deputy, on penalty of fifty pounds, with treble costs. If a clerk of the peace misdemeans himself, the justices of peace in quarter sessions have power to discharge him; and the custos rotulorum is to choose another, resident in the county; or, on his default, the sessions may appoint one; the place is not to be sold, on pain of forfeiting double the value of the sum given by each party, and disability to enjoy their respective offices, &c. Stat. 1 *W.* & *M.* c. 21.

Clerk of the Pell.—A clerk belonging to the exchequer, whose office is to enter every teller's bill into a parchment roll or skin, called *pellis receptorum*; and also to make another roll of payments, which is termed *pellis exituum*, wherein he sets down by what warrant the money was paid. Stat. 22 & 23 *Car.* II. c. 22.

Clerk of the Petty Bag.—An officer of the court of chancery. There are three of these officers, of whom the master of the rolls is the chief. Their office is to record the return of all inquisitions out of every shire; to make out patents of customers, gaugers, controllers, &c. all *congé d'elires* for bishops, the summons of the nobility, and burgesses to parliament; commissions directed to knights and others of every shire, for assessing subsidies and taxes; all offices found *post mortem* are brought to the clerks of the petty bag to be filed; and by them are entered all pleadings of the chancery concerning the validity of patents or other things which pass the great seal; they also make forth liberates upon extents of statutes-staple, and recovery of recognizances forfeited, and all elegits upon them; and all suits for or against any privileged person are prosecuted in their office, &c.

Clerk of the Pipe.—An officer in the exchequer, who, having the accounts of debts due to the king, delivered and drawn out of the remembrancer's offices, charges them down in the great roll, and is called *clerk of the pipe* from the shape of that roll, which is put together like a pipe; he also writes out warrants to the sheriffs to levy the said debts upon the goods and chattels of the debtors; and, if they have no goods, then he draws them down to the lord treasurer's remembrancer, to write estreats against their lands. The ancient revenue of the crown stands in charge to him, and he sees the same answered by the farmers and sheriffs; he makes a charge to all sheriffs of their summons of the pipe, and green wax, and takes care it be answered on their accounts. And he hath the drawing and ingrossing of all leases of the king's lands, having a secondary and several clerks under him. In the reign of Henry VI. this officer was called *ingrossator magni rotuli*. Stat. 33 *Hen.* VIII. c. 22.

Clerk of the Pleas.—An officer in the court of exchequer, in whose office all the officers of the court, upon special privilege belonging unto them, ought to sue or be sued in any action, &c. The clerk of the pleas has under him a great many clerks, who are attornies in all suits commenced or depending in the court of exchequer.

Clerks of the Privy Seal.—These are four of the officers which attend the lord privy seal; or, if there be no lord privy seal, the principal secretary of state; writing and making out all things that are sent by warrant from the signet to the privy seal, and which are to be passed to the great seal; also they make out privy seals, upon a special occasion of his majesty's affairs, as for loan of money, and the like. He that is now called lord privy seal, seems to have been, in ancient times, called clerk of the privy seal; but, notwithstanding, to have been reckoned in the number of the great officers of the realm. Stats. 12 *R.* II. c. 11. 27 *H.* VIII. c. 11.

Clerk of the Remembrance.—An officer in the exchequer, who is to sit against the clerk of the pipe, to see the discharges made in the pipe, &c. Stat. 37 *Ed.* III. c. 4. The clerk

clerk of the pipe and remembrancer, fhall be fworn to fchedule of perfons difcharged in their offices. Stat. 5 *R*. II. c. 15.

Clerk of the Rolls.—An officer of the chancery, that makes fearch for, and copies, deeds, offices, &c.

Clerk of the Rules.—In the court of King's-bench, is he who draws up and enters all the rules and orders made in court; and gives rules of courfe on divers writs. Stat. 22 & 23 *Car*. II. c. 22.

Clerk of the Sewers.—An officer belonging to the commiffioners of fewers, who writes and records their proceedings, which they tranfact by virtue of their commiffions, and the authority given them by ftat. 13 Eliz. c. 9.

Clerk of the Signet.—An officer continually attendant on his majefty's principal fecretary, who hath the cuftody of the privy fignet, as well for fealing his majefty's private letters, as fuch grants as pafs the king's hand by bill figned; and of thefe clerks or officers there are four that attend in their courfe, and have their diet at the fecretary's table. The fees of the clerk of the fignet and privy feal, are limited particularly by ftatute, with a penalty annexed for taking any thing more. 27 *H*. VIII. c. 11.

Clerk of the King's Silver.—An officer belonging to the court of common pleas, to whom every fine is brought after it hath paffed the office of the *cuftos brevium*, and by whom the effect of the writ of covenant is entered into a paper-book; according to which all the fines of that term are recorded in the rolls of the court. After the king's filver is entered, it is accounted *a fine* in law, and not before.

Clerk of the Superfedeas.—An officer belonging to the court of common pleas, who makes out writs of fuperfedeas, upon a defendant's appearing to the exigent on an outlawry, whereby the fheriff is forbidden to return the exigent.

Clerk of the Treafury.—An officer of the common pleas, who hath the charge of keeping the records of the court, and makes out all the records of nifi prius; alfo he makes all exemplifications of records being in the treafury; and he hath the fees due for all fearches. He is the fervant of the chief juftice, and removeable at pleafure; whereas all other officers of the court are for life: there is a fecondary, or under clerk of the treafury, for affiftance, who hath fome fees and allowances: and likewife an under-keeper, that always keeps one key of the treafury door, and the chief clerk of the fecondary, another; fo that the one cannot come in without the other.

Clerk of the King's Great Wardrobe.—An officer of the king's houfhold, that keeps an account or inventory of all things belonging to the royal wardrobe. Stat. 1 *E*. IV. c. 1.

Clerk of the Warrants.—An officer belonging to the common pleas' court, who enters all warrants of attorney for plaintiffs and defendants in fuits; and inrolls deeds of indentures of bargain and fale, which are acknowledged in the court or before any judges out of the court. And it is his office to eftreat into the exchequer all iffues, fines, and amerciaments, which grow due to the king in that court, for which he hath a ftanding fee or allowance.

"The CLERK forgets that ever he was *fexton*." *Honores mutant mores*, Lat. *Anderer ftand andre firren*, High Ger. i. e. "Honours change manners." People raifed from menial employments to a high ftation, are apt to forget their former condition, as well as their former friends. They think grandeur confifts in a haughty carriage, and feverity over thofe who, perhaps, before were their fuperiors. Unhappy is the condition of a man of feeling who is under a neceffity of having dependence on fuch defpicable beings, who, having no merit of themfelves, but what their riches and power give them, are blind to real merit in others.

CLERK-LIKE, *adj.* learned.—You are certainly a gentleman thereto *clerklike*, experienced. *Shakefpeare.*

CLERK'LY, *adj.* in a fcholar-like manner.—'Tis very *clerkly* done. *Shakefpeare.*

CLERKE (captain Charles), a celebrated Englifh navigator, was bred up in the navy from his youth, and was prefent in feveral actions during the war of 1755. In that between the Bellona and Courageux he was in great danger; for having been ftationed in the mizen-top on board the former, the maft was carried overboard by a fhot, and he fell into the fea along with it; but was taken up without injury. When commodore Byron made his firft voyage round the world, Mr. Clerke ferved on board his fhip in quality of a midfhipman; and was afterwards on the American ftation. In 1768 he failed round the world a fecond time in the Endeavour, on board of which he ferved in the ftation of mafter's mate; but, during the voyage, fucceeded to a lieutenancy. He returned in 1775, and was foon after appointed mafter and commander. When captain Cook undertook his laft voyage, Mr. Clerke was appointed captain of the Difcovery; and in confequence of the death of captain Cook, fucceeded to the fupreme command. He did not, however, long furvive his new dignity. Before his departure from England, he had manifeft fymptoms of a confumption. Of this difeafe he lingered during the whole of the voyage; and his long refidence in the cold northern climates cut off all hopes of a recovery: but though fenfible that the only chance he had of prolonging his life was by a fpeedy return to a warmer climate, his attention to his duty was fo great, that he perfevered in fearch of a paffage between the Afiatic and American continents until every one of the officers was of opinion that it was impracticable. He bore his diftemper with great firmnefs and equanimity to the laft; and died on the 22d of Auguft 1778, in the 38th year of his age, the fhip being then within view of Kamtfchatka.

CLERKE's ISLANDS, in the North Pacific Ocean, are two iflands of confiderable extent, containing feveral hills, all of which are connected by low land, fo as to occafion the looking at a diftance like a groupe of iflands. They have their name in honour of that able navigator captain Clerke, the companion of captain Cook. In fome old maps they are called St. Andrea Ifles. Near the eaft point is a fmall ifland, which is remarkable for having on it three elevated rocks. Lat. 63. 15. N. lon. 169. 30. W. Greenwich.

CLERK'SHIP, *f.* [from *clerk.*] Scholarfhip. The office of a clerk of any kind.—He fold the *clerkfhip* of his parifh, when it became vacant. *Swift.*

CLER'MONT, a poft town of the American ftates, in Columbia county, New-York, fix miles from Red Hook, fifteen from Hudfon, 117 miles north of New-York, and 212 from Philadelphia.

CLER'MONT, a town of the American ftates, thirteen miles from Camden, South Carolina. In the late war, here was a ftrong fort encompaffed by an abbatis. It was taken from colonel Rugely, of the Britifh, December 1781, by an ingenious ftratagem of lieutenant-colonel Wafhington.

CLER'MONT, a town of France, in the department of the Lot and Garonne: three leagues weft of Agen.

CLER'MONT EN ARGONNE, a town of France, and chief place of a diftrict, in the department of the Meufe, fituated on an eminence, furrounded with woods and paftures: four leagues weft-fouth-weft of Verdun, and two and a quarter eaft of St. Menehould. This town was taken by the Pruffians in 1792, but was evacuated foon after. Lat. 49. 7. N. lon. 22. 46. E. Ferro.

CLER'MONT, or CLERMONT EN BEAUVAISIS, a town of France, and principal place of a diftrict, in the department of the Oife; fituated on an eminence, near the Brefche: eight pofts fouth of Amiens, and feven and a half north of Paris.

CLER'MONT FERRAND, a city of France, and capital of the department of the Puy-de-Dome; before the revolution, the capital of Auvergne, and the fee of a bifhop, fuffragan of Bourges: fituated on a fmall eminence, at the foot of a lofty mountain, and contains about 16,000 inhabitants.

inhabitants. Its commerce is in corn, wine, wool, woollen-stuffs, tammies, serges, linen, lace, &c. There are some mineral springs near, and the water of a brook, which passes through one of the fauxbourgs, petrified a wooden bridge to perfect stone, so that carriages can pass over. A council was held here in 1095, to determine on the crusade against the infidels in the Holy Land, in the pontificate of Urban II. It is called Clermont Ferrand from the town of Montferrand being united to it, and forming one of the fauxbourgs: twenty-three post-miles and a quarter west of Lyons, and forty-six and three-quarters south of Paris. Lat. 45. 47. N. lon. 21. 46.

CLER'MONT GALLERANDE, a town of France, in the department of the Sarte: one league north-east of La Fleche.

CLER'MONT DE LODEVE, a town of France, in the department of the Herault, and chief place of a canton, in the district of Lodeve; the chief trade is in wool and cattle, with manufactures of cloth and hats for exportation: twenty miles west of Montpellier.

CLER'MONT MANUSCRIPT, a copy of St. Paul's epistles, found in the monastery of Clermont in France, and used by Beza, together with the Cambridge manuscript, in preparing his edition of the New Testament. This copy is in the octavo form, and is written on fine vellum in Greek and Latin, with some mutilations. Beza supposes that it is of equal antiquity with the Cambridge copy; but both were probably written by a Latin scribe in a later period than he assigns to them. The various readings of this manuscript were communicated to archbishop Usher, and they are preserved by Walton. The manuscript itself was in the possession of Morinus; and after his death deposited among the manuscript copies of the Royal Library at Paris, No. 2245.

CLERODEN'DRUM, *s.* [from κληρος, lot, chance, or fortune, and δενδρον, a tree; fortunate tree.] In botany, a genus of the class didynamia, order angiospermia, natural order personatæ. The generic characters are—Calyx: perianthium one-leafed, five-parted, bell-shaped; segments ovate-acute, broader than the tube of the corolla, permanent. Corolla: one-petalled, irregular; tube slender, long; border five-parted, equal; the upper segments more deeply separated. Stamina: filaments four, filiform, much longer than the corolla, ascending through the upper fissure of the corolla, two of them shorter; antheræ simple. Pistillum: germ roundish; style form, length, and situation, of the stamens; stigma simple. Perianthium: drupe roundish, placed on a large calyx; berry one-celled, four-seeded, often splitting into four parts. Seed: one, roundish.—*Essential Character.* Calyx five-cleft, bell-shaped; corolla, with a filiform tube, and a funnel-shaped, five-parted, equal border; stamina very long, gaping very much between the segments; berry, one-seeded, often splitting into four parts when ripe.

Species. 1. Clerodendrum infortunatum: leaves cordate, tomentose. This is a tree, or rather shrub, with subtomentose branches. It is described by Loureiro as upright, and seven feet high, with quadrangular, four-grooved, branches; leaves broad-ovate, acuminate, subcrenate, hairy, wrinkled. The fruit, according to Gærtner, is a succulent berry, subglobular, flatted a little, with a cross-shaped groove at the top; skin very thin, smooth, and shining, not opening; pulp soft, vanishing by age; there are four stones inclosed, which are somewhat of a bony texture. Native of the East-Indies and China.

2. Clerodendrum fortunatum, or entire-leaved clerod: leaves lanceolate, quite entire. This is a native of the East Indies; introduced in 1789, by Kennedy and Lee.

3. Clerodendrum phlomidis: leaves ovate, toothed and angular; peduncles axillary, subtriflorous. Found in the East Indies, by Koenig.

4. Clerodendrum calamitosum: leaves ovate, somewhat toothed, naked; flowers rather less than in the other species. Observed in Java, by Baster.

5. Clerodendrum paniculatum: leaves five-lobed, toothletted, smooth; panicle brachiate; axils woolly; branches quadrangular, smooth, purple, with a groove along the sides; leaves petioled, opposite, a hand in length, the lower ones a span long, five-lobed, cordate at the base, smooth on both sides.

6. Clerodendrum trichotomum: leaves lobed and undivided, broad-ovate, entire; panicle trichotomous. Stem shrubby; branches four-cornered, four-furrowed, smooth. The fruit is an almost globular capsule, which is four-furrowed, smooth, inclosed within the large calyx, four-celled and four valved; there is one smooth seed in each cell. The leaves have a strong poisonous smell like mandragora. Grows near Nagasaki, &c. in Japan; flowering in August and September.

7. Clerodendrum squamatum: leaves cordate, obscurely angular; branches of the panicle dichotomous, smooth. Branches quadrangular, smooth, with four grooves; leaves two inches and more in length, with a deep sinus at the base, little acuminate, three or five nerved, with ascending nerves, tender, smooth, scarce toothletted, sometimes ciliate with very minute hairs, covered underneath with very minute orbicular scales. Native of the East Indies.

8. Clerodendrum diversifolium: leaves entire and three-lobed, ovate; branches of the panicle dichotomous villose; pedicels racemed. Branches quadrangular, four-grooved, villose at top; leaves an inch and a half in length, tender, sharp at the base, three-nerved, very smooth. Native of the East Indies. See VOLKAMERIA.

CLE'ROMANCY, a kind of divination performed by throwing the dice, and observing the points, or marks, turned up. The word comes from "κληρος, lot," and "μαντεια, divination." At Bura, a city of Achaia, was a temple and celebrated oracle of Hercules; where such as consulted the oracle, after praying to the idol, threw four dies, the points whereof being well scanned by the priest, he was supposed to draw an answer from them. Something of this kind seems to have been practised with regard to Jonah.

CLER'VAL, a town of France, in the department of the Doubs, and chief place of a canton, in the district of Baume-les-Dames: seven leagues north-east of Besançon.

CLERVAU'T, a town of France, in the department of the Vienne: five miles north of Chatellerault.

CLERVAU'X, one of the most celebrated and finest abbeys of France, in Champagne, five miles from Bar-sur-Aube, seated in a valley surrounded with woods and mountains. It is the chief of the Cistercian order. Here is the famous Tun of St. Bernard, which will hold 800 tuns of wine.

CLE'RY, a town of France, in the department of the Somme, and chief place of a canton, in the district of Péronne: one league north-west of Péronne.

CLE'RY, a town of France, in the department of Loiret: seven miles south-west of Orleans.

CLE'SIDES, a Greek painter, about 276 years before Christ, in the reign of Antiochus I. He revenged the injuries he had received from queen Stratonice by representing her in the arms of a fisherman. However indecent the painter might represent the queen, she was drawn with such personal beauty, that she preserved the piece, and liberally rewarded the artist.

CLE'THRA, *s.* [probably from κλειω, to close or shut up.] In botany, a genus of the class decandria, order monogynia, natural order of bicornes. The generic characters are—Calyx: perianthium one-leafed, five-parted; leaflets ovate, concave, erect, permanent. Corolla: petals five, oblong, broader on the outside, from erect spreading, a little longer than the calyx; the upper one broadest. Stamina: filaments ten, subulate, the length of the corolla; antheræ oblong-erect, gaping at the top. Pistillum: germ roundish; style filiform, erect, permanent, increasing; stigma trifid. Perianthium: capsule roundish, involved in the calyx, three-celled, three-valved. Seeds: angular. *Essential Character.* Calyx five-parted;

parted; petals five; stigma trifid; capsule three-celled, three-valved.

Species. 1. Clethra alnifolia, or alder-leaved clethra: shrubby; leaves obovate-lanceolate, serrate, smooth; racemes simple in form of spikes. The roots spread far on every side, and send up many stems, from eight or ten to fourteen feet high, which are covered with a greyish bark, and divide into small round alternate branches. The leaves are about three inches long, and an inch and quarter broad in the middle; they are of a deep green on their upper side, and of a whitish green underneath, alternate, and on very short petioles. The flowers are on loose spikes from four or five inches to a span long; the petals are white. They appear in July, and, when the season is mild, some spikes are produced in October. The fruit is a small, subglobular, crustaceous, capsule, with three grooves; the partitions within are simple and contrary to the valves. There are six or eight seeds in each cell; they are small, subovate, variously angular, somewhat compressed, wrinkled, and rufescent. Native of North America, in moist places, and by rivulets.

2. Clethra paniculata, or panicled clethra: Shrubby; leaves lanceolate, naked on both sides; flowers panicled. Native of North America; flowers from August to October.

3. Clethra arborea, or tree clethra: a tree; leaves oblong-lanceolate, smooth on both sides; racemes in form of spikes; calyxes obtuse. Native of Madeira.

4. Clethra tinifolia: a tree; leaves oblong-lanceolate, quite entire, hoary underneath; racemes panicled, spike-shaped, tomentose. This shrubby tree rises generally to the height of twelve or fourteen feet, with a thick trunk, covered with a smooth clay-coloured bark: the branches are spread equally round, and towards their ends are beset with leaves, five inches long and half as broad in the middle, dark green and smooth, on petioles a quarter of an inch in length. Each flower is on a pedicel with a subulate bracte at the base. Fruits smooth, green, roundish, bigger than peas, containing a sweet, white, mealy pulp, and a hard brownish-black stone, bigger than a peppercorn and much like it: they are sometimes eaten in Jamaica, of which island this tree is a native. Sloane calls it bastard locust-tree.

Propagation and Culture. This is hardy enough to bear the open air in England, and is one of the most beautiful shrubs at the season of its flowering; which is very little later than in its native country, being commonly in flower here by the beginning of July; and if the season is not very hot, there will be part of the spikes in beauty till the beginning of August; and as most of the branches are terminated by these spikes of flowers, when the shrubs are strong, they make a fine appearance at that season. It will thrive much better in moist land than in dry ground, and requires a sheltered situation, where it may be defended from strong winds, which frequently break off the branches, where they are too much exposed to its violence. It is propagated by layers, but they are generally two years before they get root, so that at present it is rare in England. The finest shrubs of this kind, were in the curious garden of the duke of Argyle, at Whitton, near Hounslow, where they throve as well as in their native country. They may also be propagated by suckers, which are sent out from their roots: if these are carefully taken off with fibres in the autumn, and planted into a nursery-bed, they will be strong enough in two years to transplant where they are to remain. It may also be propagated by seeds, which must be procured from the countries where it grows naturally, for the seeds are not perfected in England. But, as these seldom arrive here till spring, when they are sown at that season, the plants will not come up till the following spring. Therefore the seeds should be sown in pots, and placed in a shady situation till autumn, then placed under a frame in winter; the plants will come up the next spring, and in autumn may be transplanted into a nursery-bed, to get strength before they are placed to remain.

CLE'THY, a river of South Wales, which rises in Pembrokeshire, about five miles south-east of Newport, and joins the Dungledy, four miles north of Pembroke.

CLE'TON, a river of Wales, which runs into the Dee, two miles below Bala, in Merionethshire.

CLET'TER, a river of Wales, in Cardiganshire, which runs into the Dovy, a few miles below Machunlleth.

CLEVE, CLIF, or CLIVE, at the beginning or end of the proper name of a place, denotes it to be situated on the side of a rock or hill; as, *Cleveland, Clifton, Stancliff*, &c.

CLE'VELAND, a district in the north riding of Yorkshire, on the borders of Durham, and from whence the noble family of Fitzroy took the title of duke.

CLE'VELAND (John), an English poet of eminence in his time, who, during the civil war under Charles I. engaged as a literary champion in the royal cause against the parliamentarians. He died in 1658, and was much extolled by his party. His works, which consisted of poems, characters, orations, epistles, &c. were printed in octavo in 1677, and 1687. Cleveland has had the fate of those poets, who, "paying their court to temporary prejudices, have been at one time too much praised, and at another too much neglected." Both his subjects, and his manner of writing, made his poems extremely popular among his contemporaries, but entirely forgotten and disregarded since. For his manner, he excelled among that class of writers so much admired in the seventeenth century, whom our critics have aptly termed "metaphysical poets, who abound with witty rather than just thoughts, with far-fetched conceits, and learned allusions, that only amuse for a moment, utterly neglecting that beautiful simplicity and propriety which will interest and please through every age." For his subjects he generally chose the party disputes of the day, which are now no longer understood or regarded. Contemporary with Milton, he was in his time exceedingly preferred before him; and Milton's own nephew tells us, he was by some esteemed the best of the English poets. But Cleveland is now sunk into oblivion, while Milton's fame is universally diffused.

CLE'VER, *adj.* [of no certain etymology.] Dextrous; skilful.—It was the *cleverer* mockery of the two. *L'Estrange.* Just; fit; proper; commodious:

I can't but think 'twould sound more *clever*,
To me, and to my heirs for ever. *Pope.*

Well shaped; handsome.—She called him gundy-guts, and he called her lousy Peg, though the girl was a tight *clever* wench. *Arbuthnot.*—This is a low word, scarcely ever used but in burlesque or conversation; and applied to any thing a man likes, without a settled meaning.

CLEVE'RA, *s.* in botany. See TERNSTROEMIA.

CLE'VERLY, *adv.* [from *clever.*] Dexterously; fitly; handsomely.—A rogue upon the highway may have as strong an arm, and take off a man's head as *cleverly*, as the executioner. *South.*

CLE'VERNESS, *s.* [from *clever.*] Dexterity; skill; accomplishment.

CLE'VERS, *s.* in botany. See GALIUM APARINE.

CLEVES, a town of Germany, in the circle of Westphalia, and capital of a duchy to which it gives name; situated on the river Kermidal, rather more than two miles from the Rhine, on the brow of a hill, surrounded with walls, but not strongly fortified: the Roman catholics have a church and three convents; the Lutherans, the Calvinists, and the Mennonites, have likewise each a church, and the Jews a synagogue. The number of houses is about 800. This town was taken by the French republican army under general Pichegru, on the 6th of October, 1794. Ten miles east-south-east of Nimmegen. Lat. 51. 50. N. lon. 23. 36. E. Ferro.

CLEVES (duchy of), a principality of Germany, bounded on the north by Overissel and the bishopric of Munster, on the east by the bishopric of Munster and county of Recklinghausen, on the south by the county of Mark and duchy of Berg, and on the west by Guelderland and Brabant; about forty miles in length, and from

from ten to twelve in breadth; the air is healthy, but the soil is unequal. On the eminences are fields, woods, and forests, which extend three or four leagues in length, bordered by towns and villages: on the borders of the Rhine, which runs through the country, are fine pastures, which feed a great number of cattle and horses. The inhabitants chiefly cultivate corn, tobacco, and legumes. Game is plentiful, and the rivers supply abundance of fish, especially salmon, pike, and carp. There are manufactures of silk, cloth, linen, and pipes: it contains twenty-four towns. Roman catholics, Calvinists, Lutherans, Mennonites, and Jews, are all allowed a freedom of worship. The revenues of Cleves and Mark amount to a million of crowns. The king of Prussia, as duke of Cleves, pays towards the charges of the empire 1208 florins; and to the Imperial chamber 676 crowns. The principal towns are Cleves, Calcar, Wesel, Duisburg, Xanten, Rees, and Emmerich: the rivers are, the Rhine, the Meuse, the Ruhr, the Emser, the Lippe, and the Issel.

CLEW, *s.* [clype, Sax. *klouwen*, Dutch.] Thread wound upon a bottom; a ball of thread:

While, guided by some *clew* of heav'nly thread,
The perplex'd labyrinth we backward tread. *Roscommon.*

A guide; a direction: because men direct themselves by a clew of thread in a labyrinth.—This alphabet must be your own *clew* to guide you. *Holder.*

Is there no way, no thought, no beam of light?
No *clew* to guide me thro' this gloomy maze,
To clear my honour, yet preserve my faith? *Smith.*

Clew of the sail of a ship, is the lower corner of it, which reaches down to that earing where the tackles and sheets are fastened. *Harris.*

To CLEW, *v. a.* *To clew the sails*, is to raise them, in order to be furled; which is done by a rope fastened to the clew of a sail, called the clew-garnet. *Harris.*

CLEW BAY, or NEWPORT BAY, a large bay on the west coast of Ireland, twelve miles from east to west, and seven from north to south, with a great number of small islands. Lat. 53. 49. N. lon. 9. 40. W. Greenwich.

CLIBA'DIUM, *s.* [κλιβάδιον, the name of a plant in Dioscorides.] In botany, a genus of the class monoecia, order pentandria, natural order of compositæ oppositifoliæ. The generic characters are—Calyx: common imbricate; scales ovate, acute. Corolla: compound; corollules tubular, funnel form; border five-cleft: corollules of the disk many, pedicelled, hermaphrodite—of the ray three or four, sessile, female. Stamina: in the hermaphrodites; filaments five, capillary, very short; antheræ oblong, approximating. Pistillum: in the hermaphrodites, germ very small, superior; style filiform; stigma simple; in the females, germ roundish, interior; style filiform; stigma two-parted. Perianthium: common none. Calyx ventricose, coloured. Proper, to the hermaphrodites none; to the females, a roundish, succulent, umbilicate drupe. Seed: one, cordate, compressed. —*Essential Character*. Male. Common, calyx imbricate; corolla of the disk five-cleft. Female. Common, calyx the same; corolla of the ray female, three or four; seed an umbilicate drupe.

There is but one species, viz. Clibadium Surinamense, or Surinam clibadium: leaves opposite, petioled, ovate, acuminate, acutely crenate, scabrous; peduncles opposite. Common, calyx violet-coloured when ripe: corolla white; drupe green, with a yellow viscid juice. Native of Surinam.

CLI'CHY LA GARENNE, a town of France, in the department of Paris: one league north-north-west of Paris.

To CLICK, *v. n.* [*cliken*, Dutch; *cliqueter*, French; or perhaps the diminutive of *clack*.] To make a sharp, small, successive noise:

The solemn death-watch *click'd* the hour she died;
And shrilling crickets in the chimney cried. *Gay.*

CLICK'ER, *s.* a low word for the servant of a salesman, who stands at the door to invite customers.

CLICK'ET, *s.* the knocker of a door. *Skinner.*

CLIE, a lake in Upper Canada, about thirty-eight miles long, and thirty broad; its waters communicate with those of Lake Huron.

CLI'ENT, *s.* [*cliens*, Latin.] One who applies to an advocate for counsel and defence.—There is due from the judge to the advocate some commendation, where causes are well handled; for that upholds in the *client* the reputation of his counsel. *Bacon.*—It may be perhaps sometimes used for a dependant in a more general sense, as it was used among the Romans:

I do think they are your friends and *clients*,
And fearful to disturb you. *Ben Jonson.*

A client among the Romans was a citizen who put himself under the protection of some great man, who in respect of that relation was called patron. This patron assisted his client with his protection, interest, and goods; and the client gave his vote for his patron, when he sought any office for himself or his friends. Clients owed respect to their patrons, as these owed them their protection. The right of patronage was appointed by Romulus, to unite the rich and poor together, in such a manner as that one might live without contempt, and the other without envy; but the condition of a client, in course of time, became a species of slavery.

CLI'ENTED, *particip. adj.* Supplied with clients.—This due occasion of discouragement, the worst conditioned and least *cliented* pettivoguers do yet, under the sweet bait of revenge, convert to a more plentiful prosecution of actions. *Carew.*

CLIENTE'LE, *s.* [*clientela*, Lat.] The condition or office of a client. A word scarcely used:

There's Varus holds good quarters with him;
And, under the pretext of *clientele*,
Will be admitted. *Ben Jonson.*

CLI'ENTSHIP, *s.* The condition of a client.—Patronage and *clientship* among the Romans always descended: the plebeian houses had recourse to the partrician line which had formerly protected them. *Dryden.*

CLIFF, *s.* [*clivus*, Lat. clif, clof, Sax.] A steep rock; a rock, according to *Skinner*, broken and craggy; [*rupes.*] —The Leucadians did use to precipitate a man from a high *cliff* into the sea. *Bacon.*

Mountaineers, that from Severus came,
And from the craggy *cliffs* of Tetrica. *Dryden.*

CLIFF REGIS, a small town in Northamptonshire, commonly called Cliff, situated between Oundle and Stamford, about six miles from each, on a cross road, nearly surrounded with woods, and eighty-one miles from London. The weekly market is on Tuesdays; and there is one annual fair on the 29th of October, being St Luke's day. The trade of the town, which is principally in the hard-wood turnery, is not very considerable, being on the decline; however, it affords employment to many poor people.

CLIF'FORD (George), third earl of Cumberland, of that noble ancient family, was very eminent for his skill in navigation. He was born in 1558, and educated at Peterhouse, Cambridge, where he had for his tutor the celebrated John Whitgift, afterwards archbishop of Canterbury. In this place he applied himself chiefly to the study of the mathematics, to which his genius led him; whereby he became qualified for the several great expeditions he afterwards undertook. The first time he had any public employment was in 1586, when he was one of the peers who sat in judgment upon Mary queen of Scots.

But, having a greater inclination to act by sea than by land, he determined on making foreign discoveries. With this view, the earl undertook no less than eleven expeditions, fitted out at his own expence, in which he made captures to a prodigious amount; and, on his return, was graciously received by his royal mistress, queen Elizabeth, who created him knight of the garter in 1591. In 1601, he was one of the lords that were sent with forces to reduce the earl of Essex to obedience. He departed this life, at the Savoy, in London; Oct. 30, 1605; and was buried at Skipton, in Yorkshire.

CLIFFORT'IA, *f.* [this name was given by Eichrodt, in honour of *George Clifford*, a merchant at Amsterdam; a catalogue of whose garden, at Hartecamp, was published by Linnæus, Amsterdam, 1737, folio.] In botany, a genus of the class dioecia, order polyandria, natural order of tricoccæ. The generic characters are—Male calyx: three leaved; leaflets, ovate, acute, coriaceous, spreading, deciduous. Stamina: filaments about thirty, capillary, erect, the length of the calyx; antheræ twin, oblong, obtuse, erect, compressed. Female calyx: perianth three-leaved, equal, erect, superior, permanent; leaflets acute, lanceolate. Pistillum: germ oblong, inferior; styles two, filiform, long, plumose; stigmas simple. Pericarpium: capsule oblong, nearly columnar, two-celled, crowned with the calyx. Seeds: solitary, nearly columnar, linear.—*Essential Character*. Male calyx, three-leaved, superior; stamens about thirty; female calyx three-leaved, superior; styles two; capsule two-celled; seed one.

Species. I. With simple leaves. 1. Cliffortia odorata, or sweet smelling cliffortia: leaves ovate, serrate, ribbed, villose, underneath. This is an erect shrub, three feet high, little branching. The male flowers only have been observed; these agree with the other species of cliffortia, though the habit is different, and rather resembles that of mint. This and most of the species were found at the Cape of Good Hope by Thunberg.

2. Cliffortia ilicifolia, or ilex-leaved cliffortia: leaves subcordate, toothed. A shrub, with alternate declining branches, clothed with truncated membranes and stipules; flowers lateral, axillary, sessile, solitary, green; filaments, white; antheræ, yellow; stem weak, four or five feet high; leaves, greyish. Before the calyx opens, it forms a bud, in shape and size like those of the caper. The flowers appear in June, July, and August; but the leaves continue in verdure through the year. The plants in the European gardens, both of this and the following sort, are all male; cultivated 1714, in Chelsea garden.

3. Cliffortia ruscifolia, or butcher's-broom-leaved cliffortia: leaves lanceolate, quite entire. Introduced in 1786, by Mr. Francis Masson.

4. Cliffortia ferruginea: leaves lanceolate, setaceous-serrate; stems like those of knot-grass, filiform, usually prostrate, even, branching; branches short, ferruginous, herbaceous. The female has not been observed; found at the Cape by Sparrmann.

5. Cliffortia graminea: leaves ensiform, serrulate; petioles, dilated, terminated by two stipule-shaped awns; stems many together, two feet high, scarcely branching, striated, covered with leaves.

6. Cliffortia polygonifolia: leaves linear, hairy. This is a smaller shrub than the second and third sorts; branches naked, upright, less divided, alternate, grey, pubescent, round.

7. Cliffortia filifolia: leaves filiform, triquetrous, smooth, quite entire. Of this we have no description. It was found at the Cape, with many of the others, by Thunberg.

II. With compound leaves. 8. Cliffortia crenata: leaves binate, orbiculate, crenulate; an erect shrub, rather large.

9. Cliffortia pulchella: leaves binate, orbiculate, quite entire; leaves converging, and guarding the flowers in the cavity which they form; beautifully adorned on the outside with radiating nerves.

10. Cliffortia trifoliata: leaves ternate, the middle three toothed; stems slender, woody, procumbent, silky, with hairs, and sending out slender branches on every side; flowers axillary, on very short peduncles, shaped like those of the second, but smaller; they appear in July and August. We have only male plants in the English gardens; cultivated by Millar before 1759.

11. Cliffortia sarmentosa: leaves ternate, linear, villose; stem shrubby, sarmentose, filiform, four feet high, irregular; branches alternate, short, simple, round, pubescent; flowers lateral, axillary, sessile, solitary, white. The female has not been observed.

12. Cliffortia strobilifera: leaves ternate, linear, acute, even; a shrub with round branches, sparingly branched. The fructification not having been observed, we can only conjecture the genus from the structure. The strobiles are galls, not fruits. Jussieu doubts whether this species, with its strobile-shaped galls, and so different in habit, be really a cliffortia.

13. Cliffortia obcordata: leaves ternate, leaflets roundish, the middle one obcordate; an erect lowly shrub, with distich branches. Leaves sessile, obvate, nerveless, often in pairs.

14. Cliffortia ternata: leaves ternate; leaflets entirely hairy; a shrub, with small, ovate-lanceolate, hairy leaves, very different from the other cliffortias.

15. Cliffortia juniperina: leaves ternate, triquetrous, subulate, crowded; a shrub resembling juniper, erect, three feet in height, branching very much; observed at the Cape by Sparrmann.

16. Cliffortia falcata: leaves ternate, linear, falcated, smooth; a shrub, a foot in height, erect, branching, strict; leaves often three from each bud.

17. Cliffortia teretifolia: leaves fascicled, columnar, subulate, incurved, smooth, entire. 18. Cliffortia ericæfolia: leaves fascicled, columnar, furrowed smooth. 19. Cliffortia cuneata, or wedge-leaved cliffortia: leaves wedge-formed, serrate at the end. All natives of the Cape: the last flowers in April.

Propagation and Culture. The second species is easily propagated by cuttings, which may be planted in any of the summer months; if these are planted in small pots filled with light earth, and plunged into a very moderate hot-bed, they will soon take root, provided they are screened from the sun, and duly watered; when they have taken root, they must be gradually inured to bear the open air, to which they should be exposed, to prevent their drawing up weak: therefore they should be placed abroad till they have obtained some strength, then they may be each transplanted into a separate small pot, and placed in the shade until they have taken fresh root; after which they may be placed with other of the hardy kinds of exotic plants in a sheltered situation till October, when they should be removed into the green house, or placed under a common hot-bed frame, where they may be screened from the hard frost, but enjoy the free air at all times when the weather is mild. When the plants advance in height, their stems and branches must be supported, otherwise they will trail upon the ground. In summer they must be placed in the open air, with myrtles and other hardy green-house plants; and in winter the plants may be treated in the same manner as those, but must have little water in winter. This plant has endured the cold of our ordinary winters, when planted near a south-west wall without covering, but in severe winters it is always destroyed. The third is more tender; therefore it should be placed in a warm green-house in winter, and during that season should have little water. In summer it may be exposed to the open air in a sheltered situation, but should not remain abroad too late in autumn; for if there should be much rain at that season, it might endanger the plants. We have only the male plant in Europe, and it is difficult to propagate. The other sorts, coming from the same country, and being shrubs of the same nature with these, whenever

whenever they are introduced among us, will be propagated in the same manner, and require the same treatment.

CLI'FT, *s.* the same with CLIFF. *Now disused.*

Down he tumbled, like an aged tree,
High growing on the top of rocky *clift*. *Spenser.*

CLI'FTON, a distinguished village, or rather new town, in the county of Gloucester, only one mile west of Bristol, and including the place called BRISTOL HOT WELLS; for particulars of both of which see the article BRISTOL, vol. iii. p. 413.

CLIHA'POTIN, a town of Poland, in the palatinate of Volhynia; seventy-two miles east of Lucko.

CLI'MACTER, *s.* [from κλιμαζω, to proceed gradually.] The progression of the life of man. It is usually divided into periods of seven years.

CLIMACTE'RIC, or CLIMACTERICAL, *adj.* Containing a certain number of years, at the end of which some great change is supposed to befal the body in respect to health, life, or fortune.—Certain observable years are supposed to be attended with some considerable change in the body; as the seventh year; the twenty-first, made up of three times seven; the forty-ninth, made up of seven times seven; the sixty-third, being nine times seven; and the eighty-first, which is nine times nine: which two last are called the grand *climacterics.* The numbers seven and nine, multiplied into themselves, do make up sixty-three, commonly esteemed the great *climacterical* of our lives. *Brown.*

CLIMATE, *s.* [*clima*, Lat. *climat*, Fr. of κλιμα, Gr. a region.] A space upon the surface of the earth, measured from the equator to the polar circles; in each of which spaces the longest day is half an hour longer than in that nearer to the equator. From the polar circles to the poles, climates are measured by the increase of a month. For the projection of the *climates*, see the article GEOGRAPHY. In the common and popular sense, a region, or tract of land, differing from another by the temperature of the air.—This talent of moving the passions cannot be of any great use in the northern *climates. Swift.*

Betwixt th' extremes, two happier *climates* hold
The temper that partakes of hot and cold. *Dryden.*

To CLIMATE, *v. n.* To inhabit. A word only in *Shakespeare:*

The blessed gods
Purge all infection from our air, whilst you
Do *climate* here. *Shakespeare.*

CLI'MATURE, *s.* The same with CLIMATE. *Not in use.*

Such harbingers preceding still the fates,
Have heav'n and earth together demonstrated
Unto our *climatures* and countrymen. *Shakespeare.*

CLI'MAX, *s.* [from κλιμαζω, to proceed.] Gradation; ascent: a figure in rhetoric, by which the sentence rises gradually; as Cicero says to Catiline, Thou do'st nothing, movest nothing, thinkest nothing; but I hear it, I see it, and perfectly understand it.—Choice between one excellency and another is difficult; and yet the conclusion, by a due *climax*, is evermore the best. *Dryden.*

Some radiant Richmond every age has grac'd,
Still rising in a *climax*, till the last,
Surpassing all, is not to be surpast. *Granville.*

To CLIMB, *v. n.* pret. *clomb* or *climbed*; part. *clomb* or *climbed.* It is pronounced like *clime.* [climan, Sax. *klimmen*, Dutch.] To ascend up to any place; to mount by means of some hold or footing. It implies labour and difficulty, and successive efforts.—Jonathan *climbed* up upon his hands and upon his feet. 1 *Samuel.*

You tempt the fury of my three attendants,
Lean famine, quartering steel, and *climbing* fire. *Shakes.*

Thou sun! of this great world both eye and soul
Acknowledge him thy greater: sound his praise
In thy eternal course, both when thou *climb'st*,
And when high noon hast gain'd, and when thou fall'st. *Milton.*

To CLIMB, *v. a.* To ascend; to mount:

In arms pursue
Paths of renown, and *climb* ascents of fame. *Prior.*

CLIMB'ER, *s.* One that mounts or scales any place, or thing; a mounter; a riser:

Lowliness is young ambition's ladder,
Whereto the *climber* upwards turns his face. *Shakespeare.*

A plant that creeps upon other supports.—Ivy, briony, honey-suckles, and other *climbers*, must be dug up. *Mortimer.*

To CLIMB'ER, *v. a.* To mount with effort; to climb:

In scaling the youngest to pluck off his becke,
Beware how ye *climber* for breaking your neck. *Tusser.*

CLIMB'ER, *s.* in botany. See CLEMATIS.

CLIME, *s.* Climate; region; tract of earth.—Health to vigorous bodies, or fruitful seasons in temperate *climes*, are common and familiar blessings. *Atterbury.*

Of beauty sing, her shining progress view,
From *clime* to *clime* the dazzling light pursue. *Granville.*

To CLINCH, *v. a.* [clynıga, Sax. to knock, *Junius*; *clingo*, in Festus, to encompass, *Minshew.*] To hold in the hand with the fingers bent over it:

Simois rowls the bodies and the shields
Of heroes, whose dismember'd hands yet bear
The dart aloft, and *clinch* the pointed spear. *Dryden.*

To contract or double the fingers.—Their tallest trees are about seven feet high, the tops whereof I could but just reach with my fist *clinched. Swift.*—To bend the point of a nail in the other side. To confirm; to fix: as, *to* clinch *an argument.*

CLINCH, *s.* A word used in a double meaning; a pun; an ambiguity; a duplicity of meaning, with an identity of expression. How it obtains this meaning is difficult to find. A nail caught on the *other side*, and *doubled*, is a nail clinched: a word taken in a *different meaning*, and *doubled* in sense, is likewise a *clinch.*

Here one poor word a hundred *clinches* makes. *Pope.*

That part of the cable which is fastened to the ring of the anchor.

CLINCH, a mountain of North America, which divides the waters of Holston and Clinch rivers, in the state of Tennessee. In this mountain, Burke's Garden, and Morris's Nob, might be considered as curiosities.

CLINCH, or PELESON, a navigable branch of the Tennessee river, in North America, equal in length to Holston river, its chief branch, but less in width. It rises in Virginia, and after it enters into the state of Tennessee, it receives Powel's and Poplar's creek, and Emery's river. The course of the Clinch is south-west. Its mouth, 150 yards wide, lies five miles below Knoxville, and sixty above the mouth of the Hiwassee. It is boatable for upwards of 200 miles; and Powel's river, nearly as large as the main river, is navigable for boats 100 miles.

CLIN'CHAMPS, a town of France, in the department of the Calvados: five miles south of Caen.

CLINCH'ER, *s.* A cramp; a holdfast; a piece of iron beat down to fasten planks:

The wimbles for the work Calypso found;
With those he pierc'd 'em, and with *clinchers* bound. *Pope.*

To CLING, *v. n.* pret. *I clung*; part. *I have clung*: [*klynger*, Danish.] To hang upon by twining round; to stick

ſtick to; to hold faſt upon.—The fontanel in his neck was deſcried by the *clinging* of his hair to the plaſter. *Wiſeman.*

When they united and together *clung*,
When undiſtinguiſh'd in one heap they hung. *Blackmore.*

See in the circle next Eliza plac'd,
Two babes of love cloſe *clinging* to her waiſt. *Pope.*

To adhere as followers or friends:

Moſt popular conſul he is grown, methinks:
How the rout *cling* to him! *Ben Jonſon.*

To CLING, *v. a.* To dry up; to conſume; to waſte; to pine away. [Ɛeclugen ꞇꞃeop, a withered tree.]

If thou ſpeak'ſt falſe,
Upon the next tree ſhalt thou hang alive,
Till famine *cling* thee. *Shakeſpeare.*

CLING, a town and caſtle of Germany, in the circle of Bavaria; four miles eaſt-north-eaſt of Waſſerberg.

CLIN'GEN, or KLINGEN, a town of Germany, in the circle of Upper Saxony, and county of Schwartzburgh; ſixteen miles north of Erfurt.

CLIN'GY, *adj.* Apt to cling; adheſive.

CLI'NIC, or CLINICAL, *adj.* [from κλινω, to lie down.] Thoſe that keep their beds; thoſe that are ſick, paſt hopes of recovery. A *clinical* lecture is a diſcourſe upon a diſeaſe, made by the bed of the patient. A *clinical convert*, one that is converted on his death-bed. This word occurs often in the works of *Taylor*.

CLIN'ICUS, *ſ.* [κλινικος, Gr.] a phyſician, or nurſe, who attends bed-ridden patients; alſo a bearer who carries the dead to the grave. *L.*

To CLINK, *v. a* [perhaps ſoftened from *clank*, or corrupted from *click*.] To ſtrike ſo as to make a ſmall ſharp noiſe. Five years! a long leaſe for the *clinking* of pewter. *Shakeſpeare.*

To CLINK, *v. n.* To utter a ſmall, ſharp, interrupted noiſe:

Underneath th' umbrella's oily ſhed,
Safe through the wet on *clinking* pattens tread. *Gay.*

CLINK, *ſ.* A ſharp ſucceſſive noiſe; a knocking.—I heard the *clink* and fall of ſwords. *Shakeſpeare.*—It ſeems in Spenſer to have ſome unuſual ſenſe, perhaps the knocker of a door:

Tho' creeping cloſe, behind the wicket's *clink*,
Privily he peep'd out thro' a chink. *Spenſer.*

CLINO, a town of European Turkey, in the province of Theſſaly; twenty-two miles weſt of Zeiton.

CLINO, a town of Germany, in the biſhopric of Trent; twenty-two miles weſt-north-weſt of Trent.

CLINO'IDES, *ſ.* [from κλινη, a bed; and ειδος, a likeneſs.] The ſmall proceſſes which form the ſella turcica, ſo named from their ſuppoſed reſemblance to a couch. See ANATOMY.

CLINOVO, or KLIUNO, a town of Turkiſh Dalmatia, generally uſed as a place of rendezvous in a time of war, and a depôt of arms and proviſions; thirty miles eaſt-north-eaſt of Spalatro.

CLINOPO'DIUM, *ſ.* [from κλινη, and ποδιον, dimin. of πους, *pes lecti*, bed's-foot; the flowers growing in whorls, one above another, like the old-faſhioned turned feet of beds.] In botany, a genus of the claſs didynamia, order gymnoſpermia, natural order verticillatæ; labiatæ Juſſieu. The generic characters are—Calyx: involucre, many briſtled; length of the perianthium, placed beneath the whorl; perianthium one-leafed, cylindric, very ſlightly incurved, with a two-lipped mouth; upper lip wider, trifid, acute, reflected; lower lip divided, ſlender, inflected. Corolla: one-petalled, ringent; tube ſhort, gradually widened into the throat; upper lip erect, concave, obtuſe, emarginate; lower lip trifid, obtuſe; middle ſegment wider, emarginate. Stamina: filaments four, under the upper lip, of which two are ſhorter than the others; antheræ roundiſh. Piſtillum: germ four-parted: ſtyle filiform, the ſame ſituation and length with the ſtamens; ſtigma ſimple, acute, compreſſed. Pericarpium: none; calyx contracted round the neck, gibbous round the body, containing the ſeeds. Seeds: four ovate.—*Eſſential Character.* Involucre many briſtled, under the whorl.

Species. 1. Clinopodium vulgare, or wild baſil; and its varieties, i. the *humile*, or dwarf wild, or field-baſil; ii. the *Carolianum*, or Carolina field-baſil; iii. the *Ægyptiacum*, or Egyptian field-baſil: heads roundiſh, hiſpid; bractes briſtly. Root perennial, fibrous, ſending up ſeveral ſtiff ſquare ſtalks a foot and half high, from which come out a few lateral branches towards the top; the flowers come out in round whorls; one of theſe terminates the ſtalk, and there is generally another which ſurrounds the ſtalk at the joint immediately below it; the whorl grows very cloſe, and each peduncle ſuſtains ſeveral flowers, which are uſually purple, but ſometimes white; they appear in June. The whole plant is hairy; ſtems reddiſh. It is fond of a calcareous ſoil. The ſmell is ſlightly aromatic, and not unpleaſant.

i. Stems not more than half the height of the common ſort, and dividing into many long ſide branches; leaves ſmaller and rougher; whorls produced half the length of the branches, whereas the common ſort has rarely more than two; the bractes are alſo much longer. This flowers in June and July, and has a perennial root.

ii. Root perennial; ſtems ſtraight, hairy, almoſt round; joints four or five inches aſunder, with two oblong leaves at each, hairy on their under ſide, on ſhort footſtalks; at the bottom of theſe a ſlender branch comes out on each ſide, half an inch long, having two or four ſmall leaves ſhaped like the others; the flowers are produced in ſmall whorls, ſtanding thinly; they are white, and the bractes are longer than the calyxes. It flowers in Auguſt. Both theſe were ſent to Mr. Miller from Carolina by Dr. Dale.

iii. Root perennial; ſtems a foot and half high; leaves oval, with many tranſverſe deep furrows, dark green, oppoſite, five or ſix inches aſunder. There are commonly two or four ſide branches from the main ſtem, produced towards the bottom; and the whorls of flowers are produced at every joint towards the upper part of the ſtem, which are pretty large and hairy; the flowers are ſomewhat larger than thoſe of the common ſort, of a deeper colour, and ſtretch a little more out of the calyx; but the greateſt difference between them is, that in this the leaves and whorls are placed at a greater diſtance; nor do the plants continue ſo long. It is a native of Egypt; flowers in June, a fortnight or three weeks before the common field-baſil, and the ſeeds ripen in September.

2. Clinopodium incanum, or hoary clinopodium: leaves tomentoſe underneath; whorls flattened; bractes lanceolate. Root perennial; ſtems about two feet high, putting out a few ſhort ſide branches towards the upper part; leaves oblong, oval, the ſize of thoſe of water mint, oppoſite, ſeſſile, ſoft to the touch, with a ſtrong odour between that of marjorum and baſil; the upper ſurface pale green, the under hoary and woolly; the edges ſlightly indented; whorls flat, ſmooth, generally three; the upper ſmaller and terminating, the loweſt larger than the middle one; flowers pale purple, the ſtamens ſtanding out beyond the corolla; the bractes large, lanceolate, indented. Native of North America, where, in ſome parts, it is called *ſnakeweed*, being looked upon as a remedy for the bite of the rattle-ſnake. In England it flowers in July.

3. Clinopodium rugoſum, or wrinkled clinopodium: leaves wrinkled; heads axillary, peduncled, flatted, radiated. Root perennial; ſtems cloſely covered with browniſh hairs, and between two and three feet high; leaves very unequal in ſize, ſerrate, rough on their upper ſide, hairy on the under. It flowers in September, but never ripens its ſeeds here. Native of Carolina, whence

the seeds were sent to Mr. Miller by Dr. Dale. It was cultivated in the Eltham garden; and, before that, in the royal garden at Hampton Court, in 1690.

4. Clinopodium capitatum: leaves flat, smooth, heads axillary, peduncled. Jacquin makes this a distinct genus, under the name of *Hyptis*, from the inverted (υπτιω) form of the corolla; the whole plant is inodorous. Native of Jamaica, Barbadoes, and St. Domingo; cultivated in the Eltham garden in 1733.

5. Clinopodium Asiaticum, or Chinese clinopodium: leaves oblong, nerved, wrinkled, tomentose underneath, spike whorled, terminating; stem suffruticose, two feet and an half high, erect, quadrangular, four furrowed, simple, villose; leaves ovate-oblong, obtuse, slightly serrate, many nerved; flowers violet coloured, in interrupted whorls, forming an oblong spike, with sharp hirsute involucres. Native of Cochin China.

Propagation and Culture. These plants may be propagated by seeds, and also by parting their roots; the latter is generally practised in England, because the foreign sorts do not perfect their seeds here. The best time to transplant and part their roots is in autumn, that they may take root before winter. If these are planted in a dry soil, they are (except the third sort) hardy enough to thrive in the open air in England, and require no other care but to keep them clean from weeds, and every other year they may be transplanted and parted. The third sort must be planted in pots, and in winter sheltered under a frame, where the plants may enjoy the free air in mild weather; but screened from frost, otherwise they will not live in this country. See ANTHOSPERMUM, BARTSIA, CLEONIA, COMETES, MONARDA, NEPETA, PHLOMIS, SATUREIA, THYMUS, and ZIZIPHORA.

CLI'NQUANT, *adj.* [French.] Dressed in embroidery, in spangles, false glitter, tinsel finery:

To-day the French,
All *clinquant*, all in gold, like heathen gods
Shone down the English. *Shakespeare.*

CLI'NTON, the most northern county of United America, in the state of New York, bounded north by Canada; east by the deepest waters of Lake Champlain, which line separates it from Vermont; and south by the county of Washington. By the census of 1791, it contained 1614 inhabitants. It is divided into five townships, viz. Plattsburg, the capital, Crown Point, Willsborough, Champlain, and Peru. The length from north to south is about ninety-six miles; and the breadth from east to west, including the line upon the lake, is thirty-six miles. The number of souls, in 1796, was estimated to be 6,000. A great proportion of the lands are of an excellent quality, and produce abundance of the various kinds of grain cultivated in other parts of the state. The people manufacture earthen ware, pot and pearl ashes, in large quantities, which they export to New York, or Quebec. Their wool is excellent; their beef and pork second to none; and the price of stall-fed beef in Montreal, sixty miles from Plattsburg, is such as to encourage the farmers to drive their cattle to that market. Their forests supply them with sugar and molasses; and the soil is well adapted to the culture of hemp. The land-carriage from any part of the country, in transporting their produce to New York, does not exceed eighteen miles. The carrying-place at Ticonderago is one mile and a half; and from Fort George, at the south end of the lake of that name, to Fort Edward, is but fourteen miles. From this country to Quebec are annually sent large rafts; the rapids of St. Johns's and Chamblee being the only interruptions in the navigation, and those not so great, but that, at some seasons, batteaux, with sixty bushels of salt, can ascend them. Salt is sold here at half a dollar a bushel. Saranac, Sable, and Boquet rivers, water Clinton-county. The first is remarkable for the quantity of salmon it produces.

CLI'NTON, a township of the American States, in Dutchess-county, New York, above Poughkeepsie. It is large and thriving, and contains 4607 inhabitants, 666 of whom are electors.

CLIO, in pagan mythology, the first of the muses, daughter of Jupiter and Mnemosyne; she presided over history; she is represented crowned with laurels, holding in one hand a trumpet, and a book in the other; sometimes she holds a plectrum, or quill, with a lute. Her name signifies honour and reputation, κλεος, *gloria*; and it was her office faithfully to record the actions of brave and illustrious heroes; she had Hyacinthus by Pierus, son of Magnes.

CLI'O, in zoology, a genus belonging to the order of vermes mollusca. Its characters are these: the body is vaginated, and adapted for swimming; oblong, with two membranaceous arms or wings; it has likewise five tentacula, two of which are in the mouth. A native of the main sea, an inch and a half long; it gives a numbing or freezing sensation to the touch; is pellucid, and of an azure colour, when in the water, decorated with crimson at each extremity; it associates with the species medusa; the head is somewhat narrow, globular, and divided into two cheeks by a longitudinal ridge or furrow, the terminal point of the mouth furnished with a lip on each side, armed in front with two bright shining teeth; the interior aperture protected by four, smaller and crooked; the two tentacula, which are situated in the mouth, are of a softer substance; the thorax generally globose, with submembranaceous wings, the throat yellow. There are six varieties of the clio now known.

To CLIP, *v.a.* [clippan, Sax.] To embrace by throwing the arms round; to hug; to enfold in the arms.—The male resteth on the back of the female, *clipping* and embracing her with his legs about the neck and body. *Ray.*

He that before shunn'd her, to shun such arms,
Now runs and takes her in his *clipping* arms. *Sidney.*

Here I *clip*
The anvil of my sword, and do contest
Hotly and nobly with thy love. *Shakespeare.*

To cut with sheers. [*klipper*, Danish; *klippin*, Dutch; apparently from the same radical sense, since sheers cut by inclosing and embracing.]—Your sheers come too late to *clip* the bird's wings, that already is flown away. *Sidney.*

Then let him, that my love shall blame,
Or *clip* love's wings, or quench love's flame. *Suckling.*

Sometimes with *off*.—We should then have as much feeling upon the *clipping off* a hair, as the cutting of a nerve. *Bentley.*—It is particularly used of those who diminish coin, by paring the edges.—This design of new coinage, is just of the nature of *clipping*. *Locke.*—To curtail; to cut short.—Mrs. Mayoress *clipped* the king's English. *Addison.*—Even in London, they *clip* their words after one manner about the court, another in the city, and a third in the suburbs. *Swift.*—To confine; to hold; to contain:

Where is he living, *clipt* in with the sea,
Who calls me pupil? *Shakespeare.*

To CLIP, *v. n.* A phrase in falconry.

Some falcon stoops at what her eye design'd,
And with her eagerness the quarry miss'd,
Straight flies at check, and *clips* it down the wind. *Dryden.*

CLI'PPER, *s.* One that debases coin by cutting.—No coins pleased some medallists more than those which had passed through the hands of an old Roman *clipper*. *Addis.*

CLI'PPING, *s.* The part cut, or clipped off.—Beings purely material, without sense or thought, as the *clippings* of our beards, and parings of our nails. *Locke.*

CLIS'SA, a fortress of Dalmatia, taken from the Turks by the Venetians in 1684: ten miles north of Spalatro.

CLIS'SON, a town of France, and principal place of a district, in the department of the Lower Loire, on the Sevre: five leagues south-east of Nantes, and six south of Ancenis. Lat. 47. 5. N. lon. 16. 23. E. Ferro.

CLIST, a river of England, which runs into the Ex a little below Exeter.

CLIS'THENES, a famous Athenian magistrate, the author of the mode of banishing ambitious citizens by ostracism, or writing their names upon a shell; the intention was patriotic, but it was abused like all other human institutions; some of the worthiest citizens of Athens being thus exiled. He died 510 years before Christ.

CLIS'TINOS, a fierce nation of American Indians, who inhabit the country about Hudson's Bay.

CLI'THERO, a market-town in Lancashire, on the river Ribble, at the foot of Pendle-hill, nineteen miles from Preston, nineteen from Skipton, twenty-seven from Lancaster, and two hundred and fourteen from London. It has a neat church, and a well-endowed free grammar-school, founded by Philip and Mary, which has lately been rebuilt, and is now a handsome structure. The town is well-watered by copious and wholesome springs, and can boast of a spa impregnated with sulphur, but without salt, and of the same medicinal virtues as the Wigan spa. In the neighbourhood are also found chalybeate springs. The castle, said to have been built in 1178, is a venerable ruin; and, standing upon a hill, is a fine object, and commands a pleasant prospect of the surrounding country. The town is a borough by prescription, and is governed by two bailiffs, who act together as one magistrate. The market-day is on Saturdays, and the fairs for cattle are held on the 24th of March, August 1, the fourth Saturday after Michaelmas-day, and the 7th of December. The cotton manufactory is carried on here to a considerable extent; and has its communication with all the neighbouring canals; its trade bids fair to be considerably enlarged.

CLITO'MACHUS, a celebrated philosopher, flourished about 140 years before Christ. He was born at Carthage; quitted his country at forty years of age, and went to Athens, where he became the disciple and successor of Carneades; he composed many books, but they are all lost.

CLITO'RIA, *s.* [so named from the form of the corolla.] In botany, a genus of the class diadelphia, order decandria; natural order papilionaceæ, or leguminosæ. The generic characters are—Calyx: perianthium one-leafed, erect, tubular, five-toothed, permanent. Corolla: papilionaceous; standard very large, straight, emarginate, waved at the margin, spreading, and overshadowing the other petals; wings oblong, straight, obtuse, shorter than the standard; keel shorter than the wings, falcated, somewhat roundly. Stamina: in two brotherhoods, (simple and nine cleft;) antheræ simple. Pistillum: germ oblong; style ascending; stigma obtuse. Pericarpium: legume very long, linear, compressed, one-celled, two-valved, with the tip subulate. Seeds: many, reniform. The corolla often appears in a supine or inverted position; seeds without albumen; embryo without plume; by which it is distinguished from phaseolus and vicia.—*Essential Character.* Corolla inverted; standard very large, spreading, overshadowing the wings.

Species. 1. Clitoria Ternatea, or winged-leaved clitoria: leaves pinnate. This rises with a twining herbaceous stalk to the height of four or five feet, in the same manner as the kidney-bean, and requires the like support; for, in the places where it grows naturally, it twists itself about the neighbouring plants; the leaves are winged, composed of two or three pair of leaflets, terminated by an odd one; these are of a beautiful green, and are placed alternate on the stalks; from the appendages of the leaves come out the peduncles; each of these is encompassed by two very fine leaves about the middle, where they are bent, sustaining a very large, gaping, beautiful, flower, whose bottom part seems as if growing to the top. The flowers have a green membranaceous calyx; the corolla is of a blue colour, and stains paper, like indigo, but as a dye it is not permanent. It is a native of the East Indies and Cochinchina, but the seeds were first brought to Europe from Ternate, one of the Molucca islands; and this induced Tournefort to give the name of *Ternatea* to this genus. There is a variety with white flowers, and another with blue flowers, which are very double. This production of double flowers is a singularity in the leguminous class of plants. The legume is narrow, elongated, a finger's length and more, lenticular, compressed, without knots or risings, subpubescent, pale, terminated by the longish subulate style, many-celled, two-valved; partitions thin; seeds solitary, seven to twelve, ovate-kidney-form, cut off at one end, compressed a little, somewhat gibbose on both sides, smooth, chesnut-brown. Cultivated 1739 by Mr. Miller. Breynius received the seeds from the East Indies in 1667.

2. Clitoria Brasiliana, or Brasilian clitoria: leaves ternate, calyxes solitary, bell-form. This has a twining stem like the foregoing, which rises five or six feet high, having at each joint one ternate leaf on a long petiole; the flowers come out singly from the axils on long peduncles, encompassed about the middle with two small oval leaves; they are very large, the standard being much broader than that of the first sort, and the two wings are larger; they are of a fine blue colour; they appear in July, and in warm seasons the seeds will ripen in autumn, soon after which the plants decay. Native of Brasil. There was one with a double flower of this sort, raised in the Chelsea garden some years past, from seeds sent from India; but the plants did not produce seeds here, and, being annual, the sort was lost.

3. Clitoria Virginiana, or small-flowered clitoria: leaves ternate, calyxes geminate, bell-form. This species being tender, and flowering here with difficulty, the flowers frequently come out singly in our stoves, which accounts for the difference between Mr. Miller's description and the Linnæan character. Dillenius also observes that the flowers are very apt to fall off. Native of Virginia; also of Jamaica, and other islands of the West Indies.

4. Clitoria Mariana, or Maryland clitoria: leaves ternate; calyxes cylindric. This rises with a twining weak stalk, about five feet high, having trifoliate leaves like the former, whose leaflets are narrower, and of a greyish colour on their under side; the flowers come out by pairs; they are small, pale blue within, dirty white on the outside. This is a native of Carolina; flowers in August, but rarely ripens any seeds in England.

5. Clitoria galactia, or milky clitoria: leaves ternate, raceme, erect; flowers pendulous. Native of Jamaica, chiefly in the lower hills; it is easily distinguished by its long reddish flowers, milky branches, and smooth leaves; it is a weakly climber, and raises itself by the help of the neighbouring bushes to the height of eight or nine feet.

Propagation and Culture. The seeds of these plants must be sown upon a good hot bed, early in the spring; and, when the plants are two inches high, they should be carefully taken up, and each planted in a small pot filled with light fresh earth, and plunged into a hot-bed of tanners' bark, observing to shade them till they have taken fresh root, and refresh them with water as they may require it. After they are well rooted in the pots, they must have air every day in proportion to the warmth of the season, to prevent their drawing up weak; their waterings should be repeated two or three times a week, but they should not have too much at each time. As these plants have climbing stalks, they will soon grow too tall to remain under common frames, therefore they must then be removed into the stove, and plunged into the bark-bed; but, if their roots have filled the pots, they should be removed into larger, and afterwards they must be treated in the same manner as other plants, from the same countries. All these sorts are annual with us in England; so that, unless the seeds ripen, the species are lost; and, as the two sorts with double flowers have not formed any pods in this country, therefore the seeds of these must be procured from the countries where they naturally grow. Indeed these are supposed to be only varieties, which accidentally arise from the single. If this be true, we cannot account for the success

cess of those plants which grew at Chelsea, for they were all of the same double kind, without the least variation; and this was not from a single experiment, but in three different years the plants, all of them, produced double flowers. See GALEGA.

CLI'TORIS, *s.* [from κλειω, to enclose or hide.] A part of the pudenda of a woman, analogous to the penis in man, and which, in its natural state, is enclosed in the vagina. See ANATOMY, vol. i. p. 621.

CLITORIS'MUS, *s.* [from κλειτορις, the clitoris.] A swelling or morbid enlargement of the clitoris.

CLITOW' a town of Bohemia, in the circle of Pilsen, celebrated for its rich silver mines.

CLITUM'NUS, in ancient geography, a river of Umbria, on this side the Appennine. According to Pliny, it was a fountain consisting of several veins, situated between Hispellum and Spoletium; which soon after swelled into a very large and navigable river, running from east to west into the Tinia, and both together into the Tiber. A river famous for its milk-white flocks and herds. *Virgil.* The god of the river was called *Clitumnus.* The river is now called *Clitunno.*

CLI'TUS, brother to Alexander the Great's nurse, followed that prince in his conquests, and saved his life by cutting off the hand of Rosaces, which held an axe lifted up to kill him at the passage of the Granicus. Alexander, who had a great regard for him, some time after invited him to supper; when Clitus, at the end of the repast, being heated with wine, diminished the exploits of that prince, in order to magnify those of Philip his father. This so enraged Alexander, that he killed him with his own hand; but he was afterwards so afflicted at it, that he attempted his own life.

CLIVE (Robert), son of Richard Clive, esquire, of Styche, near Drayton, in Salop, was born in 1725. Toward the close of the war, in 1741, he was sent as a writer in the East India service to Madras; but, being fonder of the camp than the counting-house, he soon availed himself of an opportunity to exchange his pen for a pair of colours. He first distinguished himself at the siege of Pondicherry in 1748; acted under major Laurence at the taking of Devi Cotta in Tanjore, who wrote of his military talents in high terms; commanded a small party for the taking of Arcot, and afterwards defended that place against the French; and performed many other exploits, which, considering the remoteness of the scene of action, would require a long detail to render sufficiently intelligible. He was, however, in brief, looked upon and acknowledged as the man who first roused his countrymen to spirited actions, and raised their reputation in the East; so that, when he came over to England in 1753, he was presented, by the court of directors, with a rich sword set with diamonds, as an acknowledgment of past, and an incitement to future, services. Captain Clive returned to India in 1755, as governor of Fort St. David, with the rank of lieutenant-colonel in the king's troops; when, as commander of the company's troops, in conjunction with admiral Watson, he reduced Angria the pirate, and became master of Geria, his capital, with all his accumulated treasure. On the loss of Calcutta, and the well known barbarity of the soubah Surajah Dowla, they sailed to Bengal, where they took Fort William, in January 1757; and colonel Clive defeating the soubah's army soon after, accelerated a peace. Surajah Dowla's perfidy, however, soon produced fresh hostilities, which ended in his ruin; he being totally defeated by colonel Clive at the famous battle of Plassey. The next day the conqueror entered Muxadabad in triumph; and placed Jaffier Ally Cawn, one of the principal generals, on the throne: the deposed soubah was soon after taken, and privately put to death by Jaffier's son. Admiral Watson died at Calcutta; but colonel Clive commanded in Bengal the two succeeding years: he was honoured by the Mogul with the dignity of an Omrah, or lord, of the empire; and was rewarded by the new soubah with a grant of lands, or a jaghier, producing 27,000l. a year. In 1760, he returned to England, where he received the unanimous thanks of the company, was elected member of parliament for Shrewsbury, and was raised to an Irish peerage by the title of Lord Clive baron of Plassey. In 1764, fresh disturbances taking place in Bengal, lord Clive was esteemed the only man qualified to settle them, and was accordingly again appointed to that presidency; after being honoured with the order of the Bath, and with the rank of major-general. When he arrived in India, he exceeded the most sanguine expectation, in restoring tranquillity to the province without striking a blow, and fixed the highest ideas of the British power in the minds of the natives. He returned home in 1767, and, in 1772, when a parliamentary inquiry into the conduct of the East India company was agitated, he entered into an able justification of himself in a masterly speech in the house of commons. A severe illness with which lord Clive had been attacked, during his residence in the East Indies, gave a blow to his constitution which was never repaired; and his health was often weakened by his successive visits to the unwholesome climates of that country. Hence it was that he became subject, at times, to a depression of spirits. His ardent and active mind, when not called into exertion by some great occasion, frequently preyed upon itself. In the latter part of his life, having nothing peculiarly important and interesting to engage his attention, and his body growing more and more infirm, the depression increased; and to this was owing his decease, on the 22d of November 1774, not long after he had entered into the 50th year of his age. He was interred at Moreton-Say, the parish in which he was born. In the various relations of private life, lord Clive was highly beloved and esteemed; for he was a man of the kindest affections, and of every social virtue. His secret charities were numerous and extensive; but the present he made of seventy thousand pounds, as a provision for the invalids of the East India company's service, was the noblest donation of its kind that ever came from a private individual. His person was of the largest of the middle size; his countenance inclined to sadness; and the heaviness of his brow imparted an unpleasing expression to his features. It was a heaviness that arose not from the prevalence of the unsocial passions, (for of these few men had a smaller share,) but from a natural fullness in the flesh above the eye-lid. His words were few; and his manner, among strangers, was reserved; yet it won the confidence of men, and gained admission to the heart. In February 1753, he married Margaret, daughter of Edmund Maskelyne, esquire, of Purton in Wiltshire, and sister to the reverend Dr. Nevil Maskelyne, astronomer royal. By this lady he had Edward, the present lord Clive, born March 7, 1754; Rebecca, born September 15, 1760; Charlotte, born January 15, 1762; Margaret, born August 15, 1763; and Robert, born August 31, 1769.

CLI'VERS, *s.* in botany. See GALIUM APARINE.

CLOA'CA, [from *cluo*, Lat. to cleanse.] A jakes. The canal in birds through which the egg descends from the ovary.

CLOA'CÆ, in antiquity, the common sewers of Rome, constructed to carry off the dirt and soil of the city into the Tiber, and justly reckoned among the grand works of the Romans. The first common sewer, called *Cloaca Maxima*, was built by Tarquinius, some say Priscus, others Superbus, of huge blocks of stone joined together without any cement, in the manner of the edifices of those early times; consisting of three rows of arches, one above another, which at length conjoin and unite together; measuring in the clear eighteen palms in height, and as many in width. Under these arches they rowed in boats: which made Pliny say that the city was suspended in air, and that they sailed beneath the houses. Under these arches also were ways through which carts loaded with hay could pass with ease. It began in the Forum Romanum; measured 300 paces in length; and emptied itself

itself between the temple of Vesta and the Pons Senatorius. There were as many principal sewers as there were hills. Pliny concludes their firmness and strength from their standing for so many ages the shocks of earthquakes, the fall of houses, and the vast loads and weights moved over them.

CLOACI'NA, a goddess at Rome, who presided over the Cloacæ. Some suppose her to be Venus. Hence she has been styled the goddess of jakes and common sewers.

CLOAK, *s.* [*lach*, Saxon.] The outer garment, with which the rest are covered.—All arguments will be as little able to prevail, as the wind did with the traveller to part with his *cloak*, which he held only the faster. *Locke.*

Nimbly he rose, and cast his garment down;
That instant in his *cloak* I wrapt me round. *Pope.*

A concealment; a cover.—Not using your liberty for a *cloak* of maliciousness. *Peter.*

To CLOAK, *v. a.* To cover with a cloak; to hide; to conceal:

Most heavenly fair, in deed and view,
She by creation was, till she did fall;
Thenceforth she sought for helps to *cloak* her crimes withal. *Spenser.*

CLOAK'BAG, *s.* A portmanteau; a bag in which clothes are carried.—Why dost thou converse with that trunk of humours, that stuffed *cloakbag* of guts? *Shakesp.*

CLOCK, *s.* [*clocc*, Welsh, from *clóch*, a bell, Welsh and Armoric; *cloche*, Fr.] The instrument which, by a series of mechanical movements, tells the hour by a stroke upon a bell.—If a man be in sickness or pain, the time will seem longer without a *clock* or hour-glass than with it. *Bacon.*—It is an usual expression to say, *What is it of the clock*, for *What hour is it?* Or *ten o'clock*, for *the tenth hour*. *The clock of a stocking*, is the flowers or inverted work about the ankle.—His stockings with silver *clocks* were ravished from him. *Swift.*—For all the modern improvements in the construction of CLOCKS, WATCHES, TIME-KEEPERS, &c. see the article HOROLOGY. Clocks and watches, dial-plates, and cases, are not to be exported without the movement. Stat. 9 & 10 *W.* III. c. 28. Makers shall engrave their names on clocks and watches. Stat. 9 & 10 *W.* III. c. 28. Penalties on workmen, &c. embezzeling materials of clocks and watches. Stat. 27 *Geo.* II. c. 7.

CLOCK'MAKER, *s.* An artificer whose profession is to make clocks.—This inequality has been diligently observed by several of our ingenious *clockmakers*, and equations been made and used by them. *Derham.*

CLOCK'WORK, *s.* Movements by weights or springs, like those of a clock:

So if unprejudic'd you scan
The goings of this *clock-work*, man;
You find a hundred movements made
By fine devices in his head:
But 'tis the stomach's solid stroke,
That tells this being what's o'clock. *Prior.*

CLOD, *s.* [club, Sax. a little hillock; *klotte*, Dutch.] A lump of earth or clay; such a body of earth as cleaves or hangs together.—The earth that casteth up from the plough a great *clod*, is not so good as that which casteth up a smaller *clod*. *Bacon.*—A turf; the ground. Any thing concreted together in a cluster.—Fishermen who make holes in the ice to dip up fish with their nets, light on swallows congealed in *clods* of a slimy substance; and, carrying them home to their stoves, the warmth restoreth them to life and flight. *Carew.*—A lump, a mass of metal:

One at the forge
Labouring, two massy *clods* of iron and brass
Had melted. *Milton.*

Any thing vile, base, and earthy; as the body of man, compared to his soul.—How the purer spirit is united to this *clod*, is a knot too hard for our degraded intellects to untie. *Glanville.*

And ye high heavens, the temple of the gods,
In which a thousand torches, flaming bright,
Do burn, that to us, wretched earthly *clods*,
In dreadful darkness lend desired light. *Spenser.*

A dull, gross, stupid fellow; a dolt:

The vulgar! a scarce animated *clod*,
Ne'er pleas'd with aught above 'em. *Dryden.*

To CLOD, *v. n.* To gather into concretions; to coagulate: for this we sometimes use *clot*:

Let us go find the body, and from the stream,
With lavers pure, and cleansing herbs, wash off
The *clodded* gore. *Milton.*

To CLOD, *v. a.* To pelt with clods.

CLODA'GH, a river of Ireland, which runs into Lough Erne: eight miles south of Enniskillen.

CLODA'WA, a town of Poland, in the palatinate of Kalish: twenty-four miles east-south-east of Gnesna.

CLOD'DY, *adj.* Consisting of earth or clods; earthy; muddy; miry; mean; gross; base:

The glorious sun,
Turning with splendour of his precious eye
The meagre *cloddy* earth to glittering gold. *Shakespeare.*

Full of clods unbroken.—These lands they sow always under furrow about Michaelmas, and leave it as *cloddy* as they can. *Mortimer.*

CLO'DEN, a town of Germany, in the circle of Upper Saxony, and electorate of Saxony: four miles south-southwest of Jessen.

CLODIA LEX, *de Cypro*, was enacted by the tribune Clodius, in the year of Rome 607, to reduce Cyprus into a Roman province, and expose Ptolemy king of Egypt to sale in his regal ornaments. It impowered Cato to go with the prætorian power and see the auction of the king's goods, and commissioned him to return the money to Rome. Another, *de Magistratibus*, 695, by Clodius the tribune. It forbad the censors to put a stigma or mark of infamy upon any person who had not been actually accused and condemned by both the censors. Another, *de Religione*, by the same, 696, to deprive the priest of Cybele, a native of Pessinum, of his office, and confer the priesthood upon Brotigonus, a Gallogrecian. Another, *de Provinciis*, 695, which nominated the provinces of Syria, Babylon, and Persia, to the consul Gabinus, and Achaia, Thessaly, Macedon, and Greece, to his colleague Piso, with proconsular power. It impowered them to defray the expences of their march from the public treasury. Another, 695, which required the same distribution of corn among the people gratis, as had been given them before at six *asses* and a *triens* the bushel. Another, 695, by the same, *de Judiciis*. It called to an account such as had executed a Roman citizen without a judgment of the people and all the formalities of a trial. Another, by the same, to pay no attention to the appearances of the heavens while any affair was before the people. Another, to make the power of the tribunes free in making and proposing laws. Another, to re-establish the companies of artists which had been instituted by Numa, but since his time abolished.

CLO'DIUS (Publius), a Roman descended of an illustrious family. He made himself famous for his licentiousness, avarice, and ambition. He committed incest with his three sisters; and introduced himself in womens clothes into the house of Julius Cæsar, whilst Pompeia, Cæsar's wife, of whom he was enamoured, was celebrating the mysteries of Ceres, where no man was permitted to appear. He was accused for this violation of human and divine laws; but he suborned his judges, and, by that means, screened himself from justice. He descended from

from a patrician into a plebeian family to become a tribune. He was such an enemy to Cato, that he made him go with prætorian power, in an expedition against Ptolemy king of Cyprus, that by the difficulty of the campaign he might ruin his reputation, and destroy his interest at Rome during his absence. Cato, however, by his uncommon success, frustrated the views of Clodius. He was also an inveterate enemy to Cicero, and by his influence he banished him from Rome, partly on pretence that he had punished with death and without trial the adherents of Cataline. He wreaked his vengeance upon Cicero's house, which he burnt, and set all his goods to sale; which, however, to his great mortification, no one offered to buy. In spite of Clodius, Cicero was recalled, and all his goods restored to him. Clodius was some time after murdered by Milo, whose defence Cicero took upon himself. *Appian.*

CLOD'PATE, *s.* A stupid fellow; a dolt; a thickskull.

CLOD'PATED, *adj.* Stupid; dull; doltish; thoughtless.—My *clodpated* relations spoiled the greatest genius in the world, when they bred me a mechanic. *Arbuthnot.*

CLOD'POLL, *s.* A thickskull; a dolt; a blockhead.—This letter being so excellently ignorant, he will find that it comes from a *clodpoll*. *Shakespeare.*

CLO'DRA, a town of Germany, in the circle of Upper Saxony, and circle of Neustadt: three miles east of Weyda.

CLO'DY, a river of Ireland, which runs into the Bann: three miles south of Kilrea.

CLŒ'LIA, a Roman virgin, given with other maidens as hostages to Porsenna king of Etruria. She escaped from her confinement, and swam across the Tiber to Rome. Her unprecedented virtue was rewarded by her countrymen, with an equestrian statue in the *via sacra*. *Livy.*

CLOE'RE, *s.* A prison or dungeon; it is conjectured to be of British original; the dungeon, or inner prison of Wallingford castle, temp. H. II. was called *cloere brien*, i. e. *carcer brieni*, &c. Hence seems to come the Lat. *cloaca*, which was anciently the closest ward or nastiest part of the prison; the old *cloacertus* is interpreted *carceris custos*; and the present *cloacertus*, or keeper of a *jakes*, is an office in some religious houses abroad, imposed on an offending brother, or by him chosen as an exercise of humility and mortification. *Cowell.*

To CLOG, *v. a.* [It is imagined by Skinner to come from *log*; by Casaubon derived from κλοιὸς, a dog's collar, being thought to be first hung upon fierce dogs.] To load with something that may hinder motion; to encumber with shackles; to impede, by fastening to the neck or leg a heavy piece of wood or iron.—Let a man wean himself from these worldly impediments, that here *clog* his soul's flight. *Digby.*

Gums and pomatums shall his flight restrain,
While *clogg'd* he beats his silken wings in vain. *Pope.*

To hinder, to obstruct:

The gutter'd rocks and congregated sands,
Traitor's ensteep'd to *clog* the guiltless keel. *Shakespeare.*

To load; to burthen; to embarrass.—All commodities are *clogged* with impositions. *Addison.*

Since thou hast far to go, bear not along
The *clogging* burthen of a guilty soul. *Shakespeare.*

In the following passage it is improper, for its meaning always includes hindrance.—Clocks and jacks, though the screws and teeth of the wheels and nuts be never so smooth, yet, if they be not oiled, will hardly move; though you *clog* them with never so much weight. *Ray.*

To CLOG, *v. n.* To coalesce; to adhere. In this sense, perhaps, only corruptly used for *clod* or *clot*.—Move it sometimes with a broom, that the seeds *clog* not together. *Evelyn.*—To be encumbered or impeded by some extrinsic matter.—In working through the bone, the teeth of the saw will begin to *clog*. *Sharp.*

CLOG, *s.* A load; a weight; any encumbrance hung upon any animal or thing to hinder motion:

As a dog, committed close
For some offence, by chance breaks loose,
And quits his *clog*; but all in vain,
He still draws after him his chain. *Hudibras.*

An encumbrance; a hindrance; an obstruction; an impediment.—Weariness of the flesh is an heavy *clog* to the will. *Hooker.*—Slavery is, of all things, the greatest *clog* and obstacle to speculation. *Swift.*—A kind of additional shoe, worn by women to keep them from wet.—A wooden shoe.—In France the peasantry go barefoot; and the middle sort, throughout all that kingdom, makes use of wooden *clogs*. *Harvey.*

CLOG'GINESS, *s.* The state of being clogged.

CLOG'GY, *adj.* That which has the power of clogging up.—By additaments of some such nature, some grosser and *cloggy* parts are retained; or else much subtilized, and otherwise altered. *Boyle.*

CLOG'HER, a city or town of Ireland, in the county of Tyrone, the see of a bishop, suffragan of Armagh, founded by St. Patrick; the cathedral is also the parish church: seventy miles north-north-west of Dublin, and twenty west of Armagh. On the 20th of April 1396, a dreadful fire burnt to the ground the church, two chapels, the abbey, the court-house, and thirty-two other buildings, with all the sacerdotal vestments, utensils, &c. belonging to the bishop's chapter.

CLOG'HER HEAD, a cape on the east coast of Ireland, in the county of Louth, in the Irish sea. Lat. 53. 47. N. lon. 6. 12. W. Greenwich.

CLOHA'RS CARNOET, a town of France, in the department of Finisterre, and chief place of a canton, in the district of Quimperle: one league and a half south of Quimperle.

CLOI'STER, *s.* [*clâs*, Welsh; clauꞅꞇeꞃ, Sax. *closter*, Germ. *klooster*, Dut. *claustro*, Ital. *cloistre*, Fr. *claustrum*, Lat.] A religious retirement; a monastery; a nunnery. In architecture, a peristyle; a piazza:

Some solitary *cloister* will I choose,
And there with holy virgins live immur'd. *Dryden.*

To CLOI'STER, *v. a.* To shut up in a religious house; to confine; to immure; to shut up from the world.—Nature affords plenty of beauties, that no man need complain if the deformed are *cloistered* up. *Rymer.*

CLOI'STERAL, *adj.* Solitary; retired; religiously recluse.—Upon this ground many *cloisteral* men, of great learning and devotion, prefer contemplation before action. *Walton.*

CLOI'STERED, *part. adj.* Solitary; inhabiting cloisters:

Ere the bat hath flown
His *cloister'd* flight, there shall be done
A deed of dreadful note. *Shakespeare.*

Built with peristyles or piazzas.—The Greeks and Romans had commonly two *cloistered* open courts, one serving for the women's side, and the other for the men. *Wotton.*

CLOI'STRESS, *s.* A nun; a lady who has vowed religious retirement:

Like a *cloistress* she will veiled walk,
And water once a day her chamber round
With eye-offending brine. *Shakespeare.*

CLOKE. See CLOAK.

CLOMB, *pret.* of *to climb*.—Ask to what end they *clomb* that tedious height. *Spenser.*

CLOLU'GH, a river of Ireland, which runs into the Suir: seven miles west-north-west of Waterford.

CLOM'PANUS, *s.* in botany. See STERCULIA.

CLO'NES, a town of Ireland, in the county of Monaghan: ten miles south-west of Monaghan.

CLO'NFERT, a city or town of Ireland, in the county of

of Galway, the see of a bishop, suffragan of Tuam, founded about the end of the sixth century, and united to Kilmacdaugh in the year 1602; the cathedral and parish church are the same: thirty-six miles east of Galway.

CLO'NICUS, *s.* [from κλονεω, to agitate.] An epileptic or convulsive spasm. Any unnaturally tumultuous motion of a part.

CLONME'LL, a town of Ireland, in the county of Tipperary, on the Suir: eleven miles south-south-east of Cashel, and twenty-two west-north-west of Waterford. It has a spacious bridge of twenty arches over the Suir; the market-house is strong and well-built, and there is a charter-school for forty children. This town is very ancient, being built before the invasion of the Danes; it was formerly defended by a square wall. Oliver Cromwell, who found more resistance from this place than any other of his conquests in Ireland, demolished the castles and fortifications, of which now only the ruins remain: it has a Gothic church in good repair.

CLONME'SS, a small island on the north-west coast of Ireland, in Sheep Haven; twenty-five miles north-west of Londonderry.

CLONO'DES, *s.* [from κλονεω, to agitate.] An epithet for that vehement sort of pulse which is disturbed and unequal in the same stroke.

CLO'NOY, a lake of Ireland, in the county of Kerry: eighteen miles south of Killarney.

To CLOOM, *v. a.* [corrupted from *cleam*, clæmian, Sax. which is still used in some provinces.] To close or shut with glutinous or viscous matter.—Rear the hive enough to let them in, and *cloom* up the skirts, all but the door. *Mortimer.*

CLO'PINEL (John de Meun), a celebrated French poet, born at Meun in 1280, and called Clopinel, because of his limping gait. He was a signal favourite at the court of Philip the Fair, and acquired a great share of fame by his Continuation of the Romance of the Rose, which was left unfinished by William de Loris, its original author; the best edition of which is that of the abbé Lenglet, 1735, 3 vols. 12mo. He is besides the translator of Boethius's Consolations, into French, 1494, fol. and the author of some other works, which are now but little known. He is supposed to have died about the year 1364.

CLOP'PENBOURG, a town of Germany, in the circle of Westphalia, and bishopric of Munster, the principal place of a bailiwick: sixty-four miles north-north-east of Munster. Lat. 52. 53. N. lon. 25 20. E. Ferro.

To CLOSE, *v. a.* [*closa*, Armoric; *kluys*, Dutch; *clos*, Fr. *clausus*, Lat.] To shut; to lay together:

Sleep instantly fell on me, call'd
By nature as in aid, and *clos'd* mine eyes. *Milton.*

To conclude; to end; to finish:

Edward and Henry, now the boast of fame;
And virtuous Alfred, a more sacred name;
After a life of generous toils endur'd,
Clos'd their long glories with a sigh, to find
Th' unwilling gratitude of base mankind. *Pope.*

To inclose; to confine; to reposite:

Every one
According to the gift which bounteous nature
Hath in him *clos'd*. *Shakespeare.*

To join; to unite fractures; to consolidate fissures.—There being no winter yet to *close* up and unite its parts, and restore the earth to its former compactness. *Burnet.*—As soon as any public rupture happens, it is immediately *closed* up by moderation and good offices. *Addison.*

To CLOSE, *v. n.* To coalesce; to join its own parts together.—They, and all that appertained to them, went down alive into the pit, and the earth *closed* upon them. *Numbers* xvi. 33.—*To close upon.* To agree upon; to join in.—The jealousy of such a design in us would induce France and Holland to *close upon* some measures between them to our disadvantage. *Temple.*—*To close with. To close in with.* To come to an agreement with; to comply with; to unite with.—Intire cowardice makes thee wrong this virtuous gentlewoman, to *close with* us. *Shakespeare.*—Pride is so unsociable a vice, that there is no *closing with* it. *Collier.*—These governors bent all their thoughts and applications to *close in with* the people, now the stronger party. *Swift.*—To grapple with in wrestling.

CLOSE, *s.* Any thing shut; without outlet.—The admirable effects of this distillation in *close*, which is like the wombs and matrices of living creatures. *Bacon.*—A small field enclosed.—Certain hedgers, dividing a *close*, chanced upon a great chest. *Carew.*—The manner of shutting; in this and the following sense it is pronounced as *cloze*:

The doors of plank were; their *close* exquisite,
Kept with a double key. *Chapman.*

The time of shutting up:

In the *close* of night,
Philomel begins her heavenly lay. *Dryden.*

A grapple in wrestling.—The king went of purpose into the North, laying an open side into Perkin to make him come to the *close*, and so to trip up his heels, having made sure in Kent beforehand. *Bacon.*—Pause; cessation; rest:

The air, such pleasure loth to lose,
With thousand echoes still prolongs each heav'nly *close*. *Milton.*

At ev'ry *close* she made, th' attending throng
Replied, and bore the burden of the song. *Dryden.*

A conclusion, or end:

Speedy death,
The *close* of all my miseries and the balm. *Milton.*

CLOSE, *adj.* Shut fast, so as to leave no part open; as, a *close* box, a *close* house.—We suppose this bag to be tied *close* about, towards the window. *Wilkins.*—Having no vent, without inlet; secret; private; not to be seen through:

Nor could his acts too *close* a vizard wear,
To 'scape their eyes whom guilt had taught to fear. *Dryden.*

Confined; stagnant; without ventilation.—If the rooms be low-roofed, or full of windows and doors; the one maketh the air *close*, and not fresh; and the other maketh it exceeding unequal. *Bacon.*—Compact; solid; dense; without interstices, or vacuities.—The inward substance of the earth is of itself an uniform mass, *close* and compact. *Burnet.*—Viscous; glutinous; not volatile.—This oil, which nourishes the lamp, is supposed of so *close* and tenacious a substance, that it may slowly evaporate. *Wilkins.*—Concise; brief; compressed; without exuberance or digression.—You lay your thoughts so *close* together, that, were they *closer*, they would be crowded, and even a due connection would be wanting. *Dryden.*

Read these instructive leaves, in which conspire
Fresnoy's *close* art and Dryden's native fire. *Pope.*

Joined without any intervening distance or space, whether of time or place.—Plant the spring crocusses *close* to a wall. *Mortimer.*

Where'er my name I find,
Some dire misfortune follows *close* behind. *Pope.*

Approaching nearly; joined one to another:

Now sit we *close* about this taper here,
And call in question our necessities. *Shakespeare.*

Narrow; as, a *close* alley; admitting small distance.—Short crooked swords in *closer* fight they wear. *Dryden.*—Undiscovered; without any token by which one may be found.—*Close* observe him for the sake of mockery. *Close*, in

in the name of Jesting! lie you there. *Shakespeare.*—Hidden; secret; not revealed.—A *close* intent at last to shew me grace. *Spenser.*—Having the quality of secresy; trusty:

Constant you are,
But yet a woman; and for secresy,
No lady *closer*. *Shakespeare.*

Having an appearance of concealment; cloudy; sly:

That *close* aspect of his
Does shew the mood of a much-troubled breast. *Shakesp.*

Without wandering; without deviation; attentive.—I discovered no way to keep our thoughts *close* to their business, but, by frequent attention, getting the habit of attention. *Locke.*—Full to the point; home.—I am engaging in a large dispute, where the arguments are not like to reach *close* on either side. *Dryden.*—Retired; solitary.—He kept himself *close* because of Saul. *Chronicles.*—Secluded from communication; as, a *close* prisoner.—Applied to the weather, dark; cloudy; not clear.

CLOSE, *adv.* It has the same meanings with *closely*, and is not always easily distinguished from the adjective. Nearly; densely; secretly:

Behind her death
Close following pace for pace. *Milton.*

It is used sometimes adverbially by itself, but more frequently in composition.

"A CLOSE mouth catches no flies." That is, a man who cannot speak for himself will seldom gain his point: and this is the case of many a deserving man, who by a false modesty is chained down below mediocrity all his life; and, as an addition to his misfortune, has the mortification of seeing worthless knaves, who have nothing to recommend them but their impudence, step in before him, and run away with his due. We say likewise, to the same purpose: *Dumb folks get no land*: or, *Spare to speak, and spare to speed* The Lat. *Amyclas silentium perdidit*. The Germ. say, *Es fliegt einem keine gebratene tauben ins maul.* Roasted pigeons will never fly into any man's mouth.

CLOSE-BANDED, *adj.* In close order; thick ranged; or secretly leagued, which seems rather the meaning in this passage:

Nor in the house, which chamber ambushes
Close-banded, durst attack me. *Milton.*

CLOSE-BODIED, *adj.* Made to fit the body exactly.—If any clergy shall appear in any *close-bodied* coat, they shall be suspended. *Ayliffe.*

CLOSE-HANDED, *adj.* Covetous.—Galba was very *close-handed*: I have not read much of his liberalities. *Arbuthnot.*

CLOSE-HAULED, in navigation, the general arrangement or trim of a ship's sails when she endeavours to make a progress in the nearest direction possible towards that point of the compass from which the wind blows. In this manner of sailing, the keel commonly makes an angle of six points with the line of the wind; but sloops and some other small vessels are said to sail almost a point nearer. See NAVIGATION.

CLOSE-PENT, *adj.* Shut close; without vent:

Then in some *close-pent* room, it crept along,
And, smould'ring as it went, in silence fed. *Dryden.*

CLOSE ROLLS and CLOSE WRITS. Grants of lands, &c. from the crown, are contained in charters or letters patent, that is *open* letters, *literas patentes*, so called because they are not sealed up, but exposed to open view, with the great seal pendant at the bottom; and are usually addressed by the king to all his subjects at large. And therein they differ from other letters of the king, sealed also with his great seal, but directed to particular persons, and for particular purposes: which therefore, not being fit for public inspection, are closed up and sealed on the outside, and are thereupon called writs close, *literæ clausæ*; and are recorded in the close-rolls, in the same manner as the others are in the patent-rolls. 2 *Com.* 346.

CLO'SELY, *adv.* Without inlet or outlet—Put the mixture into a crucible *closely* luted. *Boyle*.—Without much space intervening; nearly.—Follow Fluelien *closely* at the heels. *Shakespeare.*—Attentively:

If we look more *closely*, we shall find
Most have the seeds of judgment in their mind. *Pope.*

Secretly; slily.—A Spaniard, riding on the bay, sent some *closely* into the village, in the dark of the night. *Carew.*—Without deviation.—I hope I have translated *closely* enough, and given them the same turn of verse which they had in the original. *Dryden.*

CLO'SENESS, *s.* The state of being shut; or, the quality of admitting to be shut without inlet or outlet.—In drums, the *closeness* round about that preserveth the sound, maketh the noise come forth of the drum-hole more loud than if you should strike upon the like skin extended in the open air. *Bacon.*—Narrowness; straitness; want of air, or ventilation.—I took my leave, being half-stifled by the *closeness* of the room. *Swift.*—Compactness; solidity.—The haste of the spirit to put forth and the *closeness* of the bark, cause prickles in boughs. *Bacon.*—Recluseness; solitude; retirement:

I, thus neglecting worldly ends, all dedicated
To *closeness*, and the bettering of my mind. *Shakespeare.*

Secrecy; privacy.—To his confederates he was constant and just, but not open. Such was his enquiry, and such his *closeness*, as they stood in the light towards him, and he stood in the dark towards them. *Bacon.*—Covetousness; sly avarice.—Irus judged, that while he could keep his poverty a secret, he should not feel it: he improved this thought into an affectation of *closeness* and covetousness. *Addison.*—Connection; dependance.—The actions and proceedings of wise men run in greater *closeness* and coherence with one another, than thus to drive at a casual issue, brought under no forecast or design. *South.*

CLO'SER, *s.* A finisher; a concluder.

CLO'SESTOOL, *s.* A chamber implement:

A pestle for his truncheon led the van;
And his high helmet was a *close-stool* pan. *Garth.*

CLO'SET, *s.* A small room of privacy and retirement.—He would make a step into his *closet*, and after a short prayer he was gone. *Wotton.*—A private repository of curiosities and valuable things:

He furnishes her *closet* first, and fills
The crowded shelves with rarities of shells. *Dryden.*

To CLO'SET, *v. a.* To shut up, or conceal, in a closet; to take into a closet for a secret interview.—About this time began the project of *closeting*, where the principal gentlemen of the kingdom were privately catechised by his majesty. *Swift.*

CLOSH, *s.* A distemper in the feet of cattle; called also the *founder*.

CLOSH, an unlawful game, forbidden by stat. 17 Edw. IV. c. 3. and 33 Hen. VIII. c. 9. It is said to have been the same with our ninepins; and is called *closhcayles*, by stat. 33 Hen. VIII. c. 9. At this time it is allowed, and called *kailes*, or *skittles*.

CLOS'TER CAMP, a place in the archbishopric of Cologn, near Rhinberg, where the Hanoverians were worsted by the French in the year 1760.

CLOS'TER NEUBURG, a town of Germany, in the archduchy of Austria; eleven miles north-north-west of Vienna.

CLOS'TER SEVEN, a town of Germany, in the circle of Lower Saxony, and duchy of Bremen, memorable for a convention entered into between the duke of Cumberland and the duke of Richlieu, commander of the French armies

armies in 1758, by which 38,000 Hanoverians laid down their arms, and were dispersed. Nineteen miles south of Stade, and twenty-four north-north-east of Bremen.

CLO'SURE, *s.* The act of shutting up.—The chink was carefully closed up; upon which *closure* there appeared not any change. *Boyle.*—That by which anything is closed or shut.—I admire your sending your last to me quite open, without a seal, wafer, or any *closure* whatever. *Pope.*—The parts inclosing; inclosure:

O thou bloody prison!
Within the guilty *closure* of thy walls
Richard the Second here was hack'd to death. *Shakes.*

Conclusion; end. *Not in use:*

We'll hand in hand all headlong cast us down,
And make a mutual *closure* of our house. *Shakespeare.*

CLOT, *s.* [probably, at first, the same with *clod*, but now always applied to different uses; or rather *klotte*, Dutch, a mass.] Concretion; coagulation; grume: The white of an egg, with spirit of wine, doth bake the egg into *clots*, as if it began to poach. *Bacon.*—The opening itself was stopt with a *clot* of grumous blood. *Wiseman.*

To CLOT, *v. n.* [from the noun; or from *klotteren*, Dutch.] To form clots, or clods; to hang together:

Huge unwieldy bones, lasting remains
Of that gigantic race; which, as he breaks
The *clotted* glebe, the plowman haply finds. *Philips.*

To concrete; to coagulate; to gather into concretions: as, *clotted* milk, *clotted* blood. To become gross:

Here mangled limbs, here brains and gore,
Lie *clotted.* *Philips.*

CLO'TEN, a village of Swisserland, in the canton of Zurich, large and populous, in which a great number of antiquities have been discovered: six miles north-north-east of Zurich.

CLOTH, *s.* plural *cloths* or *clothes.* [clað, Saxon.] Any thing woven for dress or covering, whether of animal or vegetable substance.—A costly *cloth* of gold. *Drayton.*—The piece of linen spread upon a table:

Nor let like Nævius, every error pass;
The musty wine, foul *cloth*, or greasy glass. *Pope.*

The canvass on which pictures are delineated:

Who fears a sentence, or an old man's saw,
Shall by a painted *cloth* be kept in awe. *Shakespeare.*

Any texture put to a particular use.—The king stood up under his *cloth* of state, took the sword from the protector, and dubbed the Lord Mayor of London knight. *Hayward.*—Dress; raiment:

I'll ne'er distrust my God for *cloth* and bread,
While lilies flourish and the raven's fed. *Quarles.*

Cloth, taken absolutely, commonly means a texture of wool. In the plural, dress, habit; garment; vesture; vestments; including whatever covering is worn on the body. In this sense written *clothes*, pronounced *clo's*.—Sir earth grows more from the warmth of exercises than of *clothes.* *Temple.*—The covering of a bed:

Gazing on her midnight foes,
She turn'd each way her frighted head,
Then sunk it deep beneath the *clothes.* *Prior.*

The manufacture of woollen cloths constitutes the principal staple commodity of the kingdom, employs multitudes of the poor, and forms an inexhaustible source of commerce between this and other nations. Woollen cloths are of divers qualities, divided principally into fine and coarse. The goodness of cloth, according to some, consists in the following particulars: 1. That the wool be of a good quality, and well dressed. 2. It should be equally spun, carefully observing that the thread of the warp be finer and better twisted than that of the woof. 3. The cloth should be well wrought, and beaten on the loom, so as to be every where equally compact. 4. The wool must not be finer at one end of the piece than in the rest. 5. The lists should be sufficiently strong, of the same length with the stuff, and must consist of good wool, hair, or ostrich feathers; or, what is still better, of Danish dog's hair. 6. The cloth should be free from knots and other imperfections. 7. It must be well scoured with fuller's earth, well fulled with the best white soap, and afterwards washed in clear water. 8. The hair or nap should be well drawn out with the teazle, without being too much opened. 9. It must be shorn close without making it thread bare. 10. It must be well dried. 11. It must not be tenter-stretched to force it to its just dimensions. 12. It should be pressed cold, not hot-pressed, the latter being very injurious to woollen cloth.

The best wool for the manufacturing of cloths are those of England and Spain, duly mixed. To use these wools to the best advantage, they should be scoured, by putting them into a liquor somewhat more than lukewarm, composed of three parts water and one of urine. After the wool has continued long enough in the liquor to soak, and dissolve the grease, it is to be drained and well washed in running water. When it feels dry, and has no smell but the natural one of the sheep, it is said to be duly scoured. After this, it is hung to dry in the shade; the heat of the sun making it harsh and inflexible: when dry, it is beat with rods upon hurdles of wood, or on cords, to cleanse it from dust and the grosser filth; the more it is thus beat and cleansed, the softer it becomes, and the better for spinning. After beating, it must be well picked, to free it from the rest of the filth that had escaped the rods. It is now in a proper condition to be oiled, and carded on large iron cards placed slopewise. Olive oil is esteemed the best for this purpose: one fifth of which should be used for the wool intended for the woof, and a ninth for that designed for the warp. After the wool has been well oiled, it is given to the spinners, who first card it on the knee with small fine cards, and then spin it on the wheel, observing to make the thread of the warp smaller by one third than that of the woof, and much compacter twisted.

The thread, thus spun, is reeled, and made into skeins. That designed for the woof is wound on little tubes, pieces of paper, or rushes, so disposed as that they may be easily put in the eye of the shuttle. That for the warp is wound on a kind of large wooden bobbins, to dispose it for warping. When warped, it is stiffened with size; the best of which is that made of shreds of parchment; and when dry, is given to the weavers, who mount it on the loom. The warp thus mounted, the weavers, who are two to each loom, one on each side, tread alternately on the treddle, first on the right step, and then on the left, which raises and lowers the threads of the warp equally; between which they throw tranversely the shuttle from the one to the other: and every time that the shuttle is thus thrown, and a thread of the woof inserted within the warp, they strike it conjunctly with the same frame, wherein is fastened the comb or reed, between whose teeth the threads of the warp are passed, repeating the stroke as often as is necessary. The weavers having continued their work till the whole warp is filled with the woof, the cloth is finished: it is then taken off the loom by unrolling it from the beam whereon it had been rolled in proportion as it was woven; and now given to be cleansed of the knots, ends of threads, straws, and other filth; which is done with iron nippers.

In this condition it is carried to the fullery, to be scoured with urine, or a kind of potter's clay, well steeped in water, put along with the cloth in the trough wherein it is fulled. The cloth, being again cleared from the earth or urine, is returned to the former hands to have the lesser filth, small ends, &c. taken off as before: then it is returned to the fuller to be beat and fulled with hot

water, wherein a suitable quantity of soap has been dissolved; after fulling, it is taken out to be smoothed or pulled by the lists lengthwise, to take out the wrinkles, crevices, &c. The smoothing is repeated every two hours, till the fulling be finished, and the cloth brought to its proper breadth: after which it is washed in clear water, to purge it of the soap, and given wet to the carders to raise the nap on the right side with the thistle or teazle. After this preparation the cloth-worker takes the cloth, and gives it its first cut or shearing: then the carders resume it, and after wetting, give it as many more courses with the teazle as the quality of the stuff requires, always observing to begin against the grain of the nap, and to end with it; as also to begin with a smoother thistle, proceeding still with one sharper and sharper as far as the sixth degree. After these operations, the cloth, being dried, is returned to the cloth-worker, who shears it a second time, and returns it to the carders, who repeat their operation as before, till the nap be well ranged on the surface of the cloth, from one end of the piece to the other.

The cloth thus wove, scoured, napped, and shorn, is sent to the dyer; when dyed, it is washed in water, and the worker takes it again wet as it is, lays the nap, with a brush on the table, and hangs it on the tenters, where it is stretched both in length and breadth sufficiently to smooth it, set it square, and bring it to its proper dimensions, without straining it too much; observing to brush it afresh, the way of the nap, while a little moist, on the tenters. When quite dry, the cloth is taken off the tenters, and brushed again on the table, to finish the laying of the nap: after which it is folded, and laid cold under a press, to make it perfectly smooth and even, and give it a gloss. Lastly, the cloth being taken out of the press, and the papers, &c. for glossing it removed, it is in a condition for sale. No cloth made beyond sea shall be brought into the king's dominions, on pain of forfeiting the same, and the importers to be farther punished. Stat. 12 Edw. III.

The injuries to which cloth is ever more or less exposed, from accidental spots of grease, fruit, wine, tar, &c. have for many ages baffled the endeavours of chemical men, in their attempts to remove them. M. Chaptal, however, among the modern chemists, appears to have acquired this art in an eminent degree, and has published the following directions for cleaning cloth, and removing spots and stains of every kind.

The art of cleaning cloths supposes, first, a knowledge of the various substances which can occasion spots upon them. Secondly, That of the substances to which we must have recourse in order to remove those substances, when deposited upon the cloth. Thirdly, That of the manner in which the colours of the cloths will be affected, by the re-agents meant to be employed for the removal of the spots. Fourthly, That of the manner in which the cloth itself will be affected by the above re-agents. Fifthly, We should know how to restore the colour of the cloth, when it is changed or rendered faint.

Of the substances which occasion spots upon cloths, some are easily known by their appearance; for instance, grease of every kind. Others produce more complicated effects, such are, acids, alkalies, perspiration, fruits, and urine. The effects of acids upon blacks, purples, blues, (except those produced by indigo or by Prussian blue,) and some other colours, and upon all those shades of colour which are produced by means of iron, archil, and astringent substances, is to turn them red. They render yellows more pale, except that produced by arnatto, which they turn to an orange colour. Alkalies turn scarlet, and all reds produced by brazil or logwood, to a violet colour; they turn green (upon woollen cloths) to yellow; and they give a reddish cast to the yellow produced by arnatto. The effect of perspiration is the same as that of alkalies. Spots which are produced upon cloths by simple substances are easily removed by well-known means. Greasy substances are removed by alkalies, by soap, by yolk of egg, or by fat earths. Oxyds of iron, by nitric or oxalic acid. Spots occasioned by acids are removed by alkalies, and *vice versa*. Spots caused by fruit, upon white cloth, are removed by sulphureous acid, or, what is still better, by oxygenated muriatic acid. But when the spots are of a complicated nature, various means must be employed, successively; thus, to remove a spot occasioned by the coom of carriage-wheels, we must first dissolve the alkali by some of the means above mentioned, and then take away the oxyd of iron by oxalic acid.

The colours of the cloths are often injured by the reagents made use of; in order to restore them, we must thoroughly understand the art of dying, and know how to modify the means according to circumstances. This is sometimes difficult, because it is necessary to produce a colour similar to that of the rest of the cloth, and to apply that colour to a particular part only; sometimes also, the mordant which fixed the colour, or the basis which heightened it, has also been destroyed, and must be restored. It is evident that, in this case, the means to be employed depend upon the nature of the colour, and that of the ingredients which produced it; for it is well known that the same colour may obtained from very different substances. Thus, when after having made use of an alkali, to remove an acid spot upon brown, violet, or blue, cloth, &c. there remains a yellow spot, the original colour is again produced by means of a solution of tin. A solution of the sulphat of iron restores the colour to those brown cloths which have been dyed with galls. Acids give to yellow cloths, which have been rendered dull or brown by alkalies, their original brightness. When black cloths, dyed with logwood, have any reddish spots occasioned by acids, alkalies turn such spots to a yellow colour, and a little of the astringent principle makes them black again. A solution of one part of indigo in four parts of sulphuric acid, properly diluted with water, may be successfully employed to restore a faded blue colour upon wool or cotton. Red or scarlet colours may be restored by means of cochineal, and a solution of muriat of tin, &c.

The choice of re-agents is not a matter of indifference; vegetable acids are generally preferable to mineral ones. The sulphureous acid, however, may be used for spots from fruit: it does not injure blue upon silk, or the colours produced by astringents; nor does it affect yellow upon cotton. The volatile alkali succeeds better than fixed alkalies in removing spots produced by acids: it is usually made use of in the form of vapour, and acts quickly, seldom injuring the colour of the cloth. The means of removing spots of grease are well known; namely, alkalies, fullers earth, essential oils dissolved in alcohol, a sufficient degree of heat to render the grease volatile, &c. Spots of ink, or any other occasioned by yellow oxyd of iron, may be removed by oxalic acid: the colour may be restored by alkalies, or by a solution of muriat of tin. Such spots may also be taken away by oxygenated muriatic acid, when they are upon white cloth, or upon paper. The effect of alkalies and that of perspiration is the same; their spots may be removed by acids, or even by a dilute solution of muriat of tin.

When the spots are owing to various unknown causes, we must have recourse to compositions possessing various powers; of which the following may be considered as one of the most efficacious. Dissolve some white soap in alcohol; mix with this solution four or five yolks of eggs; add gradually some spirit of turpentine, and then stir into the mixture such a quantity of fullers earth as will enable it to be formed into balls. The manner of using these balls, is to rub the spots, previously wetted with water, with them; after which, the cloth is to be well rubbed and washed. By these means, all kinds of spots, except those occasioned by ink, or any other solution of iron, will be removed. The washing of the cloth takes off its

glofs, and leaves a dull fpot, difagreeable to the eye. The glofs may be reftored by pafling in a proper direction over the wafhed part of the cloth, a brufh wetted with water in which a fmall quantity of gum is diffolved, and then laying upon the part a fheet of paper, a piece of cloth, and a pretty confiderable weight, which are to remain there until the cloth is quite dry.

To CLOTHE, *v. a.* pret. I *clothed*, or *clad*; part. *clothed*, or *clad*. To inveft with garments; to cover with drefs, from cold and injuries.—The Britons, in Cæfar's time, painted their bodies, and *clothed* themfelves with the fkins of beafts. *Swift.*

With fuperior boon may your rich foil
Exuberant nature's better bleffings pour
O'er every land, the naked nations *clothe*,
And be th' exhauftlefs granary of a world. *Thomfon.*

To adorn with drefs.—We *clothe* and adorn our bodies: indeed, too much time we beftow upon that. Our fouls alfo are to be *clothed* with holy habits, and adorned with good works. *Ray.*—To inveft, as with clothes.—I put on righteoufnefs, and it *clothed* me. *Job.*

If thou beeft he; but O how fall'n! how chang'd
From him, who in the happy realms of light,
Cloth'd with tranfcendent brightnefs, didft outfhine
Myriads though bright! *Milton.*

To furnifh or provide with clothes.—Drowfinefs fhall *clothe* a man with rags. *Proverbs.*

To CLOTHE, *v. n.* To wear clothes.—Care no more to *clothe* and eat. *Shakefpeare.*

CLO'THIER, *f.* A maker of cloth.—Clothiers are to make broad cloths of certain lengths and breadths, within the lifts; and fhall caufe their marks to be woven in the cloths, and fet a feal of lead thereunto, fhewing the true length thereof. Stat. 4 *Ed.* IV. c. 1. 27 *H.* VIII. c. 12. Expofing to fale faulty cloths, are liable to forfeit the fame; and clothiers fhall not make ufe of flocks, or other deceitful ftuff, in making of broad cloath, under the penalty of five pounds. Stat. 5 & 6 *Ed.* VI. c. 6. Juftices of peace are to appoint fearchers of cloth yearly, who have power to enter the houfes of clothiers; and perfons oppofing them fhall forfeit ten pounds. Stats. 39 *Eliz.* c. 20. 4 *Jac.* I. c. 2. 21 *Jac.* I. c. 18. All cloth fhall be meafured at the fulling-mill, by the mafter of the mill, who fhall make oath before a juftice for true meafuring; and the millman is to fix a feal of lead to cloths, containing the length and breadth, which fhall be a rule of payment for the buyer. Stat. 10 *An.* c. 16. By ftat. 1 Geo. I. c. 15. broad cloths muft be put into water for proof, and be meafured by two indifferent perfons chofen by the buyer and feller. And clothiers felling cloths before fealed, or not containing the quantity mentioned in the feals, incur a forfeiture of the fixth part of the value. Perfons taking off or counterfeiting feals, forfeit twenty pounds. By ftat. 12 Geo. I. c. 34. if any weavers of cloth enter into any combination for advancing their wages, or leffening their ufual hours of work, or depart before the end of their terms agreed, or return any work unfinifhed, they fhall be committed by two juftices of peace to the houfe of correction for three months; and clothiers are to pay their work-people their full wages agreed, in money, under the penalty of ten pounds. Infpectors of mills and tenter-grounds to examine and feal cloths, are to be appointed by juftices of peace in feffions; and millmen fending clothiers any cloths before infpected, forfeit forty fhillings, the infpectors to be paid by the clothiers two-pence per cloth. Stat. 13 *Geo.* I. c. 23. If any cloth, remaining on the renters, be ftolen in the night, and the fame is found upon any perfon, on a juftices warrant to fearch, fuch offender fhall forfeit treble value, leviable by diftrefs, &c. or be committed to jail for three months; but, for a fecond offence, he fhall fuffer fix months imprifonment; and, for the third offence, be tranfported as a felon. Stat. 15 *Geo.* II. c. 27.

CLO'THING, *f.* Drefs; vefture; garments:

Thy bofom might receive my yielded fpright,
And thine with it, in heaven's pure *clothing* dreft,
Through cleareft fkies might take united flight. *Fairfax.*

CLO'THO, the youngeft of the three Parcæ, daughters of Jupiter and Themis, was fuppofed to prefide over the moment that we are born. She held the diftaff in her hand, and fpun the thread of life, whence her name κλωθειν, to fpin. She was reprefented wearing a crown with feven ftars, and covered with a variegated robe. *Hefiod.*

CLOTH'SHEARER, *f.* One who trims the cloth, and levels the nap.—My father is a poor man, and by his occupation a *clothfhearer*. *Hakewill.*

CLOTH'WORKER, *f.* A manufacturer of cloth. The clothworkers were incorporated 22 Hen. VIII. anno 1530, and is the twelfth company of the city of London. Their arms are *fable*, a chevron *ermin* in chief, two crabbets *argent*, in beife or beazel *or*. Their fupporters are two griffins, their creft a ram on a torce and helmet; their motto, *My truft is in God alone.* Their hall is on the eaft fide of Mincing-lane, London.

CLOTNI'ZA, a town of Poland, in the palatinate of Lublin: eighteen miles weft-fouth-weft of Lublin.

CLOT'POLL, *f.* Thickfkull; blockhead.—What fays the fellow there? call the *clotpoll* back. *Shakefpeare.*—Head, in fcorn:

I have fent Cloten's *clotpoll* down the ftream,
In embaffy to his mother. *Shakefpeare.*

To CLOT'TER, *v. n.* [*klotteren*, Dutch.] To concrete; to coagulate; to gather into lumps:

He dragg'd the trembling fire,
Slidd'ring through *clotter'd* blood and holy mire. *Dryd.*

CLOT'TY, *adj.* Full of clods; concreted; full of concretions.—The matter expectorated is thin, and mixt with thick, *clotty*, bluifh, ftreaks. *Harvey.*

CLOUD, *f.* [the derivation is not known. Minfhew derives it from *claudo*, to fhut; Somner from *clod*; Cafaubon from αχλυς, darknefs; Skinner from *kladde*, Dut. a fpot.] The dark collection of vapours in the air.—As a mift is a multitude of fmall but folid globules, which therefore defcend; fo a vapour, and therefore a watery *cloud*, is nothing elfe but a congeries of very fmall and concave globules, which therefore afcend to that height in which they are of equal weight with the air, where they remain fufpended, till, by fome motion in the air, being broken, they defcend in folid drops; either fmall, as in a mift; or bigger, when many of them run together, as in rain. *Grew.*—*Clouds* are the greateft and moft confiderable of all the meteors, as furnifhing water and plenty to the earth. They confift of very fmall drops of water, and are elevated a good diftance above the furface of the earth; for a *cloud* is nothing but a mift flying high in the air, as a mift is nothing but a *cloud* here below. *Locke.*

The dawn is overcaft, the morning low'rs,
And heavily in *clouds* brings on the day. *Addifon.*

The veins, marks, or ftains, in ftones or other bodies. Any ftate of obfcurity or darknefs:

How can I fee the brave and young
Fall in the *cloud* of war, and fall unfung? *Addifon.*

Any thing that fpreads wide; as a crowd, a multitude.—The objection comes to no more than this, that, amongft a *cloud* of witneffes, there was one of no very good reputation. *Atterbury.*

Although it be generally allowed that the clouds are formed from the aqueous vapours, which before were fo clofely united with the atmofphere as to be invifible; it is, however, not eafy to account for the long continuance of fome very opaque clouds without diffolving; or to affign the reafon why the vapours, when they have once

begun to condense, do not continue to do so till they at last fall to the ground in the form of rain, or snow. It is now known that a separation of the latent heat from the water of which vapour is composed, is attended with a condensation of that vapour in some degree; in such case, it will first appear as a smoke, mist, or fog; which, if interposed between the sun and earth, will form a cloud; and, the same causes continuing to operate, the cloud will produce rain or snow. It is however abundantly evident that some other cause besides mere heat or cold is concerned in the formation of clouds and the condensation of atmospherical vapours. This cause is esteemed in a great measure the electrical fluid; indeed electricity is now so generally admitted as an agent in all the great operations of nature, that it is no wonder to find the formation of clouds attributed to it; and this has accordingly been given by Beccaria as the cause of the formation of all clouds whatsoever, whether of thunder, rain, hail, or snow. But whether the clouds are produced, that is, the atmospheric vapours rendered visible, by means of electricity or not, it is certain that they do often contain the electric fluid in prodigious quantities, and many terrible and destructive accidents have been occasioned by clouds very highly electrified. The most extraordinary instance of this kind perhaps on record happened in the island of Java, in the East Indies, in August, 1772. On the eleventh of that month, at midnight, a bright cloud was observed covering a mountain in the district called *Cheribou*, and several reports like those of a gun were heard at the same time. The people who dwelt upon the upper parts of the mountain not being able to fly fast enough, a great part of the cloud, eight or nine miles in circumference, detached itself under them, and was seen at a distance, rising and falling like the waves of the sea, and emitting globes of fire so luminous, that the night became as clear as day. The effects of it were astonishing; every thing was destroyed for twenty miles round; the houses were demolished; plantations were buried in the earth; and 2140 people lost their lives, besides 1500 head of cattle, and a vast number of horses, goats, &c. Another remarkable instance of the dreadful effects of electric clouds, is related in Brydone's Tour through Malta. It appeared on the 29th of October, 1757. About three quarters of an hour after midnight, there was seen to the south-west of the city of Melita, a great black cloud, which, as it approached, changed its colour, till at last it became like a flame of fire mixed with black smoke. A dreadful noise was heard on its approach, which alarmed the whole city. It passed over the port, and came first on an English ship, which in an instant was torn in pieces, and nothing left but the hulk; part of the masts, sails, and cordage, were carried to a considerable distance along with the cloud. The small boats and felloques that fell in its way were all broken to pieces or sunk. The noise increased and became more frightful. A centinel, terrified at its approach, ran into his box; but both he and it were lifted up and carried into the sea, where he perished. It then traversed a considerable part of the city, and laid in ruins almost every thing that stood in its way. Several houses were laid level with the ground, and it did not leave one steeple in its passage. The bells of several churches, together with the spires, were carried to a considerable distance; and the roofs were demolished and beat down. It went off at the north-east point of the city; and, demolishing the light-house, is said to have mounted up into the air with a frightful noise; and passed over the sea to Sicily, where it tore up some trees, and did other damage; but nothing considerable, as its fury had been mostly spent at Malta. The number of killed and wounded amounted to near 200; and the loss of shipping was very considerable.

The height of the clouds is not usually great: the summits of high mountains being commonly quite free from them; as many travellers have experienced in passing these mountains. It is found that the most highly electrified clouds descend lowest, their height being often not more than 7 or 800 yards above the ground; and sometimes thunder-clouds appear actually to touch the ground with one of their edges: but the generality of clouds are suspended at the height of a mile, or little more, above the earth.

The motions of the clouds, though often directed by the wind, are not always so, especially when thunder is about to ensue. In this case they are seen to move very slowly, or even to appear quite stationary for some time. The reason of this probably is, that they are impelled by two opposite streams of air nearly of equal strength; and in such cases it seems that both the aërial currents ascend to a considerable height; for Mess. Charles and Robert, when endeavouring to avoid a thunder-cloud, in one of their aërial voyages with a balloon, could find no alteration in the course of the current, though they ascended to the height of 4000 feet above the earth. In some cases the motions of the clouds evidently depend on their electricity, independent of any current of air whatever. Thus, in a calm and warm day, small clouds are often seen meeting each other in opposite directions, and setting out from such short distances, that it cannot be supposed that any opposite winds are the cause. Such clouds, when they meet, instead of forming a larger one, become much smaller, and sometimes quite vanish; a circumstance most probably owing to the discharge of opposite electricities into each other. And this serves also to throw some light on the true cause of the formation of clouds; for if two clouds, the one electrified positively, and the other negatively, destroy each other on contact, it follows that any quantity of vapour suspended in the atmosphere, while it retains its natural quantity of electricity, remains invisible, but becomes a cloud when electrified either plus or minus. The shapes of the clouds are also probably owing to their electricity; for in those seasons in which a great commotion has been excited in the atmospherical electricity, the clouds are seen assuming strange and whimsical shapes, that are continually varying. This, as well as the meeting of small clouds in the air, and vanishing upon contact, is a sure sign of thunder.

The uses of the clouds are evident, as from them proceeds the rain that refreshes the earth, and without which, according to the present state of nature, the whole surface of the earth would become a mere desert. They are likewise useful as a screen interposed between the earth and the scorching rays of the sun, which are often so powerful as to destroy the grass and other tender vegetables. In the more secret operations of nature too, where the electric fluid is concerned, the clouds bear a principal share; and chiefly serve as a medium for conveying that fluid from the atmosphere into the earth, and from the earth into the atmosphere: in doing which, when electrified to a great degree, they produce those terrible effects, as instanced above.

To **CLOUD,** *v. a.* To darken with clouds; to cover with clouds; to obscure. To make a sullen and gloomy appearance:

Be not dishearten'd then, nor *cloud* those looks,
That wont to be more cheerful and serene. *Milton.*

To obscure; to make less evident.—If men would not exhale vapours to *cloud* and darken the clearest truths, no man could miss his way to heaven for want of light. *Decay of Piety.*—To variegate with dark veins:

The handle smooth and plain,
Made of the *clouded* olive's easy grain. *Pope.*

To defame:

I would not be a stander-by, to hear
My sov'reign mistress *clouded* so. *Shakespeare.*

To

To CLOUD, *v. n.* To grow cloudy; to grow dark with clouds.

"After CLOUDS fair weather." The Latins say, *Post nubila Phœbus*; or, *Non si malè nunc, & olim sic erit*; or, *Flebile principium melior fortuna sequatur.* We say, likewise, *Cloudy mornings may turn to clear evenings.* And so the Germans; *Auf einen trueben morgen fulget ein heiterer abend.* The French say as we; *Après la pluye le beau tems.*

CLOUD-BERRY, *f.* in botany. See RUBUS.

CLOUD'CAPT, *adj.* Topped with clouds; touching the clouds:

The *cloudcapt* towers, the gorgeous palaces,
The solemn temples, the great globe itself,
Yea, all which it inherits, shall dissolve. *Shakespeare.*

CLOUD'COMPELLING, *adj.* [a word formed in imitation of νεφεληγερετης, *ill understood.*] An epithet of Jupiter, by whom clouds were supposed to be collected:

Health to both kings, attended with a roar
Of cannons, echo'd from th' affrighted shore;
With loud resemblance of his thunder, prove
Bacchus the seed of *cloudcompelling* Jove. *Waller.*

CLOUD'ILY, *adv.* With clouds; darkly. Obscurely; not perspicuously.—Some had rather have good discipline delivered plainly, by way of precepts, than *cloudily* enwrapped in allegories. *Spenser.*

CLOUD'INESS, *f.* The state of being covered with clouds; darkness:

You have such a February face,
So full of frost, of storm, and *cloudiness.* *Shakespeare.*

Want of brightness.—I saw a cloudy Hungarian diamond made clearer by lying in a cold liquor; wherein, he affirmed, that upon keeping it longer, the stone would lose more of its *cloudiness.* *Boyle.*

CLOUD'LESS, *adj.* Without clouds; clear; unclouded; bright; luminous; lightsome; pure; undarkened.—How many such there must be in the vast extent of space, a naked eye in a *cloudless* night may give us some faint glimpse. *Cheyne.*

CLOU'DY, *adj.* Covered with clouds; obscured with clouds; consisting of clouds.—As Moses entered into the tabernacle, the *cloudy* pillar descended, and stood at the door. *Exodus.*—Dark; obscure; not intelligible.—If you content yourself frequently with words instead of ideas, or with *cloudy* and confused notions of things, how impenetrable will that darkness be! *Watts.*—Gloomy of look; not open, not cheerful:

Witness my son, now in the shade of death,
Whose bright outshining beams thy *cloudy* wrath
Hath in eternal darkness folded up. *Shakespeare.*

Marked with spots or veins. Not bright, wanting lustre.

CLOVE, *pret.* of *cleave.* See to CLEAVE.

Gyon's angry blade so fierce did play
On th' other's helmet, which as Titan shone,
That quite it *clove* his plumed crest in tway. *Fairy Queen.*

CLOVE, *f.* [*clou*, Fr. a nail, from the similitude of a clove to a nail.] A valuable spice, the fruit or seed of the clove tree. The pungency of cloves resides in their resin, or rather in a combination of resin with essential oil, for the spirituous extract is very pungent; but, if the oil and the resin contained in this extract be separated from each other by distillation, the oil will be very mild; and any pungency which it does retain proceeds from some small portion of adhering resin, and the remaining resin will be insipid. No plant, nor part of any plant, contains so large a portion of essential oil as cloves do. From sixteen ounces, Neumann obtained by distillation two ounces and two drams; and Hoffman obtained from the same quantity an ounce and a half. The oil is specifically heavier than water. For the natural history of the plant, see its generic name, CARYOPHYLLUS, vol. iii. p. 861.

CLOVE, *f.* The two-and-thirtieth part of a weigh of cheese, *i. e.* eight pounds. Stat. 9 *H.* VI. c. 8.

CLOVE, *f.* in botany. See CARYOPHYLLUS.

CLOVE-PINK, *f.* in botany. See DIANTHUS.

CLO'VEN, *part. pret.* See to CLEAVE.

Now heap'd high
The *cloven* oaks and lofty pines do lie. *Waller.*

A chap-fallen beaver, loosely hanging by
The *cloven* helm, and arch of victory. *Dryden.*

CLO'VEN-FOOTED, or CLOVEN-HOOFED, *adj.* Having the foot divided into two parts; not a round hoof; bisulcous.—There are the bisulcous or *cloven-hoofed*; as camels and beavers. *Brown.*—The *cloven-footed* fiend is banished from us. *Dryden.*

CLO'VER, or CLOVER-GRASS, *f.* [more properly *claver*; clæfer, Sax.] A species of trefoil. See TRIFOLIUM.—*Clover* improves land, by the great quantity of cattle it maintains. *Mortimer.*

Nature shall provide
Green grass and fatt'ning *clover* for their fare. *Dryden.*

To live in *clover*, is to live luxuriously; clover being extremely delicious and fattening to cattle.—Well, Laureat, was the night in *clover* spent? *Ogle.*

CLO'VERED, *adj.* Covered with clover.—Flocks thick-nibbling thro' the *clover'd* vale. *Thomson.*

CLOUGH, *f.* [clough, Sax.] The cleft of a hill; a cliff. In composition, a hilly place.

CLOUGH, *f.* in commerce. An allowance of two pounds in every hundred weight for the turn of the scale that the commodity may hold out weight when sold by retail.

CLO'VIO (Giorgio Giulio), history and portrait painter, born in Sclavonia in 1498. Having in the early part of his youth applied to literature, his genius prompted him to pursue the art of painting for a profession: and at eighteen years of age he went to Rome, where he spent three years to perfect his hand in drawing, and devoted himself entirely to painting in miniature. His knowledge of colouring was established by the instructions of Julio Romano, and his taste of composition and design was founded on the observations he made on the works of Michael Angelo Buonaroti. By those assistances he proceeded to such a degree of excellence in portrait as well as in history, that in the former he was accounted equal to Titian, and in the latter not inferior to Buonaroti. He died in 1578. His works are valuable, and are at this day numbered among the curiosities of Rome. Vasari, who had seen the performances of Clovio with astonishment, enumerates many of his portraits and historical compositions, and seems to be almost at a loss for language sufficiently expressive of their merit. He mentions two or three pieces on which the artist had bestowed the labour of nine years; but the principal picture represented Nimrod building the tower of Babel; which was so exquisitely finished, and so perfect in all its parts, that it seemed inconceivable how the eye or the pencil could execute it.

CLOVIS I. founder of the French monarchy. He was the first conqueror of the several provinces of Gaul, possessed before his time by the Romans, Germans, and Goths. These he united to the then scanty dominions of France, removed the seat of government from Soissons to Paris, and made it the capital of his new kingdom. See the article FRANCE.

CLOUT, *f.* [clut, Sax.] A cloth for any mean use:

His garment nought but many ragged *clouts*,
With thorns together pinn'd, and patched was. *Spenser.*

A patch on a shoe or coat. Anciently, the mark of white cloth at which archers shot.—He drew a good bow; he shot a fine shoot; he would have clapt in the *clout* at twelve score. *Shakespeare.*—An iron plate to keep an axle-tree from wearing.

To CLOUT, *v. a.* To patch; to mend coarfely:

I thought he flept, and put
My *clouted* brogues from off my feet, whofe rudenefs
Anfwered my fteps too loud. *Shakefpeare.*

To cover with a cloth:

Milk fome unhappy ewe,
Whofe *clouted* leg her hurt doth fhew. *Spencer.*

To join awkwardly or coarfely together.—Many fentences of one meaning *clouted* up together. *Afcham.*

"Money is welcome in a dirty CLOUT." The Latins fay *Lucri bonus eft odor ex re qualibet*; The fmell of gain is agreeable whence foever it proceeds. The French fay, to the fame purpofe, *L'argent eft toujours bon, de quelque maniere qu'il vienne*; Money is welcome whatever way it comes. Vefpafian, the Roman emperor, gave this anfwer to thofe who found fault with his laying a duty upon cloacas, or common-fewers. The fame emperor, reprimanding his fon for making the fame complaint, held a piece of money to his noftrils, and afked him if he perceived any ill fmell in it, and upon his anfwering no, replied, *Atque è lotio eft.*

CLOUT'ED, *part. adj.* Congealed; coagulated: corruptly ufed for *clotted*:

I've feen her fkim the *clouted* cream,
And prefs from fpongy curds the milky ftream. *Gay.*

Studded with nails:

The dull fwain
Treads on it daily with his *clouted* fhoon. *Milton.*

CLOUTER'LY, *adj.* [probably by corruption from *louterly.*] Clumfy; awkward: as, a *clouterly* fellow.—The fingle wheel plough is a very *clouterly* fort. *Mortimer.*

CLOWADOK', a river of South Wales, which runs into the Ython, at Llanbadern, in Radnorfhire.

CLOW'EY, a lake of North America. Lat. 62. 20. N. lon. 106. 15. W. Greenwich.

CLOWN, *f.* [imagined by *Skinner* and *Junius* to be contracted from *colonus.* It feems rather a Saxon word, corrupted from *lown*; *loen*, Dut. A word nearly of the fame import.] A ruftic; a country fellow; a churl:

The *clowns*, a boift'rous, rude, ungovern'd, crew,
With furious hafte to the loud fummons flew. *Dryden.*

A coarfe ill-bred man.—In youth a coxcomb, and in age a *clown. Spectator.*

CLOWN's ALL-HEAL, *f.* in botany. See STACHYS.

CLOWN'AGE, *f.* Clownifh behaviour.—Pride and ftiff *clownage* mixed to make up greatnefs. *Ben Jonfon.*

CLOWN'ERY, *f.* Ill-breeding; churlifhnefs; rudenefs; brutality.—The fool's conceit had both *clownery* and ill-nature. *L'Eftrange.*

CLOWN'ISH, *adj.* Confifting of ruftics or clowns:

Young Silvia beats her breaft, and cries aloud
For fuccour from the *clownifh* neighbourhood. *Dryden.*

Coarfe; rough; rugged:

But with his *clownifh* hands their tender wings
He brufheth oft. *Spenfer.*

Uncivil; ill bred; ill-mannered:

What if we effay'd to fteal
The *clownifh* fool out of your father's court? *Shakefpeare.*

Clumfy; ungainly:

With a grave look, in this odd equipage,
The *clownifh* mimic traverfes the ftage. *Prior.*

CLOWN'ISHLY, *adv.* Coarfely; rudely; brutally.

CLOWN'ISHNESS, *f.* Rufticity; coarfenefs; unpolifhed rudenefs.—If the boy fhould not make legs very gracefully, a dancing mafter will cure that defect, and wipe off that plainnefs which the à-la-mode people call *clownifhnefs. Locke.*—Incivility; brutality.

To CLOY, *v. a.* [*encloüer*, Fr.] To nail up; to ftop up. To fatiate; to fate; to fill beyond defire; to furfeit; to fill to loathing. Intemperance in eating and drinking, inftead of delighting and fatisfying nature, doth but load and *cloy* it. *Tillotfon.*

Who can *cloy* the hungry edge of appetite
By bare imagination of a feaft? *Shakefpeare.*

It feems to have, in the following paffage, another fenfe; perhaps to ftrike the beak together:

His royal bird
Prunes the immortal wing, and *cloys* his beak. *Shakefpeare.*

To nail up guns, by ftriking a fpike into the touch-hole. In farriery, to prick a horfe in fhoeing. *Afh.*

CLOYE, or CLOIS, a town of France, in the department of the Eure and Loire, and chief place of a canton, in the diftrict of Chateaudun, containing about 1000 inhabitants: five miles fouth-weft of Chateaudun.

CLOY'LESS, *adj.* That of which too much cannot be had; that which cannot caufe fatiety:

Epicurean cooks
Sharpen with *cloylefs* fauce his appetite. *Shakefpeare.*

CLOY'MENT, *f.* Satiety; repletion beyond appetite:

Alas! their love may be called appetite:
No motion of the liver, but the palate,
That fuffers furfeit, *cloyment*, and revolt. *Shakefpeare.*

CLOYNE, a town of Ireland, in the county of Cork, the fee of a bifhop, fuffragan of Cafhel: fifteen miles eaft of Cork.

CLU'ALE, a town of United America, in the ftate of Georgia: fifteen miles fouth of Oakfufkee.

CLUACI'NA, a name of Venus, whofe ftatue was erected in that place where peace was made between the Romans and Sabines after the rape of the virgins.

CLUB, *f.* [from *clwppa*, Welfh; *kluppel*, Dutch.] A heavy ftick; a ftaff intended for offence.—As he pulled off his helmet, a butcher flew him with the ftroke of a *club. Hayward.*—The name of one of the fuits of cards:

The *clubs* black tyrant firft her victim died,
Spite of his haughty mien and barb'rous pride. *Pope.*

[From cleopan, to divide. *Skinner.*] The fhare or dividend of a reckoning, paid by the company in juft proportions.—A fuddling couple fold ale: their humour was to drink drunk, upon their own liquor: they laid down their *club*, and this they called forcing a trade. *L'Eftrange.*—An affembly of good fellows, meeting under certain conditions.—What right has any man to meet in factious *clubs* to vilify the government? *Dryden.*—Concurrence; contribution; joint charge:

He's bound to vouch them for his own,
Tho' got b' implicite generation,
And general *club* of all the nation. *Hudibras.*

To CLUB, *v. n.* To contribute to a common expence in fettled proportions. To join to one effect; to contribute feparate powers to one end:

Till groffer atoms, tumbling in the ftream
Of fancy, madly met, and *clubb'd* into a dream. *Dryden.*

Let fugar, wine, and cream together *club*,
To make that gentle viand, fyllabub. *King.*

To CLUB, *v. a.* To pay to a common reckoning:

Plums and directors, Shylock and his wife,
Will *club* their tefters now to take your life. *Pope.*

CLUB-HEADED, *adj.* Having a thick head.—Small *club-headed* antennæ. *Derham.*

CLUB-LAW', *f.* Regulation by force; the law of arms.—The enemies of our happy eftablifhment feem to have recourfe to the laudable method of *club law*, when they find all other means for enforcing the abfurdity of their opinions to be ineffectual. *Addifon.*

CLUB-MOSS, *f.* in botany. See LYCOPODIUM.

CLUB-ROOM, *f.* The room in which a club or company affembles.—Thefe ladies refolved to give the pictures of their deceafed hufbands to the *club-room. Addifon.*

CLUB-RUSH. *f.* in botany. See SCIRPUS.

To CLUCK, *v. n.* [*cloccian*, Welsh; *clochat*, Armoric; cloccan, Sax. *klocken*, Dut.] to call chickens as a hen.—Ducklings, though hatched by a hen, if she brings them to a river, in they go, though the hen *clucks* and calls to keep them out. *Ray.*

CLUEN'TIUS, a Roman citizen, accused by his mother of having murdered his father, fifty-four years before Christ. He was ably defended by Cicero, in an oration still extant. The family of the Cluentii was descended from Cloanthus, one of the companions of Æneas. *Virg.*

CLU'GNY, an island in the Southern Indian Ocean, discovered by Kerguelen, near Kerguelen's Land.

CLU'IS DESSOUS, a town of France, in the department of the Indre: two leagues north-west of Aigurande.

CLU'IS DESSUS, a town of France, in the department of the Indre, and chief place of a canton, in the district of Argentum: ten miles east of Arragon.

CLUMP, *f.* [from *lump.*] A shapeless piece of wood, or other matter, nearly equal in its dimensions; a cluster of trees; a tuft of trees or shrubs; anciently a *plump*.

CLUMPS, *f.* A numskull. *Skinner.*

CLUM'SILY, *adv.* Awkwardly; without readiness; without nimbleness; without grace.—He walks very *clumsily* and ridiculously. *Ray.*

CLUM'SINESS, *f.* Awkwardness; ungainliness; want of readiness, nimbleness, or dexterity.—The drudging part of life is chiefly owing to *clumsiness* and ignorance, which either wants proper tools, or skill to use them. *Collier.*

CLUM'SY *adj.* [This word, omitted in the other etymologists, is rightly derived by *Bailey* from *lompsch*, Dutch, stupid. In English, *lump, clump, lumpish, clumpish, clumpishly, clumsily, clumsy.*] Awkward; heavy; artless; unhandy; without dexterity, readiness, or grace. It is used either of persons, or actions, or things.—The matter ductile and sequacious, apt to be moulded into such shapes and machines, even by *clumsy* fingers. *Ray.*

But thou in *clumsy* verse, unlick'd, unpointed,
Hast shamefully defy'd. *Dryden.*

That *clumsy* outside of a porter,
How could it thus conceal a courtier? *Swift.*

CLUN, a river of England, which runs into the Temde, five miles west from Ludlow, in Shropshire.

CLUNCH, *f.* In Staffordshire, upon sinking of a coal mine, near the surface they meet with earth and stone, then with a substance called *blue clunch*, and after that they come to coal.

CLUN'DERT, or KLUNDERT, a strong town of Holland, formerly called *Nieuwervaert*, situated on a river or canal which runs from the Merwe, and forms the tract on which this town and Williamstadt stand into an island. It was taken by the French in March 1793, and soon after evacuated: ten miles west-north-west of Breda, and five east-south-east of Williamstadt. Lat. 51. 39. N. lon. 22, 24. E. Ferro.

CLUNG, the *pret.* and *part.* of *To* CLING.

CLUNG, *adj.* [clunᵹu, Sax.] Wasted with leanness; shrunk up with cold.

To CLUNG, *v. n.* [clinᵹan, Sax.] To dry as wood does, when it is laid up after it is cut. See *To* CLING.

CLUNIA, in ancient geography, a principal town of the Hither Spain, a Roman colony, with a conventus juridicus, on the Durius, to the west of Numantia. Now Corrunna del Conde.

CLUNIUM, in ancient geography, a town of Corsica, near Bastia. Now St. *Catherine's*.

CLU'NY, a town of France, in the department of the Saone and Loire, and chief place of a canton, in the district of Maçon, situated between two mountains, on the Grone: where a celebrated Benedictine abby, founded by William duke of Aquitaine. The church is supposed to be one of the largest in France. The town contains three parishes, but is not populous: three leagues and a half north-west of Maçon, and seven south of Calonsur-Saone.

CLUPE'A, or CLYPEA anciently a town of Africa Propria, which receives its name from its exact resemblance to a shield. *Lucan.*

CLU'PEA, *f.* [from *clypeus*, Lat. a shield.] In ichthyology, the HERRING. The generic characters, as corrected by Bloch, are, the belly serrated, and an oblong boat-shaped cavity in the head, which is compressed on both sides, as well as the body. The mouth is furnished with small teeth. In some species, the upper jaw protrudes; in others, the under. The tongue is short, ending in a blunt point. The eyes are round, and placed at the upper part of the head. The nostrils are double, lozenge-shaped, and stand midway between the mouth and the eye. The coverings of the gills are three or four bony laminæ. The body is long, covered with scales, and furnished with seven short fins; the tail-fin is long, and forked. The lateral line is strait, and runs parallel from head to tail. These fish inhabit the depths of the ocean; they live on worms, insects, young craw-fish, snails, and the spawn of other fishes. They multiply exceedingly, and soon die after they are out of the water. The fishes of this genus were known to the ancient ichthyologists under the names of *chalcis, clupea, balec, harengus, trissa, alosa, encrasicolus,* and *sardina*: they reckoned but three species; the others have, by degrees, been added by various naturalists: Linnæus has fourteen species; Bloch and La Cepede, the latest writers on this subject, reckon twenty-two.

1. Clupea harengus, the common herring, which is distinguished from other fishes of the same genus by the protrusion of the under jaw, which is bent upwards, and by the seventeen rays in the anal fin. There are eight rays in the membrane of the gills, eighteen in the pectoral fin, the same number in the dorsal and tail, and nine in the ventral. The head is small; the eye large, with a silvery iris and black pupil. The aperture of the mouth is small; the tongue short, and, as well as the jaws, furnished with little teeth. The coverings of the gills commonly exhibit a red or violet spot, which disappears soon after the death of the fish. The back is thick, round, and blackish; the sides are silvery. Except in spawning-time, the belly is sharp and serrated. The fins are grey, and small, except the tail, which is large and bifurcated.

The herring fishery, which forms so considerable a branch of commerce to the English, Dutch, and other nations of the north of Europe, is but a modern invention. The grand winter residence of this fish is within the arctic circle, where insect food abounds in a greater degree than in warmer climes. From the Arctic Seas, the herrings annually migrate along the shores of America, as far as Carolina; along those of Europe, as far as the north of France; and on the east of Asia, they are found on the shores of Kamtschatka. The great army that annually issues from the north, separates into several divisions: the first makes its appearance off the Shetland Isles in the months of April and May; but these are only the harbingers of a far more numerous body, that follows in June. The appearance of these shoals is always announced by the gulls, gannets, and other rapacious birds, that continually hover above them; but, when the great body approaches, about the beginning of harvest, its breadth and depth alter the appearance of the ocean, which sparkles with various colours, like a bed of precious stones, by reflecting the rays of the sun from the scales and fins. When the herrings first quit the regions of the Frozen Sea, they are divided into different columns, of five or six miles in length, by three or four in breadth; and in their progress southward, the first obstacle in their way is the Shetland Islands, by which they are separated into two grand divisions; the one advancing along the whole British coast, filling every bay and creek, till it reaches the Channel, after which it gradually thins, till it disappears. The other great wing makes a similar circuit round the west-coast, till it reaches the north of Ireland, where it is again subdivided; part entering the Irish Sea, and part scattering along the west shores of Ireland, till it disappears about the entrance of St. George's Channel.

Several

CLUPEA.

1. The common Herring. 2. The silver-striped Herring. 3. The African Herring.

Several ſtationary fiſheries are eſtabliſhed on the weſt of Scotland and Ireland; but the herrings are by no means uniform in reſorting to the ſame loch or bay annually. They frequent a certain ſpace for a number of years, and then capriciouſly deſert it for perhaps as many more. On the coaſt of Wales, and among the Hebrides, they have at different times occupied and deſerted their ſeveral ſtations, without any apparent cauſe. But although this ſtupendous gift of the munificent Author of Nature, is at times partially diſtributed, it is never totally withdrawn. The ſame inſtinct invariably operates; and, if one part is deprived of its effects, another teems with plenty, and relieves the neceſſity of ſuch as are leſs liberally ſupplied: thus, thouſands of the poor are annually ſupported, and rendered happy, by that inſtinct which the Almighty hath originally impreſſed upon this uſeful part of his creatures.

But this appetite for migration, which brings the herring annually to our ſhores, ſerves alſo purpoſes of the greateſt importance in the economy of theſe animals: it leads them to the ſhallow and tepid waters of the temperate zone, to depoſit their ſpawn, where it is matured and vivified with greater certainty than in the midſt of the frozen ocean. The multiplication of their kind, is, therefore, perhaps the primary purpoſe of nature in the migration of the herring. It is not from a defect of food that they abandon regularly their northern retreats; for it is immediately after leaving theſe, that they are moſt plump: before their return, they are greatly reduced by ſpawning, and are then thin and miſerable. The time of ſpawning is from the beginning of winter till January, when they almoſt totally diſappear from our coaſts, or are taken in ſmall ſtraggling parties by the fiſhermen, for the purpoſe of bait. It is probable, that at the time they abandon our ſeas, they again repair to the north, to reſtore their vigour, and, by impregnation, to replace that immenſe waſte, which the exertions of man, and the rapacity of other fiſhes, has made of their ſpecies. The ſpawn, after being diſcharged by the parent fiſhes, continues to float on the waves for a conſiderable part of the ſpring. In the beginning of ſummer, the young enter upon life, and in June and July are ſeen in vaſt numbers approaching the ſhores. They are then about two inches in length, and moſt probably feed upon inſects, as thouſands have been caught a little after that period with the common trout fly. Along the Yorkſhire coaſt, theſe young fiſh are called *ſile*; upon that of Scotland, they obtain the the general name of *fry*, which ſeems to be applied indiſcriminately to the young of all fiſh. During winter, it is probable that the young herrings retire to the north, along with the old. On their appearance next ſummer, although the ſhoals are made up of fiſh of very different ſizes, it does not appear that they are then diſtinguiſhable from the fiſh of greater age.

The Dutch, who have ſet the example to the other nations in almoſt every thing relating to commercial induſtry, firſt commenced the herring fiſhery in 1164; and continued in the excluſive poſſeſſion of it for ſeveral centuries. At length the Engliſh, rouſed by their gains, and jealous of that naval power of which it was the grand ſource, endeavoured to participate in this lucrative commerce, and for that purpoſe fought many well-diſputed battles. The ſuperior induſtry and experience of the Dutch, always have, and probably long will, ſecure them the greateſt ſhare of this trade. The moſt conſiderable ſtations of the Britiſh fiſheries are off the Shetland and Weſtern Iſles, and off the coaſt of Norfolk; in all theſe ſtations the Dutch ſhips are ever ready to take their ſhare. It appears from the report of the Committee of the Houſe of Commons, on the high price of proviſions, in December 1800, that for the laſt ſix or ſeven years, a great and increaſing winter-fiſhery for herrings has been carried on in the Firth of Forth. This fiſhery, which begins at the end of October, and continues in full ſeaſon till February, produces ſo abundant a ſupply, that it may be conſidered as inexhauſtible. Not leſs than one thouſand two hundred boats are employed in the fiſhery; and the total quantity taken has been ſuppoſed equal to five hundred thouſand barrels, each containing about one thouſand herrings.

Herrings ſprinkled (or, as it is termed, "rouſed or corned") with a moderate quantity of ſalt, will continue perfectly good at leaſt two months, and are much ſuperior in flavour and in nutritive qualities to thoſe which are prepared for exportation to diſtant countries, with a greater quantity of ſalt. If therefore the herrings in the Forth continue in full ſeaſon till towards the middle of February, (beyond which time it is repreſented, by the beſt judges, as injurious to the fiſhery to permit them to be taken,) they will be preſerved to the middle of April, by the ordinary method of curing in bulk; but it requires only a ſmall addition of ſalt, and ſomewhat greater attention, to make them fit for keeping a much more conſiderable length of time. The ordinary price of herrings in the Forth, when freſh out of the water, has not, in former years, exceeded five ſhillings or ſix ſhillings per cran, a meaſure containing about two gallons more than a barrel, (i. e. about thirty-four gallons); but, in the beginning of this ſeaſon, 1800, an unuſual competition among the buyers raiſed the price to twelve ſhillings, and even to fifteen and ſixteen per cran. But, at the very higheſt price, it has been found that the Forth herrings could be retailed in London, (in the ſtated of rouſed or ſprinkled herrings) with a moderate allowance to the perſons employed in retailing them, at the rate of two for one penny, a price greatly below what fiſh of much inferior quality have uſually been ſold for. Sixty-five pounds of ſalt are ſufficient to preſerve a cran of herrings, during the voyage from the Forth to any part of the coaſt of England, and for ſome weeks after their arrival, and to allow, in ordinary caſes, for ſuch waſte as is unavoidable.

In conſequence of the above report, bills were paſſed the ſame ſeſſion, declaring, that all perſons engaged in the herring fiſhery, ſhould have ſalt, duty free, for the purpoſe of curing herrings: that all perſons engaged in the herring fiſhery ſhould, for a limited time, be protected from being impreſſed into his majeſty's ſervice; and that the bounty given upon pilchards packed up and prepared for exportation, ſhould be allowed for all thoſe intended for home conſumption.

The mackrel fiſhery begins on the ſouthern and weſtern coaſts of England, when the herring fiſhery ends. See SCOMBER.

One William Beukelen of Biervlet, near Sluys, was the inventor of the uſeful expedient of pickling herring; and it is from him the operation has its name, both in the Engliſh and German languages. This great benefactor of mankind died in 1397; and his memory was held in ſuch veneration by the emperor Charles V. that he paid a viſit to his tomb. Others pretend that the ſecret was diſcovered by a Scottiſh fiſherman, who, having quitted his native country in diſguſt, taught the Flemings this art. The herrings cured in Flanders maintained a great reputation for many years. The Dutch, it is ſaid, are remarkably fond of the herring in its pickled ſtate: a premium is given by the ſtate to the firſt buſs that arrives loaded with a cargo, which ſells them for a very high price. The whole inhabitants welcome the arrival with ſhouts of exultation; and the ſame joy ſeems painted on every face, which the Egyptians diſplay on the firſt overflowing of the Nile.

The wiſe regulations of the Dutch to preſerve the reputation of their herrings, have contributed greatly to their increaſe. Every ſailor and fiſherman is obliged, before he ſets out on the fiſhery, to make oath not to ſpread his nets before the 25th of June; and, on their return, they again make oath that they have ſtrictly obſerved this injunction. Another law forbade the continuation of this fiſhery beyond the 25th of January; this is not leſs favourable to their increaſe, ſince it leaves thoſe in quiet who have ſpawned late. And hence the herring-fiſhery

has been for many ages so abundant on the coasts of Holland, because the fish are fond of returning to those places where they have before spawned without interruption, or to those where they were born. This fishery was formerly much more considerable in Norway than it is at present. It has also declined much in Sweden; and in Prussia, where it used to be considerable, it is almost entirely done away. But the interruption of the fishery is not the only cause why those fish no longer appear in a certain country: there are always enough who escape the nets sufficient to preserve the species, unless indeed the fishermen, from greediness, make the meshes of their nets so small as to fish up the young fry with the old ones, as is the practice with the Swedish fishermen. This method has done much hurt; and perhaps the fishery has failed in Prussia from the same reasons. The Danish company at Altona, and the Prussian company at Embden, send as many as fifty busses each to the coast of Scotland to fish for herrings.

Mr. Gilpin says, that the herring of America is rather smaller, less round, and not so fat, as that of Europe. There are great numbers in that part of the world: in January they appear on the coasts of Georgia and Carolina; in February in Virgina; then in New England, where they spawn in the creeks and rivers till the end of April, when they return to the sea; in May they are seen at Newfoundland; after which they disappear till next year. Yet their arrival depends on the weather; for in warm seasons they appear sooner, which is observable also in fresh-water fish. Bloch says that Gilpin is deceived in supposing that these herrings make long journeys: he is of opinion that they only rise from the bottom of the sea, and approach the shores to cast their spawn.

A work appeared in Sweden in 1784, entitled *Trangumsasten*, treating of the importance of herring-oil as an article of commerce. The author asserts, that from the year 1760 to 1764, there were made 216,150 tons of herring-oil, amounting in value to 2,035,350 imperial crowns, or 122 tons of gold. To prove the importance of this fishery at Gottenburg, it appears from the same treatise, that in 1781 that city exported 107,309 tons of pickled herrings, and sold 29,250 tons in the country; 14,540 tons of herring-oil exported, and 535 used in the country.

The herrings spawn at different seasons, which subject gives rise to the following observations: Some days before they appear in shoals, the males are seen scattered about, and more males than females appear in the same shoal. When the fish is ready to spawn, she rubs her belly against the stones, throws herself from side to side, draws in the water open-mouthed, and throws it out immediately, and moves her fin very quick; as they commonly come in large shoals, the water is darkened with the vast quantity of humid seed which they spread; and a disagreeable odour may be smelt for some distance; by rubbing themselves also they lose part of their scales, which may then be seen floating. These are indications whereby the fishermen know where to spread their nets.

The stromling, or spring herring of the Baltic, spawns when the ice begins to melt, and continues till the end of June. Next comes the largest kind, or summer herring; and, lastly, the autumn herring, which spawns from Bartholomew-tide till September. These species do not spawn all at once, but by degrees. After spawning, they return in shoals to the open sea, making a rustling noise like the fall of rain. The summer herring remains farther from shores, and spawns more in the bottom of the sea; the nets and cordage are often covered with their spawn as if barked over. It is hardly necessary to add, that the shoals of herrings preserve a certain order, as observed in most other fish that go in shoals: the same may be observed of birds of passage, and even of field-mice.

Among other destroyers, the whale is a great enemy to the herrings; particularly that species of whale called *nord-caper*; he devours them by thousands; he makes a circular motion with such rapidity, that he not only causes a great quantity of herrings to swim down his throat, as into a vast gulf, but if there are any small boats near, they feel the motion of the water: the Icelanders having caught one of these whales that was pursuing some cod, and in his pursuit was left dry upon the shore, they opened his stomach, in which they found 600 live cod, besides a great quantity of sprats, and some water-fowl.

In old time, not only private houses depended on a supply of fish, but armies formerly could not be otherwise marched or subsisted. There is an order in Rymer, from Edward II. to provide three thousand dried salmon for this purpose. A convoy of salted herrings was sent to the army besieging Orleans in 1423, which occasioned the battle called "the battle of *herrings*." There is likewise a very singular provision, by an Irish statute of Elizabeth, that swine which feed on the strand where the tide ebbs and flows are forfeited, "as they eat the spawn of salmon and herrings."

No fish in the ocean is, in any proportion, so numerous as the herring. For many ages, not less than a million of millions are destroyed by man; voracious fish, sea-fowl, &c. destroy a vast quantity; yet their numbers seem not to diminish. To give one instance: in the single parish of Suanoe in Norway, in one creek they took as many herrings at least as 9,600,000, as appeared by the quantity of boats and barrels which were filled with them; for they could not be counted; and as, according to Pontopidan, at least an equal number were stifled on account of their being so crowded in that little creek, we may reckon that the place contained at least nineteen millions. We could give other instances from authors less famed, perhaps, for reporting the marvellous than Pontopidan, and which would confirm his recital. As the herring is a principal article of food in Norway, the people of that country call it the king of fish. Every year some hundred of shiploads are sent from Bergen only; and, in 1752, not a very plentiful year, there were exported from that place 132,156 tons from January to October, without reckoning those which were exported towards the end of the year. If we make a calculation of the quantities exported from all the other towns, and what are consumed in the country as food and as a bait for other fish, we may reasonably conclude, that one year with another they take annually in that country 396,463 tons, each ton containing 1200 herrings: in all 475,739 600 fish.

The Dutch employ annually from a thousand to twelve hundred busses for the herring-fishery: they commonly reckon twenty-five lasts to a buss, and some of them are twice filled when they have an opportunity of landing their cargo quickly. On the lowest calculation, we reckon that the Dutch do not catch less than 300,000,000 annually. We have spoken before of the vast quantities taken in England, Scotland, and Ireland. The French salt every year about 60,000 tons; and, in the mouth of the Chesapeak, the floods throw every season such quantities on the shore, that the putrefaction often causes a contagious disorder. In the neighbourhood of Gottenburg in Sweden, not less than 720,000,000 of these fish are annually caught. The herring is also found in Lapland. According to Ysbrand and Kraschenninikow, they must also be very plentiful in Kamtschatka, as sometimes four tons are taken with one drag of the net. We must not forget to reckon those caught in the Baltic. The inhabitants of Holstein, Mecklenburg, and Swedish Pomerania, take great numbers every year; some of which are salted, others smoked and exported; and vast quantities are consumed in Livonia and other countries bordering on that sea.

The Dutch blacken their nets with smoke, that the brightness of their colours may not scare away the fish. Above, they are fastened to casks; and the other end is sunk to the bottom by stones fastened to them. They are spread out in the evening, because all fishery is most successful in the night. The herrings also, like most other fish, follow the light; therefore they hang lanterns to the busses

buffes to entice the fiſh into the nets, which are ſometimes ſo full, as to contain from ten to eleven laſts each. The herring will alſo bite at a hook; and Low ſays he has taken many thouſands with a trout-fly. The fiſhermen alſo try this experiment to find where the herrings are: they throw out a line; if they draw up a herring, they judge that to be a good place to ſpread their nets for a draught.

This fiſh is prepared two different ways: the one is called *white-herrings*, the other *red-herrings*. The firſt method is as follows: As ſoon as the fiſh is out of the ſea, the *gutter*, as he is called, rips up the belly, takes out the entrails, and puts them into a brine-tub, or pickling-pan, deep enough for the herring to float; in fifteen or eighteen hours they are taken out, and put into a ton, or caſk; for the great quantity they take makes it impoſſible to barrel them up properly on-board the veſſel. But, as this preparation is not ſufficient to keep them from ſpoiling, as ſoon as they get on ſhore, they put them in layers with ſalt between: they commonly allow five pounds of Spaniſh ſalt to a ton, with ſome freſh brine. In Holland, at leaſt as formerly governed, this was done under the inſpection of the magiſtrates; for, according to the laws of that country, the good and bad are not to be barrelled up together, and the price of each ſort was impreſſed with a hot iron on the caſk. They are alſo careful to make theſe barrels of oak, and to join the ſtaves well, leſt the brine ſhould run out and the herrings ſpoil. By the other mode, for curing red-herrings, they let them remain longer in the pickle, that is, at leaſt twenty-four hours; when taken out of this liquor, they run a thin ſtick through the heads of a quantity of them, and hang them in a kind of chimney formed on purpoſe, under which they make a wood-fire, ſo managed as to throw up the moſt ſmoke poſſible, and the leaſt flame: here they remain till they are ſufficiently dried and ſmoked, which is commonly twenty-four hours; and then they are put in caſks, or into ſtraw. They commonly chooſe for this preparation the fatteſt herrings; and the Dutch red-herring is generally preferred to all others. In Sweden and Norway they are prepared in a different manner: they uſe much leſs ſalt, and their caſks are full of holes, or even quite open. The Iriſh dry their herrings on the rocks, the Greenlanders in the air. "The ſalted or pickled herring, (ſays Bloch,) is not hurtful to health when eaten in moderation; it is good for thoſe who are troubled with phlegm, or who have loſt their appetite by weakneſs of ſtomach; but it is very bad for ulcerated lungs, on account of the ſtrength of the ſalt, or for thoſe who have any ulcers whatever, external or internal; and particularly for ſcorbutic habits." The herring may be bred in places where it is not natural, as has been ſucceſsfully tried in Sweden. They may alſo be hatched from the ſpawn or eggs, as appears from the Travels of Peter Kalms, from which the following paſſage is extracted: "Dr. Franklin related to me the following circumſtance: In that part of New England where his father lived, two ſtreams diſcharge themſelves into the ſea, in one of which a large quantity of herrings were caught, but none in the other, though the mouths of theſe ſtreams were very nigh together. He obſerved, that in the ſpring the herrings always came up the ſame ſtream to ſpawn. Franklin, who lived between the two ſtreams, determined to try if it were poſſible to make the herrings go alſo into the other ſtream; for this purpoſe, he took the nets whereon theſe fiſh had attached their ova, or ſpawn, and threw them into the other ſtream, where they hatched. The experiment ſucceeded, and herrings were every year afterwards taken in that ſtream alſo." This confirms what we before remarked, that theſe fiſh are fond of returning to the places where they were born, or where they have once ſpawned in ſafety.

The cavity of the belly is long in the herring; the ovary, &c. are double. In a middling-ſized herring the ovary weighed ſeven drachms, and contained 68,656 very ſmall white eggs; but, as Harmer counted only 10,000 in his herring, it is probable that the fiſh he examined was taken in ſpawning-time, and had already excluded part of the eggs. The air-bladder is ſingle, and pointed at both ends. The ſtomach is a thin ſkin; the inteſtinal canal is ſtrait, ſhort, and ſurrounded with twelve appendices. There are thirty-five ribs on each ſide, and the vertebræ are fifty-ſix in number.

To make this article as complete as poſſible, we ſhall add ſomething more on the ſubject of the herring-trade. It was carried on by the ancients. Madox relates, that, in 1295, the little town of Dunwich was obliged to pay 24,000 herrings to the crown. In the thirteenth century, the Zealanders already carried on a great trade in herrings; and, for this purpoſe, in 1282, they attained, of the king of England, for themſelves and the Hollanders, a patent for liberty to fiſh on the coaſts of Yarmouth; it appears alſo by a grant from Eric VI. king of Denmark, that the herring-trade was carried on in the Baltic during the thirteenth century: this grant, or diploma, gave to the people of Hamburgh a place in the iſle of Schonen, where they might remain during the herring-fiſhery, and have ſhops at the fairs. The pickling of herrings may likewiſe be traced back to the ſame period; it was certainly that mode by which what we call *red-herrings* are prepared. In the fourteenth century a herring-fair was eſtabliſhed at Yarmouth; and Edward III. ordained, in 1357, that herrings ſhould be ſold in that town only. The Hollanders, who hitherto had bought their herrings on the coaſts from the Scottiſh fiſhermen, and then ſold them to other nations, now found themſelves obliged to ſend boats to fiſh on thoſe very coaſts; for, as thoſe fiſhermen were forced to carry their herrings to market before they were ſalted, theſe fiſh became ſoft and unfit to be conveyed into other countries. According to Mazieres, the herring-trade was alſo very conſiderable about this time on the coaſt of Norway: he ſays, that more than 3000 men were employed in thoſe parts during the months of September and October in the herring-fiſhery; and this commerce ſtill forms one of the principal branches of their national induſtry, and brings ſome tons of gold annually into that kingdom. The fir-wood, of which they make their barrels, gives the herrings a taſte not generally liked, yet the Polanders eſteem them highly on that very account. Some years ago the Daniſh government ordered oak to be uſed for the herring-caſks; but the ſale ſoon diminiſhed, at leaſt in Poland; they no longer found the taſte they had ſo much admired, and it was determined to reſume the fir-caſks. With the Dutch (now the Batavian republic) this branch of commerce is ſtill more conſiderable; and Mr. Carleſon calls the herring-fiſhery "a mine of gold for the Hollanders;" for this people draws more profit from that trade than Spain from her mines of gold and ſilver. At firſt they bought their herrings of the Scottiſh fiſhermen, as we have remarked above; but their induſtry and wiſe regulations ſoon made their herrings preferable to thoſe of Scotland, and even to the Flemiſh herrings, which had hitherto been ſo famous. Yet their commerce now is not ſo extenſive as formerly. In 1416, the firſt large net was made at Hoorn; and, ſince that time, the large veſſels, called *buſſes*, have been in uſe by the Dutch. In 1552, the town of Enkhuyſen only ſent 140 veſſels to the herring-fiſhery; and, in 1601, no leſs than fifteen hundred buſſes were employed by the republic of Holland for the ſame fiſhery: if ſir Walter Raleigh may be credited, they ſent out ſome ſeaſons 3000 veſſels and 450,000 men; this is probably exaggerated, or the fiſhery muſt have greatly declined ſince it has excited the jealouſy or emulation of other countries; for, in 1736, there were reckoned only 219 buſſes; even this number has ſince diminiſhed; for, in 1747, the Dutch employed but 200 veſſels, and in 1775 only 169; and it would probably have declined ſtill more, if, in 1775, the ſtates had not offered a bounty of 500 florins for every herring-buſs. In ſpite of this diminution, the herring-fiſhery is ſtill conſiderable, as they reckon that 20,000 men now get their bread in this trade. The French fit

fit out annually, from Calais, Dieppe, &c. about 100 vessels for this fishery: their vessels are not so large as those of the Dutch; they are only from twenty to twenty-five tons; they fish either on the English coast, or in the channel. The fishery is also carried on upon the coasts of Normandy and Picardy in autumn; but, as the fishermen of these parts are not in the habit of carrying provisions or salt out with them, they are obliged to return before they have a cargo; and often, before they can get back, the fogs so favourable to that fishery are dispersed, and their best time is lost. The Swedes, who formerly purchased their herrings of other nations, are become, within the last fifty years, more attentive to the fishing trade. In 1745, a company was instituted in that kingdom to promote the herring-fishery; this was encouraged by the government, and their herrings are now much esteemed, especially those of Gottenburgh; in 1764, twenty vessels laden with herrings from that place arrived at Hamburgh, and the fish were found to be as good as the Dutch herrings: there were exported from that place in 1771, 43,959 tons of herrings; in 1772, 73,330; in 1781 and 1782, 200,000, and 20,000 or 30,000 tons of oil: they bring into that country by land-carriage a quantity of red-herrings from Swedish Pomerania. The Danes send the herrings they catch on the northern coasts of Jutland, and the isle of Ferro, not only into Holland, but even to Scotland. In 1767, they established a herring company at Altona. From Holstein, also, a great quantity of dried herrings are sent to Hamburgh and its neighbourhood; those called *kieler-bucklinge* are more particularly esteemed. In 1770, a society was established in Prussia for this fishery; and, in 1776, they sent from Embden six busses to fish on the coasts of Scotland, and they returned with thirty lasts of herrings; since that time the number of vessels has increased every year.

The herring-oil is a great article of trade in Sweden; at first they only prepared it from the breast and intestines; and, this oil having a great sale, the merchants of that country have established manufactures for burning the oil in most places where the herring-fishery is carried on. The process is by means of large caldrons, four of which are fixed to one furnace, which is open in front, and leaves a separate opening for each caldron; and the four openings communicate within with the large furnace; to spare copper, they have found a method of strengthening these caldrons with hoops of pine, secured by strong iron rings. The caldrons are so fixed, that the fire reaches only half the side, and the wall goes within an ell of the upper edge of the hoops, where boards are placed, on which stand the workmen who stir the matter about with copper shovels. Nine or ten tons of herrings may be thus prepared in one caldron, which will require from seven to nine tons of water, which is conveyed by pumps. While the herrings are boiling, they are stirred continually till quite dissolved; then cold water is pumped in, which causes the oil to float; this is skimmed off with copper ladles, and put into leathern bottles; after remaining some time, and being cleared from its impurities and from the water, it passes through a strainer into a large upright tub which has a hole within a yard of the bottom; here it is also left some time for the impurities to sink, and then strained once more, and put into oak casks for exportation. The oil should be thoroughly cleared from water and impurities, otherwise it will acquire a bad smell in warm weather. The herrings are commonly boiled five or six hours, and it takes two or three hours to cool before the oil can be extracted. The fresher and fatter the herring, the thicker the oil, and the better in quality, and the heavier; when made of stale herrings, it soon stinks. At the commencement of the fishery, as the herrings are much fatter they produce on an average twice the quantity of oil that can be drawn from them towards the conclusion of it, i. e. in December, when they are very lean and thin. The longer the oil boils, the darker its colour; and, when boiled in caldrons entirely of copper, it is browner than when wood is used. Pine-wood and coal are the fuel employed in this operation. A manufactory of four caldrons employs from twenty-eight to thirty-two men. It is only when the fishery is plentiful, and the price of herrings is low, that they make oil; when the fish are dear, the process is not sufficiently lucrative. This oil is used for lamps; but not for dressing of leather, on account of its fluidity. The remains of the herrings, after the oil is extracted, make excellent manure, and the lands where it is used produce more corn and grass than with any other manure whatever. Those farmers indeed whose lands lie near the coasts make use of it; but a mass of some hundred thousands of tons, to which it annually amounts, cannot all be used for this purpose: therefore the greatest part is thrown into the sea. Hence has arisen a question, whether this immense quantity of bones, scales, fins, &c. thus thrown back into the sea, may not in process of time hurt the herring fishery. This question has been discussed in the Trangrums-aften, a work we have have had occasion to mention before; and the author maintains the negative. We are of the same opinion; for the herring, being a rapacious fish, we should suppose would rather be invited than disgusted by such a feast.

2. Clupea sprattus, the sprat: the under jaw advanced and bending upwards, and the nineteen rays in the anal fin, are the marks that distinguish the sprat from other species of the herring. There are eight rays in the membrane of the gills; sixteen in the pectoral fin, six in the ventral, eighteen in the tail, and seventeen in the dorsal. The head is sharp, and pretty large in proportion to the body; the forehead is blackish; the coverings of the gills are radiated and silvery. The eyes are large, pupil black, iris yellow mixed with white. The back is blueish; the sides silvery. This fish, which is seldom more than four or five inches long, and one broad, is covered with large thin scales, which easily rub off. It is flattened at the sides; and the belly is sharp and bent. The fins are short, tender, and of a grey colour. The tail is forked.

This fish, like the common herring, is not only an inhabitant of the Northern and Baltic Seas, but also of most of the ports in the Mediterranean and Eastern Seas. It haunts deep places; and is found abundantly in autumn, on the shores and smooth places, where it goes to spawn. They are also caught pretty plentifully near Revel, where they salt and then export them in casks of about twenty pounds weight each. They come in such shoals, that at one draught of the net they catch sometimes forty tons. When we consider what a number of these fish is requisite to fill a ton; and what quantities are caught in Norway, Sweden, Holstein, Holland, and England; and consider what a sum is annually gained on the coasts of Brittany from this little fish: it will seem doubtful whether the sprats are surpassed in numbers even by the common herring. They sometimes catch quantities of them in Prussia and Pomerania. This fish, like the herring, is eaten either fresh, salted, or dried. These fish come into the river Thames in the beginning of November, and continue there till March; a season when the the herring have long retired into the North Sea. During the whole of the winter season, they constitute a portion of the food of the citizens of London. At Gravesend and Yarmouth, they are cured like the red herring, and sometimes pickled like anchovies; from which they differ but little in their flavour. Aldrovandus first speaks of this fish in 1613, Schonevelt in 1624, and Charleton in 1668. Willoughby described it more exactly in 1686; but he calls it a young herring: it may therefore be proper to remark those characters wherein these two species differ: 1. The young herring is thicker and straiter than the sprat. 2. The number of rays in the fins is different. 3. The sprat appears in autumn only; the herring in spring and summer also. 4. The herring has fifty-six vertebræ, the sprat only forty-eight; the cavity of the belly is much shorter in the latter, which also has not half the number of ribs that the herring has. 5. In the sprats

sprats the belly is thinner and sharper. Ray has copied Willoughby, and confounds the sprat and herring together of course. Klein makes the sprat and the anchovy but one species. Lastly, Pontoppidan, Gronovius, and Muller, seem inclined to regard the sprat as a young herring; and the drawing given by the latter is in fact a young shad, having those black spots which are peculiar to that species.

3. Clupea alosa, the shad: the plated armour which guards the belly in this fish is the distinguishing mark. There are eight rays to the membrane of the gills; fifteen to the pectoral fin, nine to the ventral, twenty to the anal, eighteen to the tail, and nineteen to the dorsal. The head is small, and transparent where the brain lies. The aperture of the mouth is large; the under jaw does not protrude so much as in the preceding species; the upper jaw has teeth only on one side, which are small; the rest of the mouth is smooth, except that there are some teeth on each side at the origin of the gills. The tongue is blackish, smooth, loose, and ends in a blunt point. The eye is of a middle size, having a black pupil angular below, and a silvery iris. The nostrils are double; but those in the front are hardly visible. The coverings of the gills are radiated, bluish in the middle, silvery at the edges. The back is of a greenish yellow, sharpish above the fin, round below. The sides are white, flattened to an edge towards the belly, and as rough as a saw: this arises from the hardness of the scales, or rather from that shield-work which forms a hard point where the parts are bent in; they are so sharp as to draw blood from the hands. The lateral line, as in the preceding species, is hardly visible, but is nearer to the back than to the belly; above this line there are four or five black spots, which however appear only in the young fish. The scales are large, and easily rub off; the fins, on the contrary, are small, and of a grey colour edged with blue; that of the tail only is large, with two brown spots at the bottom; the ventral fin has an appendage.

This species is found in the North Sea; also in the Mediterranean, and the Persian Gulph; and hence it was known to the Greeks and Romans. It passes from the sea into the rivers to spawn, like the salmon and many other fish: it appears in the Rhone in March; in the Volga, the Rhine, and the Elbe, in April and May; in the Nile it is not seen till December and January. When it reaches these streams, it deposits its spawn at the bottom in the most rapid part of the current; towards autumn they return to the sea. They grow to the length of two or three feet; and the breadth is about a third of the length; but are so thin, that when full grown they seldom weigh more than three or four pounds; yet at Avignon and thereabouts some have been caught which weighed six or seven pounds; and in England they sometimes weigh eight pounds.

The Severn produces the shads in higher perfection than any other British river. They appear there in April or May, according to the warmth of the spring; and after two months they disappear, and are succeeded by other varieties of the same fish. About Gloucester, the shad is esteemed a great delicacy; it is there caught in nets, and sold at a price as high as that of salmon. It is from thence they are sent to the London market, where they are distinguished from the shad of the Thames, by the French name *alose*. It is not ascertained where the shads spawn: at the time of their mounting the river, they are in full roe; but none are caught on their return to the sea, after shedding their spawn. The bleak, which are caught in the Severn in the months of July and August, are erroneously supposed to be the young of this species. They were reckoned very mean food by the ancients; Ausonius characterises it as the food of the poor. Those of the Thames agree to his description, being a very insipid and coarse fish. Jovius gives a similar account of this animal as an article of food; but asserts that it improves after ascending the Tiber. In the Severn there is a variety caught near Gloucester, called the *twaite*, which is equally disesteemed with the Tames shad. These varieties are distinguished by their size, the twaite being nearly one half smaller than the true shad; and has always fewer black spots behind the gills. Its size, and the resemblance it bears to the herring, have gained it in some countries the name of *mutter-herring*, or the mother of herrings; in other places it is called the *may fish*, because it appears in that month. They go up the Rhine as far as Basil, where they are caught, especially about spawning-time; to draw them into the nets, they make a bait of parched pease and myrrh; these they put into a little bag, and hang it inside the net. When they fish with a line, an earth-worm is the bait. In the Volga, where they are very plentiful, if the fishermen find any in their nets they throw them away, for the Russians have a superstitious notion that those who eat of them will grow mad; and hence they have given this fish the name of *beschenaia riba*, mad-fish; and *schelesniza riba*, iron-fish. Professor Hermann, of Strasburg, says that this species, when caught in the Rhine, is commonly about two feet long. The abbé Molina says this fish is found at Chili; and Fresier adds, that they are so plenty on the shores of that country, that they may be taken by baskets-full on the surface of the water. It is said that the shad is fearful of tempests, and loves music; and therefore the fishermen fasten little wooden hoops hung with bells to their nets, the jingling of which invites the fish that way. Elian relates, that in Egypt the shad is caught by the sound of castanets and shells assisted by the voices of the fishermen. Rondeletius affirms, that they come in shoals towards the shore at the noise made by the tortoises with their shells, especially in the night. Bloch, however, is of opinion, that this fish, like all others, is scared away by a noise.

The shad is not tenacious of life; it dies soon after it is out of the water. When it first quits the sea, it is lean and ill-tasted; but, the longer it remains in the rivers, the fatter it grows. In Prussia they dry and smoke them; the Arabs dry them in the air, and eat them with dates. This fish lives on worms, insects, and smaller fish; its enemies are the pike, perch, and other fish of that rapacious kind, particularly the perch, which makes great destruction among the young shads. The stomach is small, consisting of a thin skin; there are eighty appendices which supply the deficiency of the intestinal canal, as it is very short. The ovary and seed-vessels are double; the air-bladder is not divided.

4. Clupea encrasicolus, the anchovy. The protrusion or advancement of the upper jaw is the character of this species. The membrane of the gills has twelve rays, the pectoral fin fifteen, the ventral seven, the anal and tail eighteen, and the dorsal fourteen. The head is long, broad above, but ending in a point, where the nostrils are visible. The aperture of the mouth is very large; it is smooth within; the tongue is narrow, and ends in a point like the under jaw. The eye is round; pupil black, iris silvery. The opening of the gills is wide. The belly is grey; the body long, and covered with a thin skin, which has tender scales that easily rub off. The fins are short and transparent: the tail forked. The anchovy is seldom more than three inches long; but those of Brabant grow to five inches long and one wide. According to Barbot, they are found near Zaria as large as a herring.

This species is taken in the Mediterranean, and exported, pickled, to the different nations of Europe. Before salting, the head and viscera are taken away; and in this state they are eaten raw, with vinegar and oil. They are supposed to give wine an excellent relish; but probably their chief merit consists in bracing the stomach, after being relaxed by excessive drinking. Near a century ago, the anchovy was found at the mouth of the river Dee; and since that time has hardly ever been deemed an inhabitant of our seas. It is found in the Baltic, though but seldom; but is plenty in the North Sea, the Atlantic, and

and the Mediterranean; hence it was known to the Greeks and Romans. They leave the depths of the open sea, and come on the shores and smooth places to spawn; where they are caught in great quantities, from December to March, in Provence, Brabant, and Catalonia. They are also taken in May, June, and July, near Gibraltar, and about Genoa, Venice, Rome, and Bayonne: they fish for them at night with a light. The intestinal canal has a double sinuosity, and at its origin has about eighteen appendices. The gall-bladder is large; the other intestines are like the rest of the genus. There are thirty-two ribs on each side; and the vertebræ are forty-six in number.

5. Clupea cyprinoides, the deep-water fish: specific character, the last ray of the dorsal fin very long, and the anal fin pickle-shaped. The pectoral fin has fifteen rays, the ventral ten, the anal twenty-five, the tail thirty, the dorsal seventeen. The body is compressed, and covered with large scales; but the head, which is broad at top and sharp below, has none. The lower jaw is bent, and exceeds the upper in length; there are teeth in both. The bones of the lips are broad, and strongly bent; the aperture of the mouth is wide, with an oblique direction upwards; the tongue is loose and rough; the palate is armed in front with three arched rows of teeth, and in the throat are four bones ragged like a file. The nostrils are double, and very near the eyes, which have a black pupil and silvery iris, and are covered with a membrane. The aperture of the gills is wide, and the membrane is covered in part. The rays of the fins are flexible and branched, except the first of each, which is single; the pectoral and dorsal fins are scaly at their origin. The head, sides, and belly, are silvery; the back and fins bluish. This species is found in the Pacific Ocean and the Atlantic, and in the rivers and lakes which correspond therewith. Dr. Solander found it in November in the Rio Janario at Brazil, where it is called *camaripuguacu*; Forster saw it in August in a still water at Tanna, an island in the Pacific Ocean; Plumier made a drawing of it at the Antilles; it is common also at the Caribbee Islands, where the English call it *deep-water fish*, and *pond king-fish*; at Tranquebar it has the name of *marakay*, and among the Otaheiteans *apalika*. Marcgrave asserts that it grows twelve feet long, and as thick as a man; the mouth opens so wide, that a man's head may be easily thrust into it; he adds, that the eyes and scales of a fish of this size are as big as a crown piece; that it is fat, but yet the flesh is hard, so that only the young ones are eaten; and that it is very full of bones. From its size, Barrere places it among the carps.

6. Clupea trissa, the large sprat: specific character, the last ray of the dorsal fin lengthened, the anal strait. The pectoral fin has thirteen rays, the ventral eight, the anal and tail twenty-four each, the dorsal sixteen. The head is small, compressed, and without scales. The mouth is oblique like the preceding species, which it very much resembles except in size, this being but about as many inches long as that is feet. The lower jaw bends upwards, ending in a point which fills up a dent in the upper; there are no teeth, but the tongue is short and hard, and there is a rough membrane in the palate. The nostrils are double, and very near the mouth. The eyes are almost vertical; and on each side there is a membrane which approach so near each other as to leave but a small oblong aperture, and almost hide the pupil of the eye, which is black inclosed in a silvery iris. The gills have a wide aperture, the membrane lies concealed. The trunk is thin; the belly is arched; and from the throat to the anus there is the appearance of a saw consisting of thirty teeth. The lateral line is of a yellow colour in this and the preceding species. The scales are broad, thin, well fastened to the skin, but lying one over another like tiles on a house. The sides of the fish are silvery, the back and fins are bluish; the fins have branched rays. Many countries produce this fish: Osbeck and Ellis speak of it as found in China; Plumier at the Antilles, where it is called *savalle*; Brown reckons it among the fishes of Jamaica; Barbotteau found it in the Caribbees; and Dr. Blagdon at Carolina. In spawning-time it mounts the streams, and deposits its eggs among the weeds. It grows to the length of ten inches or a foot; it is fat and good eating, but little sought after, because so full of troublesome little bones. The waters of Jamaica, according to Brown, afford great quantities of them. The Caribbees however esteem them highly; but they have sometimes a hurtful and venemous quality; and it is to be regretted that Brown did not make the proper enquiries to ascertain by what aliment or other means the fish could acquire such a dangerous property. The vertebræ are forty-seven in number, the ribs twelve on each side. As this much resembles the preceding species, it may be necessary to mention wherein they differ besides their size, lest this should be taken for the young of the former: the present species, besides having the anal fin strait, and no teeth in the jaws, has a broad body: the former has a long body, and hexagonal scales; the scales of the present are of the usual shape.

7. Clupea Sinensis, the Chinese herring: specific character, no teeth, the lower ray of the branchial membrane shortened. There are six rays in the membrane of the gills, thirteen in the pectoral fin, eight in the ventral, nineteen in the anal, twenty-two in the tail, and eighteen in the dorsal. The body is very thin; the head is without scales. The lower jaw is the longest; the upper has two broad lip-bones; no teeth can be perceived, even in the inner part of the mouth. The nostrils are round, single, and near the eyes; the pupil of the eye is black, iris silvery. The aperture of the gills is large, and the membrane almost covered. The body is broad; the back and belly end sharp. The fins are small, the rays small, and but little divided. The head is of a silver colour; the same colour pervades the body, and appears through the scales, which are of the nature of horn. The fins are yellowish; those of the back and tail have a broad edging of a dark chesnut colour. This species is found on the coasts of Asia and America; Mr. John transmitted it from Tranquebar, where it is called *potken* and *naunalai*. He describes it as being ten inches long, living in the sea and in rivers; it spawns in March and April, and is caught at that time; but those taken in May, June, and July, are better tasted. Nieuhoff first made it known as being found near the Dutch possessions in the East-Indies; they go in shoals, like those of Europe, especially on the Malabar coast; but, not being such good eating as our herring, they are mostly thrown for manure on the fields of rice; they are caught with the same kind of nets as the common herring, they salt them in the same manner, and feed their servants with them.

8. Clupea pilchardus, the pilchard: specific character, the dorsal fin placed at the centre of gravity. In the other species, this fin is nearer the tail than the head. But, if this fish be lifted up by the end of the dorsal fin, it will hang in equilibrium, whereas in the other herrings the head will always preponderate. The membrane of the gills contains eight rays, the pectoral fin seventeen, the tail twenty-two, the dorsal eighteen. The head is without scales, compressed, with an oblong cavity towards the top. The eyes are high up, with a nictating membrane on each side; the pupil is black, the iris silvery. The mouth small; the lower jaw the longest, bending upwards, and ending in a point; there are no teeth in the jaws; the tongue thin, broad, and smooth, and the palate also. The nostrils single, and nearer the mouth than the eyes; the bones of the lips broad; the opercula of the gills even and radiated; the aperture wide, but the membrane concealed. The body thin, but fleshy; the back and belly almost round. Its ordinary size does not exceed nine inches; the body is a little thicker in proportion than that of the herring, and the belly less sharp: the scales are very large, thin, and rounded; the back is blueish; the sides and belly silvery; the head is compressed, and the

mouth

mouth without teeth. The upper angle of each of the gills is marked with a large black spot; some have four or five such spots disposed in a row near the tail; the lower edge of the belly is serrated, owing to the row of large clypiform scales that runs along it.

The pilchard annually appears in large shoals off the Cornish coasts, from whence it is regularly exported in great quantities into the Mediterranean. The fishing season is from June till the beginning of winter; a few sometimes are found hovering about till Christmas. There are spies, or *huers* as they are provincially called, stationed on the cliffs that project into the sea, whose business it is to watch the progress of the shoals, and to give notice to the boats below of the measures they are to take, by means of signals previously agreed upon. The signs of their approach are, a flight of aquatic birds, a phosphoric light produced by their movements, the smell they exhale from a certain distance, and the blue and white gleam on the surface of the sea at those times. The places they are principally caught at are Falmouth, Penzance, Fowey, and St. Ive's. By an act of James I. these huers are empowered to go over the grounds of others, without being liable to damages. By their motions the nets are both shooted and drawn; and, when they have been successful in inclosing part of a shoal, an hundred thousand are sometimes taken at a single draught. In October 1767, there were at one time inclosed in the Bay of St. Ive's, seven thousand hogsheads, or two hundred and forty five millions of fish. The average amount of the export of these fish appears to be 29,795 hogsheads annually; which, including the bounty paid by government, and the price of the oil extracted from them, are sold for about forty-nine thousand pounds. But the great benefit arising from the pilchard fishery, is the employment it affords to a number of seamen, who are thus trained up for the defence of the nation. A variety of hands, too, are employed on shore, in the different operations of salting, pressing, washing, and cleaning, the fish, as well as the trades-people, who depend upon the construction and sale of boats, nets, ropes, and casks.

As it is not possible to salt all these fish immediately, when they are drawn up in such vast quantities, they pile them on the ground in heaps of a yard and a half or two yards high, with layers of sea-salt between the strata; they are left thus for a fortnight or three weeks; then the salt is washed from them; and they are put into barrels and pressed with heavy weights to extract the oil; by which means a great quantity is obtained for various purposes. The principal differences between the pilchard and the common herring, besides the situation of the dorsal fin, are the following: it is more fat and fleshy; the scales are larger; the head is of a greater size, and more blunt; the furrow observed in the upper jaw of the herring is wanting in the pilchard, which last also is without teeth. Being fatter, it is preferred by many to the common herring; they are eaten fresh in the same manner, but the greater part are salted.

9. Clupea Africana, the African herring. This species is distinguished from the preceding by the length of the anal fin; and from the following by having the lower jaw the longest. The head is small, compressed, without scales; the eyes almost vertical, with a black pupil, the iris silvery bordered with red; and in front of them are the nostrils, which are single. No teeth. The aperture of the gills is wide, and the membrane is partly concealed. The body is very thin, broad upwards, and tapering off to the tail. The back and belly go off sharp: the belly is short, and of a silver colour; the back is long, and of the colour of polished steel. The sides are silvery, the fins grey; and the rays of the fins, the tail excepted, are short, and not much divided; the ventrals are so very minute, that they hardly deserve the name of fins. This species is found on the coast of Africa towards Guinea; we are told that at Acara, a Danish possession in Africa, they are so plentiful in June and July, that forty of them are sometimes sold for a penny. The Danes in that quarter call it *fild*; but other Europeans call it *the African herring*.

10. Clupea atherinoides, the silver-striped herring: a broad silvery stripe along each side is the specific character. There are twelve rays in the membrane of the gills, fourteen in the pectoral fin, eight in the ventral, thirty-five in the anal, twenty-two in the tail, eleven in the dorsal. The body is long and compressed, the head is small, without scales, ending in a blunt snout; the upper jaw is the longest; the mouth is large, and both jaws are armed with several rows of small teeth; but there are none on the tongue or on the roof of the mouth. The bones of the lips are narrow and jagged; the eyes are large, pupil black, iris orange colour; the nostrils are single. The branchial aperture is wide; the membrane lies hid. The body is covered with a viscous matter of a brown colour, transuding through the silvery scales. The ventral fins are short; those of the anus long and scaly; the rays are mostly four-branched, except the first. This species is found in both Indies and in the Adriatic sea. Brunniche found it at Singania, and in the port of Spalatro in Dalmatia; and Bloch received specimens from Surinam and Tranquebar. They are caught in the sea only, but in great quantities, and at all seasons; the inhabitants of Malabar call them *narum* and *ruruwab*; they do not much regard them as food, because they are so full of small bones, the general objection to herrings; nor are they much sought after by the Europeans, because they have larger and better fish. On account of the silvery stripe down the side, which gives it some resemblance to the smelt, the Italian fishermen will sometimes sell this fish by that name. This species is about six inches long; it is fat and well tasted; it is eaten either fresh or salted.

11. Clupea Malabaricus, the Malabar herring: the lower jaw bent upwards, and thirty-eight rays in the anal fin, form its specific character. There are eight rays in the membrane of the gills, fourteen in the pectoral fin, seven in the ventral, twenty-two in the tail, and eight in the dorsal. The mouth is armed with very small teeth; the bones of the lips are narrow, long, and jagged. The gill coverts are without scales, smooth, and composed of several leaves; the aperture is wide, the membrane covered. The scales are large; the back round, the belly sharp. The dorsal, anal, and tail fins, are grey; the pectoral and ventral fins blue; the rays soft and branched except the first, which are single and stiff. The colour of the back is silvery with yellow spots. This species is from Tranquebar, where it is caught on the neighbouring coast all the year round; it is good eating, but so full of little troublesome bones, that none but the poor negroes eat it. It never comes into the rivers, or is known to grow more than a foot long. The Malabars call it *aduppu-adipuruwai*.

12. Clupea nasus, the nose-herring: specific character, the upper jaw like a snout or nose, and the last ray of the dorsal fin long and bristly. There are four rays in the membrane of the gills, thirteen in the pectoral fin, six in the ventral, twenty each in the anal and tail, and sixteen in the dorsal. The mouth is small and unarmed; the jaws are equal in length. The nostrils are single. The eyes are large, with a skin over them; the pupil is black, the iris yellowish. The head has no scales; but there are large ones on the body. The back is blue; the belly and sides silvery. The rays of the fins are soft and ramified. This species comes from the same place as the preceding: its length is eight inches; like the last, it is eaten only by the poor; it is moreover unwholesome. It is caught all the year round in nets, both in the sea and at the mouths of rivers; but it is by no means plentiful. The Malay name is *poikutti*.

There are six other species enumerated by Gmelin, in his new edition of Linnæus, viz. The *setirostris*, found in the Pacific ocean and the Red sea; the *mystus*, from the Indian ocean; the *tropicus*, observed by Osbec in the island

island of Ascension; the *baumela*, and the *dorab*, found by Forskael in the Red Sea; and the *villosa*, from the North Sea, described first by Muller.

CLUSE, a place of Swisserland, where there is a passage over the edge of Mount Jura: ten miles north-east of Soleure.

CLUSE (La), a town of Savoy, and capital of Faucigny, situated on the Arve: twenty-four miles south-east of Geneva.

CLU'SIA, a daughter of an Etrurian king, of whom V. Torquatus, the Roman general, became enamoured. He asked her of her father, who slighted his addresses; upon which he besieged and destroyed his town. Clusia threw herself down from a high tower, and came to the ground unhurt. *Plutarch.*

CLU'SIA, *f.* [in memory of *Carolus Clusius*, or Charles de l'Ecluse, an eminent French botanist.] In botany, a genus of the class polygamia, order monoecia, natural order guttiferæ. The generic characters are—Calyx: perianthium four, five, or six, leaved, imbricate; leaflets concave, permanent, the interior ones gradually smaller. Corolla: petals four, five, or six, roundish, spreading, concave, large. Stamina: filaments many, simple, shorter than the corolla; antheræ simple, growing to the side of the tip. Pistillum: germ ovate-oblong; style none; stigma starred, flat, obtuse, permanent. Pericarpium: capsule ovate, marked with furrows, celled, the valve bursting in a radiate manner. Seeds: numerous, ovate, covered with pulp, affixed to a columnar angulated receptacle. The number in the fruit differs from four to twelve, according to the proportion observed in the stigma, valves, cells, &c. Some of the flowers are sterile with respect to the male organs, and others with respect to the female ones. In the female flowers a nectary is formed by the coalition of the antheræ, including the germ.—*Essential Character.* Male. Calyx, four or six leaved; leaflets opposite, imbricate; corolla, four or six petalled; stamina, numerous. Female. Calyx and corolla, as in the males; nectaries, formed by the coalition of the antheræ, including the germ; capsule, five-celled, five-valved, stuffed with pulp.

Species. 1. Clusia rosea, or rose-coloured balsam-tree: leaves veinless; corollas six-petalled. This is a tree from twenty to thirty feet in height, much resembling the next species, but the leaves sometimes emarginate, and roundish; flowers large, rose-coloured, and very handsome, but without scent. The whole surface of the genitals, and especially of the nectary, is covered with a gelatinous gluten; fruit green, the size of a middling apple, with eight lines running like meridians on a globe, from the stalk to the crown of it. When the fruit becomes ripe, it opens at these lines, and divides into eight parts, disclosing many mucilaginous scarlet seeds, resembling those of a pomegranate; the mucilage being washed off, the seeds appear white and hard, and contain a kernel; they are contained in the hollow furrows of an octagonal core. The whole tree is exceedingly beautiful, and the structure of the fruit is a most exquisite piece of mechanism. Native of the Bahama islands, St. Domingo, and other American islands, between the tropics, on rocks, and frequently on the trunks and limbs of trees, occasioned by birds scattering or voiding the seeds, which, being glutinous like those of missleto, take root in the same manner; but the roots, not finding sufficient nutriment, spread on the surface of the tree till they find a decayed hole or other lodgment, wherein is some small portion of soil; the fertility of this being exhausted, a root is discharged out of the hole till it reaches the ground, though at forty feet distance; here again it fixes itself, and becomes a much larger tree. The resin is used to cure sores in horses, and instead of tallow for boats.

2. Clusia alba, or white-flowered balsam-tree: leaves veinless; corollas five-petalled. Height thirty feet; an elegant tree, and parasitical on other vast trees, like the foregoing; the trunk is frequently a foot in diameter, and supports a spreading head. The whole abounds in a very tenacious balsamic juice, of a green colour, but becoming of a brownish red on being exposed to the air; flowers inelegant, and without scent; white, all hermaphrodite, but with the antheræ more or less polliniferous; fruits, when ripe, scarlet; seeds white, involved in a scarlet pulp; the birds are very fond of them, and, when the capsules burst open, hang over them on the wing, and pluck out the seeds with the pulp adhering. It is common in the woods of Martinico, where it is called *aralie*. The Caribs use the juice for paying their boats.

3. Clusia flava, or yellow-flowered balsam-tree: leaves veinless, corollas four petalled. The third sort is pretty common in the British islands of America, where the trees grow to the height of twenty feet, and shoot out many branches on every side; with thick, round, succulent, leaves, placed opposite: the flowers are produced at the ends of the branches, each having a thick succulent cover; these are of different colours in different plants, some being red, others yellow, some white, and some green. After the flowers are past, they are succeeded by oval fruit, which are also of different colours in different plants. Brown says, that in Jamaica it rises only to the height of fourteen or fifteen feet, that it grows mostly on the lower hills, delighting in dry ground, but thriving in most light soils. Wherever the trunk or larger branches are wounded, they throw out a thick resinous gum, which is sometimes used as a vulnerary among the inhabitants of Jamaica; but it has not any extraordinary smell, or pungent taste. This species was cultivated by Mr. Miller in 1759: he informs us that there were some fine plants in the garden of Mr. Parker, near Croydon in Surrey, which were brought over in tubs from Barbadoes; and that there are three varieties differing in the size and colour of the flowers and fruit.

4. Clusia venosa, or vein-leaved balsam-tree: leaves veined. This tree rises to the height of twenty or thirty feet; it has very large oval spear-shaped leaves, ending in points, placed alternate on the branches, and having several ribs, which go off from the midrib alternate, rising upward to the side of the leaves; and also a great number of small veins, running horizontally between these ribs. The borders of the leaves are serrate, and their under sides are of a shining brown colour. The branches are covered with a woolly down, and the flowers are produced in loose spikes at the end of the shoots; these are smaller than those of the foregoing, and are of a rose colour. According to Jacquin, the corolla is white, and an inch and a half in diameter; leaves four inches long. It is a native of the moist mountainous woods of Martinico, where it has the name of *paletuvier de montagne*. Miller says it was discovered by Dr. Houstoun at Campeachy, whence he sent dried specimens and seeds.

5. Clusia pedicellata: leaves opposite, obovate, quite entire, veined; cymes axillary; flowers four-petalled. Native of New Caledonia; found September 9, 1774.

6. Clusia sessilis: leaves opposite, obovate and elliptic, quite entire, veined; flowers axillary, solitary, subsessile, four-petalled. Native of Tongatabu; found October 8, 1774.

Propagation and Culture. The best method of having these plants, is to procure them from the West Indies, to be brought over in tubs; for the seeds seldom succeed, and the young plants grow so slowly as not to make any figure for some years. In bringing them over, great care should be taken that they do not receive much wet; for, having very succulent stems, moisture will cause them to rot. The plants are tender, and must be constantly kept in the stove, otherwise they will not live through the winter in England; they must also be watered very sparingly, especially in winter, for they naturally grow in those parts of the islands where it seldom rains. They may be propagated by cuttings, which must be laid to dry when they are cut off from the plants for a fortnight or three weeks, that the wounded part may be healed over, otherwise

CLUSIA.

The Rose-coloured Balsam Tree.

wise they will rot. When the cuttings are planted, the pots should be plunged into a hot-bed of tanners' bark, and now and then gently refreshed with water; the best time for planting these cuttings is in June or July, that they may be well rooted before the cold weather comes on in autumn. In winter these plants may be placed upon stands in the dry stove; but, if in summer they are plunged into the tan-bed, they will make great progress, and their leaves will be large, in which consists the great beauty of these plants. See DECUMARIA.

CLUSI'NA PA'LUS, in ancient geography, a lake of Tuscany, extending north-west, between Clusium and Arretium, and communicating with the Arnus and Clanis. Now *Chiana Paiude*

CLUSI'NI FON'TES, ancient baths in Tuscany, in the territory of Clusium, between this last to the north, and Acula to the south, at the distance of eight miles from each. Now *Bagni di S. Casciana*.

CLU'SIUM, anciently a town of Tuscany, at the south end of the Palus Clusiana, where it forms the Clanis; the royal residence of Porsena, three days journey from Rome to the north. Now *Chiusi*. Clusium Novum was a town of Tuscany, near the springs of the Tiber, in the territory of Arretium, where lies the Ager Clusinus, now called *Casentino*; *Clusini Novi*, the people. *Pliny*.

CLUS'TER, *s.* [clyster, Sax. *kluster*, Dut.] A bunch; a number of things of the same kind growing or joined together.—Grapes will continue fresh and moist all winter, if you hang them *cluster* by *cluster* in the roof of a warm room. *Bacon*.

An elm was near, to whose embraces led,
The curling vine her swelling *clusters* spread. *Pope*.

A number of animals gathered together:

As bees
Pour forth their populous youth about the hive
In *clusters*. *Milton*.

There with their clasping feet together clung,
And a long *cluster* from the laurel hung. *Dryden*.

A body of people collected: used in contempt.—My friend took his station among a *cluster* of mob, who were making themselves merry with their betters. *Addison*.

To CLUS'TER, *v. n.* To grow in bunches; to gather into bunches; to congregate:

Great father Bacchus, to my song repair;
For *clustering* grapes are thy peculiar care. *Dryden*.

Or from the forest falls the *cluster'd* snow,
Myriads of gems. *Thomson*.

To CLUS'TER, *v. a.* To collect any thing into bodies.

CLUS'TERY, *adj.* Growing into clusters.

CLU'TIA. See CLYTIA and ANDRACHNE.

To CLUTCH, *v. a.* [ʒe-clecht, Sax.] To hold in the hand; to gripe; to grasp:

They,
Like moles within us, heave and cast about;
And, till they foot and *clutch* their prey,
They never cool. *Herbert*.

To comprize; to grasp.—A man may set the poles together in his head, and *clutch* the whole globe at one intellectual grasp. *Collier*.—To contract; to double the hand, so as to seize and hold fast:

Not that I have the power to *clutch* my hand,
When his fair angels would salute my palm. *Shakespeare*.

CLUTCH, *s.* The gripe; grasp; seizure. Generally, in the plural, the paws, the talons.—It was the hard fortune of a cock to fall into the *clutches* of a cat. *L'Estrange*.—Hands, in a sense of rapacity and cruelty:

Set up the covenant on crutches,
'Gainst those who have us in their *clutches*. *Hudibras*.

CLUT'TER, *s.* See CLATTER. A noise; a bustle; a busy tumult; a hurry; a clamour. *A low word*.—He saw what a *clutter* there was with huge over-grown pots, pans, and spits. *L'Estrange*.

To CLUT'TER, *v. n.* To make a noise or bustle.

CLUVESYE'CK, a town of Germany, in the duchy of Holstein: five miles east-north-east of Rendsburg.

CLUVIER, or CLUVERIUS, (Philip), a celebrated geographer, born at Dantzic, in 1580. After an education at home, he travelled into Poland, Germany, and the Netherlands, to improve himself in the knowledge of the law. But, when at Leyden, Joseph Scaliger persuaded him to give way to his natural bent for geography. In pursuance of this advice, Cluvier visited the greatest part of the European states. He was well skilled in many languages, speaking with facility, Greek, Latin, German, French, English, Dutch, Italian, Hungarian, Polish, and Bohemian. On his return to Leyden, he taught there with great applause; and died in 1623, being only 43 years of age, justly esteemed the first geographer who had put his researches in order, and reduced them to regular principles. He was author of several ingenious works in geography, viz. 1. *De Tribus Rheni Alveis*. 2. *Germania Antiqua*. 3. *Italia Antiqua, Sicilia, Sardinia, & Corsica*. 4. *Introductio in Universam Geographiam*.

CLUYD, or CLWYD, a river of North Wales, which runs through a vale of the same name, passes by Ruthin, St. Asaph, &c. and runs into the Irish sea, six miles below the latter town.

CLUY'TIA, *s.* [named by Boerhaave, in memory of *Augerius Clutius*, Dirk Autgers Cluyt, professor of botany at Leyden.] In botany, a genus of the class dioecia, order gynandria, natural order of tricoccæ. The generic characters are. I. Male. Calyx: perianthium five-leaved, size of the corolla; leaflets ovate, obtuse, concave, spreading. Corolla: petals five, spreading very much, cordate; claws flat, shorter than the calyx. Nectaries exterior five, three-parted, oblong, spreading, length of the claws of the petals, placed in a circle within the petals. Nectaries interior five, glandiform, small, melliferous at the tip. Stamina: filaments five, placed on the middle of the style, remote from the corolla, spreading horizontally; antheræ roundish, versatile. Pistillum: germ none; style cylindric, truncate, very long, bearing the stamens on its middle. II. Female. Calyx: perianthium, as in the male, permanent. Corolla: petals, as in the male, permanent. Nectaries exterior five, twin, roundish, of the same size and situation as in the male; interior none. Pistillum: germ roundish; styles three: bifid, reflex, length of the corolla; stigmas obtuse. Perianthium: capsule globular, six-furrowed, rough, three-celled. Seeds: solitary, roundish, even, appendiculated at the tip. There are species which are decandrous, and androgynous.—*Essential Character*. Calyx, five-leaved; corolla, five-petalled. Female, styles three; capsule, three-celled; seed, one.

Species. 1. Cluytia alaternoides, or narrow-leaved clutia: leaves subsessile, linear-lanceolate flowers solitary, erect. Stem shrubby, six or eight feet high, putting out many side branches which grow erect; leaves of a greyish colour, and entire. The flowers come out from the joints, at the setting on of the leaves, towards the upper part of the branches; they are small, and of a greenish white, appear from June to August, and make no great appearance. Cultivated 1692, in the royal garden at Hampton Court. Miller informs us, that plants with male flowers had been long in the English gardens, but that those which bear female flowers were introduced afterwards.

2. Cluytia polygonoides: leaves lanceolate; flowers axillary, very many. Native of the Cape of Good Hope.

3. Cluytia pulchella, or broad-leaved clutia: leaves ovate, quite entire; flowers lateral. This rises about the same height with the first, but has a stronger stem. The leaves are much larger, sea-green, and on petioles an inch long. The flowers are like those of the first sort in shape and

and colour, but those on the male plants are smaller, and grow closer together than those of the female, but both are sustained upon short foot-stalks. These flowers appear at the same time as those of the first sort, and the seeds ripen in autumn. Cultivated in 1739, by Mr. Miller: who says that there were no plants in England with male flowers, till he received one from Dr. Job Baster of Zirkzee in Holland.

4. Cluytia hirta: leaves wedge-shaped, smooth, flowers lateral, glomerate, hirsute. This is a very branching shrub; branches round, smooth, tubercled with fallen leaves, usually scattered, but sometimes coming out three together. Found at the Cape of Good Hope by Thunberg.

5. Cluytia tomentosa: leaves elliptic, tomentose on both sides. A shrub three feet in height, very branching, erect, tubercled with the scars of fallen leaves; branches round pubescent; leaves crowded, sessile, somewhat acute, the size of thyme leaves; flowers lateral, solitary, sessile, longer than the leaves, white. Found on the sandy shores of the Cape; flowering in May.

6. Cluytia retusa: leaves oval, retuse, flowers racemed axillary. Native of the East Indies.

7. Cluytia eluteria, or maritime clutia, or sea-side balsam: leaves cordate-lanceolate. According to Miller, it rises with an upright shrubby stalk, not more than three or four feet high in England; but, in places where it grows naturally, it rises upwards of twenty feet in height, with the branches forming a large spreading head. The leaves are shaped like those of the black poplar. On breaking the more tender branches, a large drop of a thick balsamic liquor oozes from the wound, whence it has the appellation of balsam-tree. It grows frequently to the height of four or five feet. The leaves and tender tops are said to heal sores, and are frequently used in baths and fomentations. Swartz, who makes this a species of croton, doubts whether the fourth croton of Browne be the same plant. Native of both Indies. The *cortex cascarillæ* is supposed to be the produce of this tree. At the end of the last century it was recommended by Stisser as a powerful diuretic and carminative, and he used it with success in calculous, asthmatic, phthisical, scorbutic, and arthritic, complaints. Since that it has been used in Germany for the Peruvian bark in intermittent fevers; and the German physicians have given it much credit as an astringent, and have accordingly used it in hæmorrhages and various alvine fluxes.

8. Cluytia stipularis: leaves oval, tomentose underneath. Branches flexuose, tomentose. Flowers axillary, subsessile, not longer than the stipules, dark purple. Native of the East Indies.

9. Cluytia acuminata: herbaceous; leaves ovate, smooth, obtuse, with a point; flowers axillary, solitary. Native of the Cape.

10. Cluytia lanceolata: leaves elliptic-lanceolate, flowers lateral tomentose. This bears a great affinity to the third species, and should be placed next before it; however differs in having the branches purple, and ash-coloured-villose at top.

Propagation and Culture. The first and third sorts are easily propagated by cuttings during any of the summer months: if the cuttings are planted in small pots, and plunged into a very moderate hot-bed, and shaded from the heat of the sun in the middle of the day, they will soon take root, and should then be inured to the open air, otherwise they will draw up very weak: afterwards these plants may be each put into a separate small pot, and placed in a sheltered situation, where they may remain until the middle of October, or later, if the weather continues mild, when they should be removed into the green-house, and placed where they may have the free air in mild weather, for they only require to be protected from frost, therefore require no warmth in winter; but if the green-house is shut up too close, or the plants are much shaded by others, the tender shoots are subject to grow mouldy, which destroys more of these plants than the cold. In the summer they must be placed abroad in a sheltered situation, with other hardy exotic plants. As these plants are always green, they look well in the green-house during the winter season; and in summer, when they are placed in the open air with other exotic plants, they make a pretty variety. The seventh will live through the winter in an airy glass case, without artificial heat; but in that situation should have very little water; for the plants, abounding with a milky juice like the euphorbia, must at no season of the year have too much wet. If these plants, when young, are placed in a very moderate warmth in winter, it will greatly forward their growth, but they must not have too much heat, for that will force them too much; and when the plants have obtained strength, they may be treated more hardily. This sort may be propagated by cuttings during the summer season; but the cuttings should be laid in a dry place for a few days, when they are taken from the old plants, that their wounded parts may dry and be healed over before they are planted. These must be planted in small pots filled with light sandy earth, and plunged into a moderate hot-bed of tanners bark; and if the season is very warm, the glasses should be shaded in the heat of the day, and raised up to admit fresh air to the cuttings every day; these must be sparingly watered. When they have taken root, and begin to shoot, they must have a greater share of air, and by degrees be inured to the open air; and, when their roots have filled the pots, they should be carefully parted, and each planted in a separate pot of the same light sandy earth; then they should be placed on the back part of the stove, behind the other plants, where they may be screened from the sun till they have taken fresh root, after which they may be brought forward, and exposed gradually to the open air. In the summer they should have free air constantly in warm weather, but they must be screened from heavy rain; and in winter placed in an airy glass-case, where they may enjoy the sun, and during that season have very little wet.

CLYBE'A, or AKLIBIA, a town of Africa, in the kingdom of Tunis, on the east coast: fourteen miles south of of Cape Bona.

CLYDE, a famous river in Scotland, which, arising in Annandale, falls into the sea over against the isle of Bute. Next to the Tay, it is the largest river in Scotland; and is navigable up to Glasgow. The canal, which joins the Forth, falls into it a little below that city. The cataract called the *Frith of the Clyde*, opposite to Lanerk, is a great natural curiosity, and the first of the kind in Great Britain. This tremendous cataract for about a mile falls from rock to rock. At Stone-byers, the first fall is about sixty feet; the last, at Cory-Lynn, is over solid rock, not less than one hundred feet high. At both these places this great body of water exhibits a grander and more interesting spectacle than imagination can readily conceive. A path conducts the traveller down to the beginning of the fall, into which projects a high rock, in floods insulated by the water. On reaching the top, the walk is formed near the verge of the rocks; which on both sides are perfectly mural and equidistant, except where they overhang: the river is pent up between them at a distance far beneath, sliding along a stony bottom sloping the whole way. The summits of the rock are wooded; the sides smooth and naked; the strata narrow and regular, forming a stupendous natural masonry. After a walk of above half a mile on the edge of this great chasm, on a sudden appears the great and bold fall of Boniton, in a foaming-sheet, far-projecting into a hollow, in which the water shews a violent agitation, and a wide-extending mist arises from the surface. Above that is a second great fall; two lesser succeed: beyond them the river winds, grows more tranquil, and is seen for a considerable way, bounded on one side by wooded banks, on the other by rich and swelling fields of corn.

CLY'DESDALE, a district of Scotland, in the south part of the county of Lanerk.

CLY'MENE, in fabulous history, the daughter of Oceanus; who, being beloved by Apollo, he had by her Phaëton, Lampatia, Egle, and Phebe.

CLYME'NUM. See LATHYRUS and VICIA.

CLY'MENUS, a king of Orchomenos, son of Presbon. He received a wound from a stone thrown by a Theban, of which he died His son Erginus, who succeeded him, made war against the Thebans to revenge his death. *Pausanias*.—One of the descendants of Hercules, who built a temple to Minerva of Cydonia.

CLYPEA'RIA, *f.* Lat. See ADENANTHERA.

CLYPE'OLA, *f.* [from *clypeus*, a little shield; so named from the form of the silicle.] In botany, a genus of the class tetradynamia, order siliculosa, natural order siliquosæ. The generic characters are—Calyx: perianthium four-leaved; leaflets ovate-oblong, permanent. Corolla: four-petalled, cruciform; petals oblong, entire; claws rather longer than the calyx. Stamina: filaments six, shorter than the corolla: the two opposite ones still shorter; antheræ simple. Pistillum: germ roundish, compressed; style simple; stigma obtuse. Pericarpium: silicle orbiculate, emarginate, flat-compressed, erect, deciduous, bivalve; valves orbiculate. Seeds: orbiculate, in the center of the pericarpium.—*Essential Character*. Silicle emarginate, orbiculate, compressed, flat, deciduous.

Species. 1. Clypeola Jonthlaspi, or annual treacle-mustard, or buckler-mustard: annual; siliques orbiculate, one-celled, one-seeded. It is a low annual plant, seldom more than four inches high; stems slender, hardish, upright, branched at the bottom, tinged with red, covered with short whitish hairs; leaves spatulate, alternate, sessile, glaucous, with minute stars of hairs all over the surface; flowers in terminating spikes, and very minute; corolla yellow, the size of the calyx; seed single, elliptic, compressed, smooth, tawny-coloured. Villars doubts whether this plant be distinct from alyssum minimum of Linnæus. Native of the south of France, Spain, and Italy; flowering there from March to May; but with us from May to July.

2. Clypeola tomentosa, or hoary treacle-mustard: perennial; silicles orbiculate, two-celled, two-seeded; leaves subtomentose. First observed in the Levant by Tournefort. Arduini had the seeds in 1755 from Leonard Sesler, who cultivated this plant many years in his garden at Venice. He and Lamarck agree with Tournefort in referring this and the next species to the genus alyssum; and, to make amends, they transport the peltaria to this genus. In this natural class, the division of the genera is frequently arbitrary, and there would be no end to removals.

3. Clypeola maritima, or sea treacle-mustard, or churlesmustard: perennial; silicles two-celled, ovate, two-seeded. Stems much branching, diffused, evergreen; leaves linear-lanceolate, whitish, not stiff; filaments toothless; in which circumstance alone it differs from the alyssums, with which it might very well be associated. According to Ray, the leaves are an inch in length, tasting like cress; corollas white, darker in the middle, resembling those of water-cress. It has the appearance of wall-flower, but the branches are weaker, and both they and the leaves are much smaller. Native of the south of France, Spain, and Italy; common on the coast of the Mediterranean.

Propagation and Culture. These are low plants, that have little beauty, and are preserved chiefly in botanic gardens. The first is propagated by seeds, sown on a border of light earth, where they are to remain. If sown in autumn, the plants will grow larger, flower earlier, and ripen seeds with more certainty. If these be permitted to scatter, the plants will thrive without farther care. The third should be sown upon a warm border in a dry soil, and does not bear transplanting well. See ALYSSUM, BISCUTELLA, and PELTARIA.

CLYS'SUS, *f.* [from κλυζω, to wash.] The essence or finer parts of any substance, extracted by washing away its impurities, or by fire. The word was formerly used to denote the vapours produced by the detonation of nitre with any inflammable substance. It was prepared by using a tubulated earthen retort capable of supporting the sudden application of strong heat, together with a very large receiver, pierced with a small hole. Other clyssi were also produced, which had their names from the inflammable substance made use of; such as the clyssus of antimony and the clyssus of sulphur, both which, if the materials be duly proportioned, are merely vitriolic or sulphureous gases.

CLYS'TER, *f.* [from κλυζω, to cleanse.] An enema, or liquid injected into the anus to cleanse the bowels. It also means the instrument used in such injection. See ENEMA.

CLYTEMNES'TRA, in fabulous history, a daughter of Tyndarus, king of Sparta, by Leda. She was born, together with her brother Castor, from one of the eggs which her mother brought forth after her amour with Jupiter, under the form of a swan. Clytemnestra married Agamemnon king of Argos. She had before married Tantalus, son of Thyestes, according to some authors. When Agamemnon went to the Trojan war, he left his cousin Ægysthus to take care of his wife, of his family, and all his domestic affairs. Besides this, a certain favourite musician was appointed by Agamemnon to watch over the conduct of the guardian, as well as that of Clytemnestra. In the absence of Agamemnon, Ægysthus made his court to Clytemnestra, and publicly lived with her. Her infidelity reached the ears of Agamemnon, before the walls of Troy, and he resolved to take full revenge upon the adulterers at his return. He was prevented from putting his schemes into execution; Clytemnestra, with her adulterer, murdered him at his arrival, as he came out of the bath; or, according to other accounts, as he sat down at a feast prepared to celebrate his happy return. Cassandra, whom Agamemnon had brought from Troy, shared his fate; and Orestes would also have been deprived of life, like his father, had not his sister Electra removed him from the reach of Clytemnestra. After this murder, Clytemnestra publicly married Ægysthus, and he ascended the throne of Argos. Orestes, after an absence of seven years, returned to Mycenæ, and resolved to avenge his father's murder. He concealed himself in the house of his sister Electra, who had been married by the adulterers to a person of mean extraction and circumstances. His death was publicly announced; and, when Ægysthus and Clytemnestra repaired to the temple of Apollo, to return thanks to the god for the death of the surviving son of Agamemnon, Orestes, with his faithful friend Pylades, hid himself in the temple, rushed upon the adulterers, and killed them with his own hand. They were buried without the walls of the city, as their bones were not worthy to be laid in the sepulchre of Agamemnon.

CLY'THENESS, a cape of Scotland, in the German Ocean, on the south-east coast of the county of Caithness. Lat. 58. 14. N. lon. 0. 10. E. Greenwich.

CNEO'RUM, *f.* [*Cneorum* of Pliny, Hippocrates, and Theophrastus: derivation unknown.] In botany, a genus of the class triandria, order monogynia, natural order of tricoccæ. The generic characters are—Calyx: perianthium very small, three-toothed, permanent. Corolla: petals three, oblong, lanceolate-linear, concave, erect, equal, deciduous. Stamina: filaments three, subulate, shorter than the corolla; antheræ small. Pistillum: germ obtuse, triangular; style erect, firm, length of the stamens; stigma trifid, spreading. Pericarpium: berry dry globose three-lobed, three-celled. Seed: solitary, round, in a two-celled shell.—*Essential Character*. Calyx: three-toothed; petals, three, equal; berry, tricoccous.

There is but one species known: it is called cneorum tricoccum, widow-wail, or spunge-olive; an humble shrub, which seldom rises more than two feet and a half high in this country, but spreads out on every side with many lateral branches, so as to form a thick bush; the stems ligenous, and

and almost as hard as those of the box-tree, and the wood is of a pale yellow colour under the bark; the branches are garnished with thick stiff leaves, of an oblong oval shape, about an inch and a half long, and a quarter of an inch broad, of a dark green colour, having a strong vein or rib through the middle; the flowers are produced single from the wings of the leaves, towards the extremity of the branches; they are of a pale yellow colour. After the flowers are fallen, the germ becomes a fruit, composed of three seeds joined together after the same manner as those of euphorbia or spurge; these are first green, afterwards turn of a brown colour, and, when ripe, are black. The fruit is thus described by the accurate Gærtner: It consists of three small berried drupes, gibbous on one side, and angular on the other, joined at a common axis, dark brown, when ripe; flesh thin, herbaceous; shell bony, thick, subglobular, wrinkled, with a groove and umbilical hole on the belly, two-celled, valveless; one of the cells, placed behind the other, both at the seat of the radical, divided by a thin partition, so that the upper part of the shell appears to be four-celled; in each cell there is a single, small, ovate seed, doubled together like a worm, white, with a brown caruncle at the insertion of the navel. The flowers begin to appear in May, and are succeeded by others during the summer months; and, when the autumn proves favourable, these shrubs will continue in flower till the end of October. As this is a low evergreen shrub, it may be very ornamental, if placed in the front of plantations or evergreen trees and shrubs; for as the branches grow pretty compact, and are well garnished with leaves, it will hide the ground between the taller shrubs better than most other plants; and, being durable, will not want to be removed. Native of the south of France, Italy, and Spain; in hot, dry, barren, and rocky, soils; cultivated in 1596 by Gerarde.

This was formerly preserved in green-houses, and thought too tender to live in the open air in England; but it has now long been planted in the full ground, where it resists the cold of our ordinary winters very well, and is seldom injured but by extreme hard frosts; nor do these kill the plants which grow upon dry, rocky, or rubbishing soils, where their shoots are generally short and firm; but in the moist rich ground, where the shoots are more luxuriant, they are sometimes injured. It is propagated by seeds, which should be sown in autumn, soon after they are ripe, and then the plants will come up the following spring; whereas those which are not sown till the spring will remain a year in the ground, and often miscarry; these seeds may be sown in a bed of common earth, covering them half an inch deep, and will require no other care but to keep the plants clear from weeds the following summer; and in the autumn following the plants may be transplanted where they are to remain. See CONVOLVULUS and DAPHNE.

CNE'SIS, *s.* [from κνάω, to scratch.] A painful itching of any part.

CNI'CUS, *s.* [from κνίω, to cut, prick, or scratch; hence κνῖκος, a prickly plant.] In botany, a genus of the class syngenesia, order polygamia æqualis, natural order of compositæ capitatæ. The generic characters are—Calyx: compound ovate, guarded with bractes, imbricate; scales ovate, close, branched thorny. Corolla: compound tubular, uniform; corollets hermaphrodite, equal; proper funnel-form oblong: border, five-cleft, erect, nearly equal. Stamina: filaments five, capillary, very short; anthers cylindric, tubular. Pistillum: germ short; style filiform, length of the stamens; stigma oblong, emarginate. Perianthium: none; calyx closed. Seed: solitary; down, plumose. Receptaculum: flat, villose.—*Essential Character.* Calyx: ovate, imbricate with branch-thorny scales, guarded with bractes; corollets equal.

Description. Some of the species approach to carduus, others to serratula, and one to carthamus; hence Lamarck has suppressed this genus, inserting some of the species among the cardui, and others among the carthami; from which Linneus separates the cnicus principally because the scales of the calyx are ovate and branch-spiny; whereas in carthamus they are narrowed at the base, and have a leafy, ovate, spreading appendicle at the tip.

1. Cnicus oleraceus, or pale-flowered cnicus: leaves pinnatifid, keeled, naked; bractes concave, entire, somewhat coloured. In the woods of Swisserland, near brooks it grows to the height of six feet, with the leaves more thorny, and the branches, in the mature state of the plant, more elongated and leafless: flowers pale yellow. Native of most countries of Europe, except the most southern; flowering in July and the autumnal months, in moist woods, meadows, and marshes. The Russians boil the leaves in the spring, and eat them as coleworts. No cattle touch it for food, according to Schreber. Cultivated in 1570 by Mr. Hugh Morgan. Mr. Miller's description of cnicus erisithales seems to belong to this species.

2. Cnicus erisithales, or clammy cnicus: leaves stem-clasping, pinnatifid, awn-serrated; peduncles drooping; calyxes glutinous. Stem three feet high and more, angular, sometimes a little tomentose, not branched, unless at the top, naked far under the flowers; flowers three or four, frequently two opposite, sessile, never guarded with leaves, seldom solitary, nodding in a state of maturity; florets purple, yellow, or white, with purple stamens and pistil; seed two lines long, ancipital, with the angles obtuse, crowned with a ring, whence arise feathered rays, as far as forty. The gestation of this species lasts a month. Native of France, Swisserland, Austria, Carniola, and Silesia; begins to flower in June. Introduced in 1787 by M. Vare; perennial.

3. Cnicus ferox, or prickly cnicus: leaves decurrent, lingulate, tooth-thorny; stem branching, erect. This species resembles carduus eriophorus; stem firm, deeply grooved, covered with a cobwebbing pubescence. A large head of white or purple floscules terminates the branches, and is guarded with linear strigose bractes having small spines about the edge. Native of the south of France and Piedmont; flowers in July and August. Introduced in 1775 by M. Thouin; biennial.

4. Cnicus pygmæus, or pigmy cnicus: leaves sessile, sublinear, very much crowded; calyx unarmed. Root perennial, black; stem upright, hollow, from two to five inches high, thickened at the top, very closely covered with white hairs; leaves many, both on the root and on the stem, sharp, three inches long, some quite entire, others toothletted, unarmed, the sides rolled back, grooved on the upper surface where the midrib projects on the under, hairy, especially beneath and near the stem, deep green above, pale green underneath; it flowers in July and August. Native of the mountains of Austria. Found also on Mount Grindoviz, in 1761, by Scopoli, who refers it to the genus cirsium, and Jacquin to that of serratula.

5. Cnicus acarna, or yellow cnicus: leaves decurrent, lanceolate, undivided; calyxes pinnate-thorny. Stem herbaceous, winged by the leaves running down it, hoary, a foot high, but sometimes much smaller; leaves sessile, scattered, extremely acute, hoary, keeled, having a few teeth about the edge, with two or three yellow spines in each; seeds ovate, sharp at the base, somewhat compressed, shining, yellowish white, crowned with a feathered egret, half an inch long, spreading out into a ball. Native of the south of France and of Spain; and was cultivated in 1683 by Mr. James Sutherland.

6. Cnicus spinosissimus, or thorny cnicus: leaves stem-clasping, sinuate-pinnate, thorny; head simple; flowers sessile. Stem unbranched, twelve to eighteen inches high; the top entirely covered with leaves, angular, not winged; stem-leaves most fiercely thorned; pinnas angular, many-lobed, the nerves continued into strong thorns; the leaves on the top of the stem form a nest for the flower, broader, ovate-lanceolate, pinnate, whitish yellow, pubescent; calyx connate, with lanceolate scales, ending in a stout spine; floscules pale yellow. The stem of our plant is twice as long as in Haller's figure, grooved, villose; leaves subdecurrent,

subdecurrent, villose above, beneath having thick hairy nerves; flowering heads as far as eighteen; calycine scales smooth, erect. Haller affirms, that Gmelin's plant is not the same with his. Native of Swisserland, Austria, and Carniola; perennial; in gardens it rises to the height of four feet.

7. Cnicus centauroides, or artichoke-leaved cnicus: leaves pinnatifid; calyxes scariose; scales acuminate. Leaves large, long, winged, the colour and form of artichoke leaves, hoary underneath; stem three feet high, angular, putting forth few branches, and having at the top heads the size of a small artichoke, and of a tawny colour; corollas purple. Native of the Pyrenees. It flowers in July and August; and was cultivated here in 1640.

8. Cnicus uniflorus, or single-flower cnicus: leaves pinnatifid; calyx scariose, villose. Stem two feet high, erect, subangular, the thickness of the little finger, scarcely lanuginose, one-flowered; flower one, terminating, sessile; corolla large, violet; stamens and style longer than the corolla, the former white, the latter violet. Native of Siberia; perennial.

9. Cnicus cernuus, or Siberian cnicus: leaves cordate; petioles curled, thorny, stem-clasping; flowers drooping; calyxes scariose. Root perennial, large, and rough, sending out many thick, black, fibres, which strike deep in the ground. The leaves which rise immediately from the root are near a foot long, and six inches broad in the middle, diminishing gradually toward the point, but at the base swelling out almost heart-shaped; their petioles are bordered, and the borders are cut and curled, embrace the stalks half round, and end in spines; they are of a deep green on their upper side, but white on their under, and sharply serrate on their edges. The stalks rise six or seven feet high, sending out a few small branches; they are striated, of a brown colour, and at bottom have heart-shaped leaves, half-stem-clasping; the leaves toward the top of the stalk are long and narrow, ending in acute points. Each branch is terminated by one large head of flowers; florets pale yellow, with an agreeable scent. It flowers the second year from seed in July, and the seeds ripen in the autumn, when the plant decays. Native of Siberia, whence the seeds were sent to the imperial garden at Petersburgh, and were communicated to Mr. Miller, who cultivated them at Chelsea in 1758. The inhabitants of Siberia eat the tender stalks, boiled.

Propagation and Culture. These are perennial plants, which may be propagated by parting the roots; the best time for doing this is in autumn, that the plants may get good root in winter; for those which are transplanted in the spring do not flower well the first year, unless they are planted in a moist soil. As these plants grow very large, they are not proper furniture for small gardens, where they will take up too much room; for they should not be planted nearer than four feet from each other, because, if too near any other plants, they will rob them of their nourishment; for the roots of these extend to a great distance, so that two or three for variety, are sufficient for any garden, and may be planted at a distance from choicer plants. They are also propagated by seeds, which may be sown in the spring on a bed of common ground, and will only require to be thinned and kept clean from weeds till autumn, when they may be transplanted where they are designed to remain. See ATRACTYLIS, CARLINA, CARTHAMUS, and CENTAUREA.

CNI'DUS, in ancient geography, a town of Caria, situated on a horn or promontory of a peninsula. It had in front a double port, and an island lying before it in form of a theatre, which being joined to the continent by moles or causeways, made Cnidus a *dipolis* or double town, because a great number of Cnidians inhabited the island. Pausanias mentions a bridge which joined the island to the continent; *Cnidii*, the people; *Cnidius*, the epithet; *Cnidia Venus*, a principal divinity of the Cnidians. *Horace.*—Her statue was executed by Praxiteles; and so exquisitely stone, and so much admired, that people came from all parts to view it. *Pliny.*—Of this place was Eudoxus, the famous astronomer and geometrician, who had here an observatory. *Strabo.*

CNIS'SA, *s.* [from κνίζω, to scrape off.] That kind of smell which proceeds from the scraping and cleansing any filthy or stinking place.

CNO'PITZ, a river of Carinthia, which runs into the Drave, about six miles south-west of Saxenburg.

CNOS'SUS, or CNOSUS, anciently called *Carator*, from a cognominal river running by it; a city of Crete, twenty-three miles to the east of Gortina. Here stood the sepulchre of Jupiter, the famous labyrinth, and the palace of Minos, a very ancient king; here happened the adventure of Ariadne, his daughter, with Theseus, called *Gnosis. Ovid.*—Its port-town was Heracleum, on the east side of the island.

CNO'THONDORF, a town of Hungary: eighteen miles west of Tokay.

CO'A, a river of Portugal, which runs into the Duero; twelve miles south of St. Joanno de Pesqueira.

CO'A, *s.* in botany. See HIPPOCRATEA.

To COACERVA'TE, *v. a.* [*coacervo*, Lat.] To heap up together.—The collocation of the spirits in bodies, whether the spirits be *coacervate* or diffused. *Bacon.*

COACERVA'TION, *s.* The act of heaping, or state of being heaped, together.—The fixing of it is the equal spreading of the tangible parts, and the close *coacervation* of them. *Bacon.*

COACH, *s.* [*coche*, Fr. *koteczy*, among the Hungarians, by whom this vehicle is said to have been invented. *Minshew.*] A carriage of pleasure, or state, now distinguished from a chariot by having seats fronting each other. Professor Beckman has taken great pains to investigate the origin of coaches. If, says he, we are to understand by this name every kind of covered carriage, in which one can with convenience travel, there is no doubt that some of them were known to the ancients. The *arcera*, of which mention is made in the twelve tables, was a covered carriage used by sick and infirm persons. It appears to have been employed earlier than the soft *lectica*, and by it to have been brought into disuse. A later invention is the *carpentum*, the form of which may be seen on antique coins, where it is represented as a two-wheeled car, with an arched covering, and which was sometimes hung with costly cloth. Still later were introduced the *carrucæ*, first mentioned by Pliny; but so little is known of them that antiquaries are uncertain whether they had only one wheel, like our wheel-barrows, or, as is more probable, four wheels. This much, however, is known, that they were first-rate vehicles, ornamented with gold and precious stones, and that the Romans considered it as an honour to ride in those that were remarkably high. In the Theodosian code the use of them is not only allowed to civil and military officers of the first rank, but commanded as a mark of their dignity. After this, covered carriages seem more and more to have become appendages of Roman pomp and magnificence; but the manner of thinking which prevailed under the feudal system, banished the use of them for some time. As it was of the greatest importance to the feudal lords that their vassals should be always able to serve them on horseback, they could not think of indulging them with elegant carriages. They foresaw, that by such luxury the nobility would give over riding on horseback, and become much more indolent, and less fit for military service. Masters and servants, husbands and wives, clergy and laity, all rode upon horses or mules, and sometimes women and monks more commodiously upon she-asses. The minister rode to court; and the horse, without any conductor, returned alone to his stable, till a servant led him back to court to fetch his master home. In this manner rode the magistrates of the imperial cities to council, in the beginning of the sixteenth century: so that, in 1502, steps to assist in mounting were erected by the Roman gate at Frankfort. The members of the council, who, at the diet, and on other occasions, were

were employed as ambassadors, were, on this account, called *rittmeister*; and even at present the expression riding servant is preserved in some of the imperial cities. The public entry of great lords into any place, or their departure from it, was never in a carriage, but on horseback; and, in all the works which speak of the papal ceremonies, there is no mention of a state-coach, or body-coachman, but of state-horses, or state-mules. It was necessary that a horse for his holiness should be of a grey colour; not mettlesome, however, but a quiet tractable nag; that a stool with three steps should be brought to assist him to mount, and the emperor and kings, if present, were obliged to hold his stirrup, and to lead the horse, &c. Bishops made their public entrance on horses or asses richly decorated. At the coronation of the emperor, the electors and principal officers of the empire were ordered to make their entrance on horses, and to perform their service on horseback. Formerly it was necessary that those who received an investiture should make their appearance on horseback: the vassal was obliged to ride with two attendants to the lord's court, where having dismounted from his horse, he received his fief.

Covered carriages were known in the beginning of the sixteenth century; but they were used only by women of the first rank, for the men thought it disgraceful to ride in them. At that period, when the electors and princes did not chuse to be present at the meetings of the states, they excused themselves by informing the emperor that their health would not permit them to ride on horseback; and it was considered as a point established, that it was unbecoming for them to ride like women. What, according to the then prevailing ideas, was not allowed to princes, was much less permitted to their servants. In the year 1544, when count Wolf of Barby, was summoned by John Frederic elector of Saxony to go to Spires to attend the convention of the states assembled there, he requested leave, on account of his ill state of health, to make use of a close carriage with four horses. When the counts and nobility were invited to the marriage solemnity of the elector's half-brother, duke John Ernest, the invitation was accompanied with a memorandum, that what dresses of ceremony they might be desirous of taking with them they should transport in a small waggon. Had they been expected in coaches, such a memorandum would have been superfluous. The use of covered carriages was, for a long time, forbidden even to women. In 1545, the wife of a certain duke obtained from him, with great difficulty, permission to use a covered carriage in a journey to the baths, in which, however, much pomp was displayed; but with this express stipulation, that her attendants should not have the same indulgence. It is nevertheless certain, that the emperor, kings, and princes, about the end of the fifteenth century, began to employ covered carriages on journeys, and afterwards on public solemnities.

In the year 1474, the emperor Frederic III. entered Frankfort in a close carriage: and, as he remained in it on account of the wetness of the weather, the inhabitants had no occasion to support the canopy which was held over him, but while he went to the council-house, and again returned. In the year following, the emperor visited the same city in a very magnificent covered carriage. In the description of the splendid tournament held by Joachim elector of Brandenburg, at Ruppin, in 1509, we read of a carriage gilt all over, which belonged to the electress; of twelve other coaches, ornamented with crimson; and of another of the duchess of Mecklenburg, which was hung with red sattin. At the coronation of the emperor Maximilian, in 1562, the elector of Cologne had twelve carriages. In 1594, when the margrave John Sigismund did homage at Warsaw on account of Prussia, he had in his train thirty-six coaches with six horses each. Count Kevenhiller, speaking of the marriage of the emperor Ferdinand II. with a princess of Bavaria, says, "The bride rode with her sisters in a splendid carriage studded with gold; her maids of honour in carriages hung with black sattin, and the rest of the ladies in neat leather carriages." The same author mentions the entrance of cardinal Dietrichstein into Vienna, in 1611, and tells us that forty carriages went to meet him. At the election of the emperor Matthias, the ambassador of Brandenburg had three coaches. When the consort of that emperor made her public entrance, on her marriage, in 1611, she rode in a carriage covered with perfumed leather. Mary, infanta of Spain, spouse of the succeeding emperor, Ferdinand III. rode, in Carinthia, in 1631, in a glass-carriage in which no more than two persons could fit. The wedding carriage of the first wife of the emperor Leopold, who was also a Spanish princess, cost together with the harness 38,000 florins. The coaches used by that emperor are thus described by Kink: "In the imperial coaches no great magnificence was to be seen: they were covered over with red cloth and black nails. The harness was black, and in the whole work there was no gold. The pannels were of glass, and on this account they were called the imperial glass coaches. On festivals the harness was ornamented with red silk fringes. The imperial coaches were distinguished only by their having leather traces; but the ladies in the imperial suite were obliged to be contented with carriages the traces of which were made of ropes." At the magnificent court of duke Ernest Augustus at Hanover, there were, in 1681, fifty gilt coaches with six horses each; so nearly did Hanover begin to surpass other cities in the number of its carriages. The first time that ambassadors appeared in coaches, on a public solemnity, was at the imperial commission holden at Erfurth, in 1613, respecting the affair of Juliers.

The great lords imagined at first that they could suppress the use of coaches by prohibitions. In the Churmark archives there is still preserved an edict, in which the feudal nobility and vassals are forbid the use of coaches, under pain of incurring the punishment of felony. In 1588, duke Julius of Brunswick published an order, couched in very expressive terms, by which his vassals were forbid to ride in carriages. Philip II. duke of Pomerania-Stetten, reminded his vassals also, in 1608, that they ought not to make so much use of carriages as of horses. All these orders and admonitions, however, were of no avail, and coaches became common all over Germany. In France we find that in the fourteenth, fifteenth, and even sixteenth, centuries, the French monarchs rode commonly on horses, the servants of the court on mules, and the princesses, together with the principal ladies, sometimes on asses. Persons of the first rank often sat behind their equerry, and the horse was often led by servants. When Charles VI. wished to see *incognito* the entrance of the queen, he placed himself on horseback behind Savoisy, who was his confidant, with whom, however, he was much incommoded in the crowd. When Louis duke of Orleans, that prince's brother, was assassinated in 1407, the two *ecuyers* who accompanied him rode both upon the same horse. In 1534, queen Elenora and the princesses rode on white horses during a sacred festival. That private persons also, such as physicians, &c. used no carriages in the fifteenth century, is proved by the principal entrance to their public school, which was built in 1472, being so narrow that a carriage could not pass through it, though it was then one of the widest at that period. In Paris also, at all the palaces and public buildings, there were steps for mounting on horseback, such as those which the parliament caused to be erected in 1599; and Sauval says on this occasion, that, though many of these steps in latter periods had been taken away, there still remained several of them in his time at old buildings.

Carriages, however, appear to have been used very early in France. An ordinance of Philip the Fair, issued in 1294, for suppressing luxury, and in which the citizens' wives are forbid to use carriages, is still preserved. Under Francis I. or rather about 1550, somewhat later, there were at Paris, for the first time, only three coaches, one of

of which belonged to the queen, another to Diana de Poictiers, the mistress of two kings, Francis I. and Henry II. by the latter of whom she was created duchess of Valentinois, and the third to René de Laval lord of Boisdauphin. The last was a corpulent unwieldy nobleman, who was not able to ride on horseback. Others say, that the three first coaches belonged to Catharine de Medicis; Diana duchess of Angoulême, the natural daughter of Henry II. who died in 1619 in the eightieth year of her age; and Christopher de Thou, first president of the parliament. The last was excused by the gout; but the rest of the ministers of state soon followed his example. Henry IV. was assassinated in a coach; but he usually rode through the streets of Paris on horseback, and, to provide against rain, carried a large cloak behind him. For himself and his queen he had only one coach; as appears by a letter still preserved, in which he writes to a friend, "I cannot wait upon you to-day, because my wife is using my coach." We however, find two coaches at the public solemnity on the arrival of the Spanish ambassador, Don Peter de Toledo, under Henry IV. This contradiction is a circumstance which is not worth farther research; but it shews that all writers do not speak of the same kind of carriages or coaches, and that every improvement has formed as it were an epoch in the history of them. These coaches were not suspended by straps, but they had a canopy supported by ornamented pillars, and the whole body was surrounded by curtains of stuff or leather, which could be drawn up. The coach in which Louis XIV. made his public entrance, about the middle of the seventeenth century, appears to have been a suspended carriage, hung on straps.

The oldest carriages used by the ladies in England were known under the now-forgotten name of *whirlicotes*. When Richard II. towards the end of the fourteenth century, was obliged to fly before his rebellious subjects, he and all his followers were on horseback; his mother only, who was indisposed, rode in a carriage. This however became afterwards somewhat unfashionable, when the monarch's queen, Anne the daughter of the emperor Charles IV. shewed the English ladies how gracefully and conveniently she could ride on a side-saddle. Whirlicotes were laid aside, therefore, except at coronations and other public solemnities. Coaches were first known in England about 1580; and, as Stowe says, were introduced from Germany by Fitz-allen earl of Arundel. In 1598, when the English ambassador went to Scotland, he had a coach with him. Anderson places the period when coaches began to be in common use about the year 1605. The celebrated duke of Buckingham, the unworthy favourite of two kings, was the first person who rode with a coach and six horses, in 1619: to ridicule this new pomp, the earl of Northumberland put eight horses to his carriage. Towards the end of the thirteenth century, when Charles of Anjou made his entrance into Naples, the queen rode in a carriage called by historians *caretta*, the outside and inside of which were covered with sky-blue velvet, interspersed with golden lilies, a magnificence never before seen by the Neapolitans. At the entrance of Frederic II. into Padua, in 1239, it appears there were no carriages, for the most elegantly dressed ladies that came to meet him were on palfreys ornamented with trappings. It is well known that the luxury of carriages spread from Naples all over Italy. Coaches were seen for the first time in Spain in 1546; at least such is the account of Twiss, who, according to his usual custom, says so without giving his authority.

Towards the end of the sixteenth century, John of Finland, on his return from England, among other articles of luxury, carried with him to Sweden the first coach that ever had been seen there: before that period, the greatest lords in Sweden, when they travelled by land, carried their wives with them on horseback; the princesses even travelled in that manner, and when it rained took with them a mantle of waxed cloth. It appears that there were elegant coaches in the capital of Russia so early as the beginning of the seventeenth century.

But to what nation are we to ascribe the invention of coaches? if under this name we comprehend covered carriages, these are so old as not to admit of any dispute respecting the question. To the following, however, one might expect an answer: who first fell on the idea of suspending the body of the carriage on elastic springs, by which the whole machine has undoubtedly been much improved? but to this question we can find no answer, except the information before mentioned, that suspended carriages were known in the time of Louis XIV. As the name coach is now adopted, with a little variation, in all the European languages, some have thought to determine the country of this invention from the etymology of the word. It is difficult, however, to determine positively whence it is derived, as we do not know by whom these close carriages were invented. Menage makes it Latin, by a far-fetched derivation from *vehiculum*; Junius derives it somewhat shorter from ὀχέω, to carry. Wachter thinks it comes from the German word *kutten*, to cover; and Lye, from the Belgic *koetsen*, to lie along, as it properly signifies a couch or chair. But, even allowing that one could fix the origin of the word, it would by no means be ascertained what kind of a carriage we ought properly to understand by it. Mr. Cornides has lately endeavoured to prove, that the word *coach* is of Hungarian extraction, and that it had its rise from a village in the province of Wieselburg, which at present is called *Kitsee*, but was known formerly by the name of *Kotsee*, and that this travelling machine was there first invented. However this be, the grounds on which he supports his assertion deserve notice, as they seem at least to prove that in the sixteenth century, or even earlier, a kind of covered carriages were known under the name of Hungarian carriages. As the word *gutschi*, and not *gutsche*, was used at first in Germany, the last syllable gives us reason to conjecture, that it is rather of Hungarian than German extraction. As Hortleder tells us that Charles V. because he had the gout, laid himself to sleep in an Hungarian *gutsche*, one might almost conclude, that the peculiarity of these carriages consisted in their being so constructed as to admit people to sleep in them. This conjecture is supported by the meaning of the word *gutsche*, which formerly signified a couch or sofa. As the writers quoted by Mr. Cornides call the Hungarian coaches sometimes *leves*, light, sometimes *veloces*, swift, one ought rather to consider them as a particular kind of carriages for travelling with expedition. It is, however, still more worthy of remark, that, so early as the year 1457, the ambassador of Ladislaus V. king of Hungary and Bohemia, brought with him to the queen of France, besides other presents, a carriage which excited great wonder at Paris, and which, as an old historian says, was *branlant et moult riche*. Does not the first word of this expression seem to indicate that the carriage was suspended?

A peculiar kind of coach has been introduced in latter times under the name of *berlin*. The name indicates the place which gave birth to the invention, as the French themselves acknowledge; though some, with very little probability, wish to derive it from the Italian. Philip de Chiese, a native of Piedmont, and descended from the Italian family of Chiesa, was a colonel and quarter-master-general in the service of Frederic William, elector of Brandenburg, by whom he was much esteemed on account of his knowledge in architecture. Being once sent to France on his master's business, he caused to be built, on purpose for this journey, a carriage capable of containing two persons; which in France, and every where else, was much approved, and called a berline. This Philip de Chiese died at Berlin in 1673. This gave rise to the coaches let out for hire, known under the name of *fiacres*, or hackney-coaches. This began in France; for, about the year 1650, one Nicholas Sauvage first thought of keeping horses and carriages ready to be let out to those

those who might have occasion for them. The Parisians approved of and patronized his plan; and, as Sauvage lived in the street St. Martin, in a house called the *Hôtel S. Fiacre*, the coaches, coachmen, and proprietor, were called *fiacres*. In a little time this undertaking was improved by others, who obtained a license for their new institutions on paying a certain sum of money. Some kept coaches ready in certain places of the streets, and let them out as long as was required, to go from one part of the city to another. These alone, at length, retained the name of fiacre, which at first was common to every kind of hired carriage without distinction. Others kept carriages at their houses, which they let out for a half or whole day, a week, or month; these coaches were known by the name of *carosses de remise*. Others kept carriages which at a certain stated time went from one quarter of the city to another, like a kind of stages, and took up such passengers as presented themselves; and, in 1662, some persons set up carriages with four horses, for the purpose of carrying people to the different palaces at which the court might be. The proprietors often quarrelled respecting the boundaries prescribed to them by their licenses; and, on this account, they were sometimes united into one company, and sometimes separated. The police established useful regulations, by which the safety and cleanliness of these carriages were promoted; marks were affixed to them by which they might be known; and young persons and women of the town were forbidden to use them.

Coaches to be let for hire were first established at London in 1625. At that time there were only twenty, which did not stand in the streets, but at the principal inns. Ten years after, however, they were become so numerous, that Charles I. found it necessary to issue an order for limiting their number. In 1637, there were in London and Westminster fifty hackney-coaches, for each of which no more than twelve horses were to be kept. In 1652, their number had increased to two hundred; in 1654, there were three hundred, for which six hundred horses were employed; in 1694, they were limited to seven hundred; and in 1715 to eight hundred. Hackney-coaches were first established at Edinburgh in 1673. Their number was twenty; but, as the situation of the city was unfavourable for carriages, it fell in 1752 to fourteen, and in 1778 to nine, and the number of sedans increased. Fiacres were introduced at Warsaw for the first time in 1778. In Copenhagen there are an hundred hackney-coaches. In Madrid there are from four to five thousand gentlemen's carriages; in Vienna three thousand, and two hundred hackney-coaches. At Amsterdam coaches with wheels were in the year 1663 forbidden, in order to save the expensive pavement of the streets; for coaches there, even in summer, are placed upon sledges, as those at Petersburgh are in winter. The tax upon carriages in Holland has from time to time been raised, yet the number has increased; and some few years ago the coach-horses in the Seven United Provinces amounted to twenty-five thousand. When prince Repnin made his entrance into Constantinople in 1775, he had in his retinue no less than eighty coaches.

For the regulation of hackney-coaches in London, the following laws have been put in force, viz. 9 An. c. 23. made perpetual by 3 Geo. I. c. 7. and enlarged as to the number of coaches, by 11 Geo. III. c. 24. so as to make the whole number, to be licensed, one thousand; and enlarged also as to chairs, by 10 An. c. 19, and 12 Geo. I. c. 12. making the whole number of those four hundred. The other statutes now in force are, 12 An. c. 14. 1 Geo. I. c. 57. 30 Geo. II. c. 22. 4 Geo. III. c. 36. 7 Geo. III. c. 44. 10 Geo. III. c. 44. 11 Geo. III. c. 24. and 28. 12 Geo. III. c. 49. 24 Geo. III. c. 27. 26 Geo. III. c. 72. 32 Geo. III. c. 47. The following is a general abstract of the united effect of these several acts: Five commissioners are appointed to license and regulate them: and the proprietor of each coach pays ten shillings per week every month. Each coach is to be numbered on both sides, not to be altered, on penalty of five pounds. A like penalty on driving or letting to hire a coach without license: mourning coaches and hearses are within the acts. The horses must be fourteen hands high. Coachmen compellable to go in the day ten miles, but after dark two miles and a half on turnpike roads. To have check-strings, on penalty of five shillings. The rates are as follow July 1801.

By way,	For one mile, or less	1s. od.
	From that to a mile and a half	1 6

And then 6d. for each additional half-mile entered upon.

By time,	Forty minutes, or less	1s. od.
	Between that and an hour	1 6
	One hour and twenty minutes	2 0

And then sixpence for each additional twenty minutes entered upon. For a day of twelve hours eighteen shillings, and sixpence for each twenty minutes over. A coachman refusing to go, or exacting more than his fare, to forfeit from ten shillings to three pounds; and, by misbehaviour or impudence, incurs the same penalty, and his licence may be revoked, or he committed to the house of correction. Persons refusing to pay the fare, or defacing the coach, may be compelled by a justice to make satisfaction. There are several usual stands, but a coach may stand in any street thirty feet wide at the road, except St. James's-street and Pall-mall. The penalties are recoverable before the aldermen of the city, and justices of peace, as well as before the commissioners.

Stage-coaches are under the regulation of 28 Geo. III. c. 57. 30 Geo. III. c. 36. and 37 Geo. III. c. 16. Drivers of stage-coaches are not to admit more than one outside passenger on the box, and four on the roof of the coach, on penalty of five shillings for each passenger, at every turnpike gate. Some other wholesome regulations are also made by these acts, but which, like other good laws, are seldom enforced.

By 38 Geo. III. c. 41. there shall be paid for every four-wheeled coach, landau, &c. kept for private use, or to let to hire, (except hackney-coaches,) a tax of 9l. 12s. per annum; for two such carriages, 10l. 4s. each; for three, 11l. 4s. for four, 11l. 8s. for five, 11l. 11s. for six, 11l. 12s. for seven, 11l. 13s. for eight, 11l. 14s. and, for every such carriage let out for hire by licensed postmasters or innkeepers, whose name and place of abode are to be painted thereon, the duty is eight guineas; and, for every two or three-wheeled carriage, four guineas per annum.

To COACH, *v. a.* To carry in a coach:

The needy poet sticks to all he meets,
Coach'd, carted, trod upon; now loose, now fast,
And carry'd off in some dog's tail at last. *Pope.*

COACH-BOX, *s.* The seat on which the driver of the coach sits.

COACH-HIRE, *s.* Money paid for the use of a hired coach:

You exclaim as loud as those that praise,
For scraps and *coach-hire*, a young noble's plays. *Dryden.*

COACH-HOUSE, *s.* The house in which the coach is kept from the weather.—Let him lie in the stable or the *coach-house*. *Swift.*

COACH-MAKER, *s.* The artificer whose trade is to make coaches:

Her chariot is an empty hazel-nut,
Made by the joiner Squirrel, or old Grub,
Time out of mind the fairies *coachmakers*. *Shakespeare.*

The wares of coachmakers shall be searched by persons appointed by the sadlers' company. 1 *Jac.* I. c. 22. By 25 Geo. III. c. 49. 27 Geo. III. c. 13. every maker of coaches, chariots, chaises, &c. must take out annual licenses from the excise office, and to pay a duty of twenty shillings for every four-wheeled carriage, and ten shillings for every two-wheeled carriage, built by them for sale.

The Coachmaker's Company are but of late incorporation. They have for their armorial ensigns, *azure*, a chevron

chevron between three coaches *or*. The crest is Phœbus drawn in a chariot all of the second, and the supporters two horses *argent*, armed *or*. Their motto, *Post nubila Phœbus*; After clouds sun-shine. Their hall is in Noble-street.

COACH'MAN, *s.* The driver of a coach:

Thy nags, the leanest things alive,
So very hard thou lov'st to drive;
I heard thy anxious *coachman* say,
It cost thee more in whips than hay. *Prior.*

To COA'CT, *v. n.* To act together; to act in concert. *Not used.*

But if I tell how these two did *coact*,
Shall I not lye in publishing a truth? *Shakespeare.*

COAC'TION, *s.* [*coactus*, Lat.] Compulsion; force, either restraining or impelling.—It had the passions in perfect subjection; and though its command over them was persuasive and political, yet it had the force of *coaction*, and despotical. *South.*

COAC'TIVE, *adj.* Having the force of restraining or impelling; compulsory; restrictive.—The Levitical priests, in the old law, never arrogated unto themselves any temporal or *coactive* power. *Raleigh.*—Acting in concurrence. *Obsolete.*

Imagination,
With what's unreal thou *coactive* art. *Shakespeare.*

COADJU'MENT, *s.* [from *con* and *adjumentum*, Lat.] Mutual assistance.

COADJU'TANT, *s.* [from *con* and *adjuto*, Lat.] Helping; operating:

Thracius *coadjutant*, and the roar
Of fierce Euroclydon. *Philips.*

COADJU'TOR, *s.* [from *con* and *adjutor*, Lat.] A fellow-helper; an assistant; an associate; one engaged in the assistance of another:

A gownman of a different make,
Whom Pallas, once Vanessa's tutor,
Had fix'd on for her *coadjutor*. *Swift.*

In the canon law. One who is impowered or appointed to perform the duties of another, particularly of an aged infirm bishop.—A bishop that is unprofitable to his diocese ought to be deposed, and no *coajutor* assigned him. *Alyffe.*

COADJU'VANCY, *s.* from *con* and *adjuvo*, Lat.] Help; concurrent help; contribution of help; co-operation.—Crystal is a mineral body, in the difference of stones, made of a lentous percolation of earth, drawn from the most pure and limpid juice thereof; owing to the coldness of the earth some concurrence and *coadjuvancy*, but not immediate determination and efficiency. *Brown.*

COADUNA'TUS, *part. adj.* [from *coaduno*, to unite.] In botany, it means united or joined together in some expressed manner, as *coadunata folia*, leaves joined together at the base.

COADU'NITION, *s.* [from *con*, *ad*, *unitio*, Lat.] The conjunction of different substances into one mass.—Bodies seem to have an intrinsic principle of, or corruption from, the *coadunition* of particles endued with contrary qualities. *Hale.*

To COAG'MENT, *v. a.* [from *con* and *agmen*, Lat.] To congregate and heap together.—Had the world been *coagmented* from that supposed fortuitous jumble, this hypothesis had been tolerable. *Glanville.*

COAGMENTA'TION, *s.* Collection, or coacervation, into one mass; union; conjunction.—The third part rests in the well-joining, cementing, and *coagmentation* of words, when it is smooth, gentle, and sweet. *Ben Jonson.*

COA'GULABLE, *adj.* That which is capable of concretion.—Stones that are rich in vitriol, being often drenched with rain-water, the liquor will then extract a fine and transparent substance, *coagulable* into vitriol. *Boyle.*

To COA'GULATE, *v. a.* [*coagulo*, Lat.] To force into concretions; as, by the affusion of some other substance, to turn milk.—The milk in the stomach of calves, which is *coagulated* by the runnet, is again dissolved and rendered fluid by the gall in the duodenum. *Arbuthnot.*

To COA'GULATE, *v. n.* To run into concretions, or congelations.—About the third part of the oil olive, which was driven over into the receiver, did there *coagulate* into a whitish body, almost like butter. *Boyle.*

COAGULA'TION, *s.* Concretion; congelation; the act of coagulating; the state of being coagulated. The body formed by coagulation.—As the substance of *coagulations* is not merely saline, nothing dissolves them but what penetrates and relaxes at the same time. *Arbuthnot.*

COA'GULATIVE, *adj.* That which has the power of causing concretion, or coagulation.—To manifest the *coagulative* power, we have sometimes in a minute arrested the fluidity of new milk, and turned it into a curdled substance, only by dexterously mingling with it a few drops of good oil of vitriol. *Boyle.*

COAGULA'TOR, *s.* That which causes coagulation.—*Coagulators* of the humours, are those things which expel the most fluid parts, as in the case of incrassating, or thickening; and by those things which suck up some of the fluid parts, as absorbents. *Arbuthnot.*

COAL, *s.* [col, Sax. *kol*, Germ. *kole*, Dut. *kul*, Danish.] The common fossile fewel:

But age, enforc'd, falls by her own consent;
As *coals* to ashes, when the spirit's spent. *Denham.*

The cinder of scorched wood; charcoal.—Whatsoever doth so alter a body, as it returneth not again to that it was, may be called alteratio major; as when cheese is made of curds, or *coals* of wood, or bricks of earth. *Bacon.*—Fire; any thing inflamed or ignited.—You have blown this *coal* betwixt my lord and me. *Shakespeare.*

The rage of jealousy then fir'd his soul,
And his face kindled like a burning *coal*. *Dryden.*

Vegetable coals are commonly distinguished by the name of CHARCOAL, which see. The word *coal*, is with us almost exclusively applied to denote mineral or pit-coal. Of this there are many varieties. They appear to consist of petroleum, consolidated with an earth chiefly of the argillaceous kind. The legislature only distinguishes two kinds relative to the duties thereon; namely, colm and caking-coal. The former does not consolidate by a kind of fusion into larger masses, when heated, as the latter does, and cannot therefore be applied to such a variety of uses.

Pit-coal is usually found in strata in the earth, almost always in mountains of shistus or grit. It appears to be a general opinion, that this substance owes its origin to the decomposition of vegetable bodies. And, indeed, when we attend to the inflammable substances found in the earth, or in the mineral kingdom, we may perceive that very few, and most probably none of them, can be truly said to belong to it, but have been elaborated in the bodies of animals or vegetables. From the turf that is pared from the surface of the earth, and owes its inflammability to the roots of vegetables which are mixed with it, we may descend to the peat, or black earth of the moors, in many specimens of which vegetable remains are still perceptible; though in most they appear to be deprived of every appearance of their organic texture, their oily and inflammable nature only remaining; and from thence the transition to pit-coal is easy. For, if we reflect on the vast revolutions which the earth has certainly undergone through a long course of ages, by means of which its surface has been broken, displaced and inverted, from the actions of floods, earthquakes, and the great convulsions of nature occasioned by volcanic eruptions, it will be no improbable inference that the thin though extensive strata of pit-coal, as well as the exsudations of naphtha, petroleum, and their modifications, have all arisen from the burying of extensive woody

tracts of the surface, such as are common in all uncultivated countries. And this probability will be reduced to more certainty, when we advert to the natural history of pit-coal, which is met with in all the various states of transformation. Whole trees are converted into pit-coal, in such quantities together as to exhibit entire forests; in which the roots, trunks, branches, bark, and even species, are discernible. Both coal-pits and slate quarries exhibit innumerable marks of impressions of leaves, and other indications of their vegetable origin; and the analysis of this combustible substance tends still further to confirm this truth. On the other hand, if we attend to such inferences as chemical theory might point out from the facts around us, we shall see how small the probability is, that the mineral kingdom should, after a certain limited time, contain inflammable bodies, if they were not occasionally thrown into it, in consequence of the operations carried on within organized substances. For all inflammable substances, tending to decompose the oxygen or vital air of the atmosphere, would, in process of time, revert to the class of uninflammable bodies, if the operation of organized substances, particularly of the vegetable kind, did not tend to disengage the vital air again, and render bodies combustible, which were not so when they became parts of those substances. For the chemical analysis of coal, or carbon, see the article CHEMISTRY, p. 109, of this volume.

In proof of the facts stated above, we might here adduce the ingenious observations lately made by Mr. Kirwan, in appreciating the immense advantages that would accrue to Ireland, by establishing a sufficient supply of pit-coal from their own mines. To render the discovery of those more intelligible, he gives a general view of the internal construction of hills and plains, which he divides into three classes. 1. Some are formed of rude shapeless masses, without any regular fissures, but which, on attentive inspection, are found to consist of small grains of different sorts of stone concreted together, and hence called *granites*: the exact adaption of these grains to each other, and the regular crystallized shape of some of them, shew that they must have been once in a soft, or even fluid, state; their continuity, or want of regular fissures, indicate their simultaneous concretion; the superior difficulty of their solution at present, and the immense space they occupy in the globe, of which they constitute, as it were, the kernel, and the total absence of all organic remains, induce us to think that of all others they are the most ancient. 2. Other hills consist of stony masses, apparently homogeneous, at least for the greater part, but separated from each other by parallel fissures: these are mostly of an argillaceous or calcareous nature, and appear to have been formed by a gradual subsidence from water. As no organic remains are found in them, they also seem to date their origin from the formation of the globe. 3. From the decomposition of these primæval masses, their attrition against each other, the erosion of water, and various other accidents, clays, sands, marles, and the component particles of freestone, sandstone, limestone, slate, and various other species of stone, have arisen. These are placed over each other, in alternate and regular beds, parallel to each other, and being commonly mixed with marine exuviæ, or other animal or vegetable remains, the hills formed of them are evidently of a date posterior to those already mentioned. In these, and in these only, (or in plains formed of the same materials,) coal is found, and there are scarcely any of them that do not contain it. It is to hills of this sort, therefore, that we must direct our researches after coal. The thicker beds of it lie pretty deep, generally from twenty-five to forty fathoms, or more; and the surest means of discovering them is to penetrate into these hills with an earth-borer, examining the strata every two or three feet; if alternate strata of indurated clay, sand, slate, or sandstone, occur, with iron ore or mica, we may be certain that coal will be found at a greater depth. The beds nearest to the surface are generally either earthy, slaty, or sulphureous, and commonly thin and scanty; but under these, different beds of greater thickness and of a better sort are found. Coals have also been sometimes discovered by collecting the reddish or yellowish muddy water that runs down the sides of hills after heavy rains; this water is collected in a pan suffered to subside, and gently evaporated; if the sediment appears covered with a black scum, the hills may be presumed to contain coal.

Veins of coal are often mentioned by different writers; yet in reality coal is scarcely ever found in *veins*, but rather in *beds* or *in heaps*; though these beds, from a derangement caused by the occurrence of stone or matter of a different kind from that which forms the strata, are sometimes thrown into the form of a horse-shoe, with the curvature downwards, and thus assume the appearance of a vein. When a coal mine is discovered, its *direction*, that is, its extent in the same horizontal line, and its *dip* and *rise*, or *inclination*, that is, its fall beneath that line, are next to be traced; as it should always be worked at right angles with its direction, and the shaft to drain off the water should be sunk in the lowest part. To find the inclination, three holes, each reaching to the bed of coal, are bored at the distance of six hundred feet from each other, forming an equilateral triangle, and the level and depth of each are taken. The highest is the standard to which the distance downwards of the bed of coal under each hole is referred, that which is most distant in depth from the standard being the lowest. It is almost needless to add, that the boring should be skilfully conducted, in order that the holes be perfectly perpendicular. The tools or instruments used in boring are very simple. The boring rods are made of iron from three to four feet long, and about one inch and a half square, with a screw at each end, by which they are screwed together, and other rods added as the whole increases in depth. The chissel is about eighteen inches long, and two and a half broad at the end, which being screwed on at the lower end of the rods, and a piece of timber put through an eye at the upper end, they are prepared for work. The operation is performed by lifting them up a little, and letting them fall again, at the same time turning them round; by a continuance of which motions, a round hole is worn through the hardest strata. When the chissel is blunt, it is taken out, and a scooped instrument called a *wimble* put on in its stead; by which the dust or pulverized matter which was worn off the stratum in the last operation is brought up. By this substance, the borers know exactly the nature of the stratum they are boring in; and, by any alteration in the working of the rods, they perceive the least variation of the strata. The principal part of the art depends upon keeping the hole clean, and observing every variation of the strata with care and attention.

In England beds of coal of less than two feet and an half in thickness are judged not worth working; but in Germany none exceeding six inches are neglected. To convey a fuller idea of the strata of earth or stone that generally accompany coal-mines, we shall here add Mr. Kirwan's account of those that are found in the principal coal-mines of Europe.

The most considerable coal-mines in England are found in the counties of Northumberland and Durham on the east, and those of Lancashire and Cumberland on the west; they seem to extend across the kingdom, or at least to the mountains of Cumberland and Westmoreland. On the eastern coast, towards Newcastle, the land gently descends towards the sea, but is here and there intersected with deep vallies, in the declivities of which the coaly strata appear to have been first discovered. The strata in the coal-mines belonging to Newcastle-upon-Tyne, lie in the following order:

	Fathoms.	Feet.
1. Mould or clay - - - - - - - -	4	0
2. Brown ferruginous clay and mica - -	3	0

3. Whitish

	Fathoms.	Feet.
3. Whitish sandstone, intermixed with mica	4	0
4. Bituminous clay, mixed with pyrites and mica - - - - - - - - - - - -	8	0
5. Coal - - - - - - - - - - - - - -	0	0½
6. Stony clay, with sand and mica - -	4	0
7. Coal - - - - - - - - - - - - - -	0	1
8. Martial indurated clay, mixed with mica	8	0
9. Bituminous clay, like No. 4. - - - -	4	5
10. The principal bed of coal - - - - -	0	4 to 8.

The principal bed is therefore about thirty-seven fathoms deep; but other beds are found still lower.

At Whitehaven.	Fath.	Feet.
1. Clay - - - - - - - - - - - - - -	8	1½
2. Clay, mixed with sand - - - - - - -	11	5½
3. Culm and clay - - - - - - - - -	3	1¼
4. Indurated clay - - - - - - - - -	2	2½
5. Indurated clay, of a stony hardness - -	4	2
6. Coal of bad quality - - - - - - -	1	4
7. Martial clay and mica - - - - - - -	1	3¾
8. Coal - - - - - - - - - - - - - -	0	1½
9. Brown martial micaceous clay - - -	0	1⅓
10. The same, but fatter - - - - - - - -	2	4
11. Apyrous or fire-clay, called fill - -	4	4¾
12. Clay, mixed with iron ore - - - - - -	6	2
13. Culm - - - - - - - - - - - - -	0	3⅓
14. Micaceous sandstone - - - - - - -	9	4⅓
15. Clay, mixed with sand and mica - - -	8	5
16. Blue clay - - - - - - - - - - - -	0	2
17. Principal bed of coal - - - - - - - -	1	3
	59	3¾

The strata here extends from north to south; but their inclination, or dip, is from east to west.

At Alfreton common, in Derbyshire, the principal bed of coal is one hundred and eighty-four feet deep, buried under similar strata of argillaceous earths as the preceding, with one seam of coal about half way down, only eighteen inches thick; but the stratum at the bottom is seven feet four inches, of exceeding good coal.

At Hetruvia, in Staffordshire, the coal lies very near the surface. The first approach is through ratchil, or fragments of stone; then limestone about one foot thick; a bed of sand, clay, and lime, follows; and then comes the stratum of coal.

At Bagelt, in North Wales, the mine penetrates through sixty-one feet of sand and gravel, shafe, clay, and slate, when it reaches a stratum of coal six feet in thickness. It then sinks fifty-three feet deeper, and reaches a seam of coal only two feet three inches thick. But, after descending one hundred and five feet further, through sandstone and slate, and two hundred and forty feet from the surface, it approaches a stratum of valuable coal, upwards of fifteen feet thick.

At Litchfield, the mine sinks through black clay, rotten-stone, marle, thin coal, black-rock, black-bat, or marle, white-rock, grey-rock, &c. until it reaches one hundred and fifteen feet under ground, where the great and valuable stratum of coal lies, not less than thirty feet thick.

At Colebrook Dale, in Shropshire, according to Mr. Young's Annals of Agriculture, they obtain four strata of coal in the same pit, ranging in the following order: brick-clay, potter's-clay, smut, blue-bat, or marle, sandstone, coal four feet thick; potter's-clay, then the best coal three feet thick; brick-clay, then clod-coal two feet six inches thick; common clay, and then flint-coal four feet thick. The utmost depth of this mine is only eighty-two feet.

In Scotland, at Baldo near Falkirk, the pit sinks only fifty-two feet under ground, through a thin layer of clay, then a ledge of slate thirty-three feet thick, then limestone, slate, and earth, until it reaches a seam of coal three feet six inches thick.

In Ireland, at Drumglass, the mine is one hundred and thirty-two feet deep, passing through clay and rubble-stones, soft argillaceous stone, indurated clay, a ledge of slate, then the seam of coal four feet five inches thick. At Ballycastle, the other Irish mine, the seam of coal at present worked is five feet thick, but lies two hundred and forty-two feet under ground, passing through strata of basaltes, slate, yellow free-stone, slaty coal, and ninety feet of hard grey free-stone. This mine, notwithstanding, is worked with great spirit.

In France, a quick-burning volatile coal has been discovered and worked for many centuries. The best are found in Forez, Bourbonnois, and Auvergne. It lies at considerable depths, and generally in heaps, not in seams, on the sides of hills, and is therefore easily extracted.

In Germany, the strata of coal is very thin, and found at a considerable depth; yet that indefatigable people find it their interest to work such thin seams of coal as in England are despised. In the Sophia shaft or pit, at Wetten, in the duchy of Magdebourg, the principal bed of coal is only one foot thick, and lies one hundred and eighty-seven feet below the surface, under immense rocks of slate, sand-stone, flint, and shistus. In the Dorothia mine at Lobegin, the seam of coal is four feet five inches thick, and lies one hundred and eighteen feet below the surface, surmounted by yellow clay mixed with calcareous earth, grey micaceous slate, soap-rock mixed with quartz and flint, and bituminous shistus. In the country of Liege, the coal is constantly surmounted by a hard argillaceous grit or sand-stone, and lies in the form of a horse-shoe. The coal-mine of Kladraw, in Bohemia, is but six fathoms under the turf, and covered wholly with a white micaceous sand.

In Sweden, the coal is very thin, but generally easy to work. At Boscrup, in Scania, the mine is fifty feet deep, with a bed of pyritous coal at the bottom, two feet thick. It has, also, a little more than half way down, a seam of coal one foot thick, which is carefully wrought. The superincumbent matters are mostly sand-stone, with argillaceous earths, quartz, and iron ore. The mine near Helsinburg has a seam of coal two feet thick, and only thirty-six feet below the surface; and, about eighteen feet further down, it has another seam of coal one foot thick. These strata are principally surmounted by argillaceous slate and sand-stone.

In Italy there are no coal-mines; the great line of this valuable fuel appearing to sweep away round the globe from north-east to south-west; not ranging at a distance even from the south-easterly parts of our own island, as hath been generally imagined, but actually visiting Brabant and France, and yet avoiding Italy.

The most remarkable coal-work ever known, was that wrought at Burrowstounness, under the sea. The strata of coal were found to continue under the bed of the sea in this place, and the colliers had the courage to work the seam near half way over; there being a mote half a mile from the shore, where there was an entry that went down into the coal-pit, under the sea. This was made into a round key or mote, built so as to keep out the sea, which flowed there twelve feet. Here the coals were laid, and a ship, of that draught of water, could lay her side to the mote, and take in her lading. This famous colliery belonged to the earl of Kincardine's family. The fresh water which sprung from the bottom and sides of the coal-pit, was always drawn out upon the shore by an engine moved by water, that drew it forty fathoms. This coal-pit continued to be wrought many years, to the great profit of the owners, and the wonder of all that saw it; but, at last, an unexpected high tide drowned the whole at once: the labourers had not time to escape, but perished in it.

In working coal-mines, their regularity is frequently interrupted, and the strata broken, by chasms, breaches, or fissures, which are differently denominated according to their various dimensions, and the matters with which they

they are filled; but usually called dikes, hitches, and troubles.

Dikes are the largest fissures. They seem to be nothing but a crack or breach of the solid strata, occasioned by one part of them being broken away and fallen from the other. They generally run in a straight line for a considerable length, and penetrate from the surface to the greatest depth ever yet tried, in a direction sometimes perpendicular to the horizon, and sometimes obliquely: the same kind of strata are found lying upon each other in the same order, but the whole of them greatly elevated or depressed on the one side of the dike as on the other. These fissures are sometimes two or three feet wide, and sometimes many fathoms. If the fissure be of any considerable width, it is generally filled with heterogeneous matter, different from that of the solid strata on each side of it. It is sometimes found filled with clay, gravel, or sand; sometimes with a confused mass of different kinds of stone lying edgeways; and at other times with a solid body of free-stone, or even whin-stone. When the fissure is of no greater width than two or three feet only, it is then usually found filled with a confused mixture of the different matters which compose the adjoining strata, consolidated into one mass. If the dike stretches north and south, and the same kind of strata are found on the east side of the dike, in a situation with respect to the horizon ten or twenty fathoms lower than on the other side, it is then said to be a *dip-dike*, or *downcast-dike*, to the eastward; or, counting from the east side, it is then said to be a *rise-dike*, or *upcast*, of so many fathoms westward. If the strata on one side are not much higher or lower with respect to the horizontal line, than those on the other, but only broken off and removed to a certain distance, it is then said to be a dike of so many fathoms thick; and from the matter contained betwen the two sides of the fissure, or dike, it is denominated a *clay-dike*, *stone-dike*, &c.

A *hitch* is a fissure of a smaller degree, by which the strata on one side are not elevated or separated from those on the other side above one fathom. These hitches are denominated in the same manner as dikes, according to the number of feet they elevate or depress the strata. Some of these are met with whose cavities are filled with sparr, the ores of iron, lead, vitriol, or other metallic or mineral matters; all of which, in the coal-countries, are called dikes. The strata are generally found lying upon each other in the same order on one side of the hitch as on the other, as mentioned above, and nearly of the same thicknesses, appearing to have been originally a continuation of the same regular strata, and the hitch only a breach by some later accident, perpendicularly or obliquely down through them, by which one part is removed to a small distance, and depressed to a lower situation than the other. But this is not the only alteration made in the strata by dikes and hitches; for generally to a considerable distance on each side of the dike, all the strata are in a kind of shattered condition, very tender, easily pervious to water, and debased greatly in their quality, and their inclination to the horizon often altered.

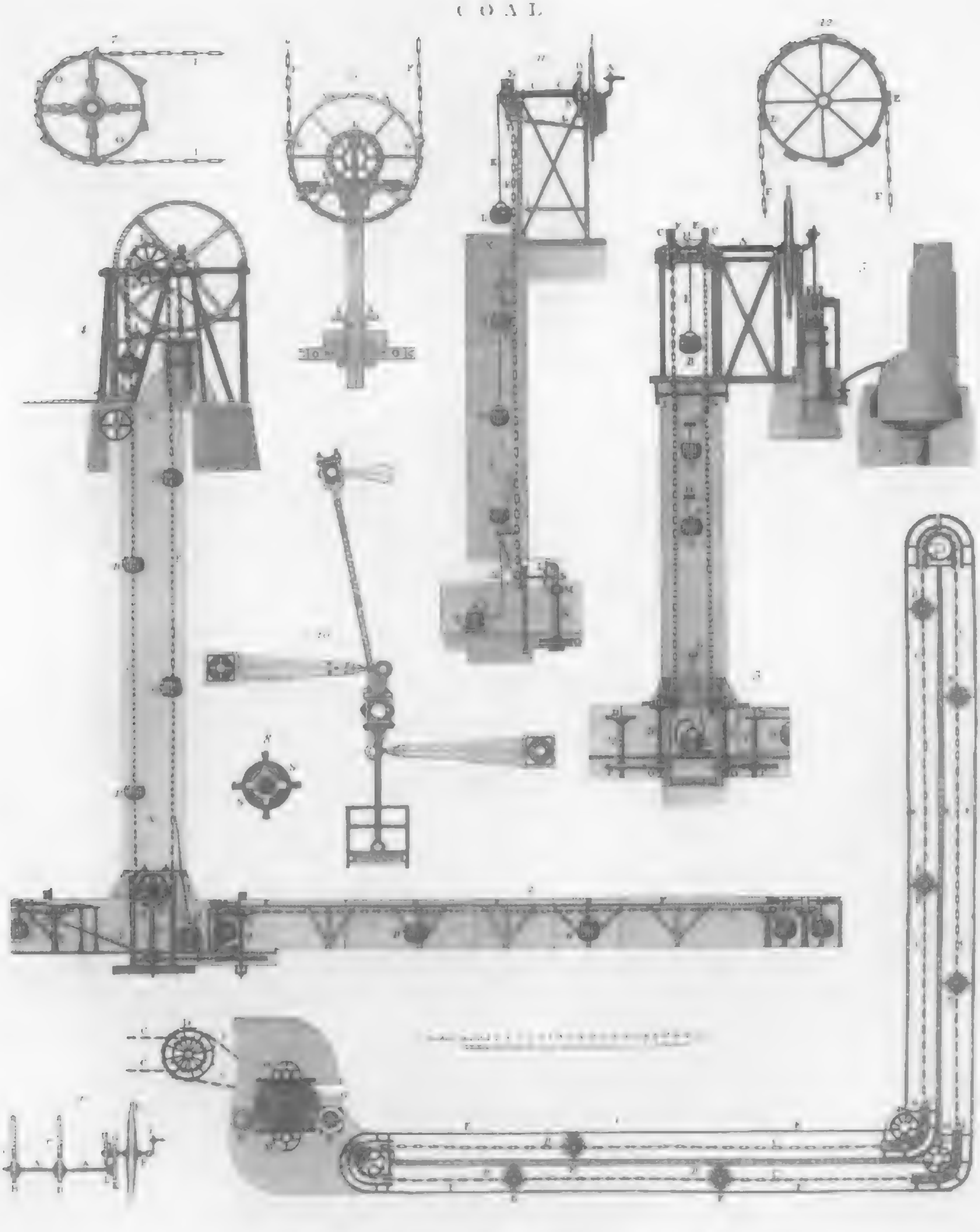
Troubles may be denominated dikes of the smallest degree; for they are not a real breach, but only an approach towards it, which has not taken a full effect. The strata are generally altered by a trouble from their regular site to a different position. When the regular course of the strata is nearly level, a trouble will cause a sudden and considerable ascent or descent; where they have, in their regular situation, a certain degree of ascent or descent, a trouble either increaseth it, or alters it to a contrary position: and a trouble has these effects upon the strata in common with dikes, that it greatly debases them from their original quality; the partings are separated; the backs and cutters disjoined, and their regularity disordered; the original cubic and prismatic figures, of which the strata were composed, are broken, and the dislocation filled with heterogeneous matter; and the whole strata are reduced to a softer and more friable state.

In working coal-mines, that kind of combustible vapour, or inflammable air, which will catch fire at a candle, is too often met with. It proceeds from the dikes or fissures of the solid strata, exhaling from some in an insensible manner, whilst from others it blows with as great impetuosity as a pair of bellows. When this mephitic air is permitted to accumulate, it becomes dangerous by taking fire, and burning or destroying the workmen, and sometimes by its explosion will blow the works out of the pit, and do considerable damage. If a supply of fresh air is forced down the pit by air-boxes and a ventilator, or by dividing the pit into two by a close partition of deals from top to bottom, it will be driven out, or so weakened, that it will be of no dangerous consequence; or, when the mephitic air is very strong, it may be safely carried off by making a close sheathing or lining of thin deals quite round the circumference of the pit, or by one or two small leaden pipes carried from the sheathing to the surface. If a candle be applied to the orifice of the pipe at the surface, the mephitic air will instantly take fire, and continue burning with a lambent flame until it be extinguished by some external cause.

After the pit is sunk to the coal, the next consideration is the mode of working it. The most general practice is to excavate and take away a part only of the stratum of coal in the first working, leaving the other part as pillars for supporting the roof; and, after the coal is wrought in this manner to such a distance from the pit as intended, then these pillars, or so many of them as may be deemed safe, are taken out by a second working, and the roof and other solid strata above permitted to fall down and fill up the excavation. The quantity of coal wrought away, and the size of the pillars left in the first working, is proportioned to the hardness and strength of the coal and other strata adjacent, compared with the incumbent weight of the superior strata. If there be two or three strata or seams of coal in the same pit, having only a stratum of a few feet thick betwixt them, it is then material to observe, that every pillar in the second seam be placed immediately below one in the first, and every pillar in the third seam below one in the second; and in such a situation the upper stratum of coal ought to be first wrought, or else all the three together; for it would be unsafe to work the lower one first, lest the roof should break, and bury the works and the men in one promiscuous ruin.

When the coals are wrought, they are put in baskets, hooked to a chain, and drawn up the pit by a rope to the the surface, which is best effected by a machine called a *gin*, worked at present by horses. There are other machines for drawing coals, some wrought by water, others by the vibrating lever of a fire-engine; but those wrought by horses are in most general use. A very ingenious and much improved method of raising coals, has however been lately invented by Mr. Humphrey Jeffreys, engineer, at Newcastle-upon-Tyne. His method has the sanction of the king's letters patent, dated Feb. 12, 1799; the description of which, elucidated by an engraving, we shall give in his own words, viz. "I the said Humphrey Jeffreys do hereby declare, that my said invention is set forth in the following description; that is to say: My addition to, and improvement of, machinery applicable to the bringing or conveying coals, ores, or other minerals, from the interior or innermost parts of coal-mines, commonly called *putting*, is shewn in the annexed plate; where fig. 1. is a ground-plan of this method of putting, represented as placed in the interior part of a coal-mine, where (and also in all the other figures the same letters correspond to the same parts) X X is the pit or shaft. B, B, are full and empty corves or baskets, for conveying the coal. C C, is an endless chain, or rope, passing round, and supported by, the wheels D. E, are cross bars, supporting the endless chain C C, at certain distances, between the wheels D, D, and

COAL



Improved Machinery for working Coal mines

and from which the corves or baskets are suspended, as shewn in fig. 2. On these cross bars are four small wheels or pullies, two of which are placed at the ends of each bar, and bear upon the platform F F, except when passing round the wheels D, D, when the inner wheels or pullies bear on the platform G G; by which means, the corves or baskets B, B, are carried to the opposite side of the platform F F, and then travel in a direction contrary to that in which they moved on the other side of the platform. By this method of constructing the platform G G, and placing the wheels D, D, (as represented in fig. 1 and 2,) the corves or baskets may be carried round any part of a circle, not exceeding three-fourths, with certainty and expedition, without the assistance of human strength, or retarding the motion of the machinery, which may be worked in the mine by any given power. My method of giving motion to this machinery, is represented in fig. 4, 5, and 11, where the endless chain or chains F, F, being put in motion, (in the manner hereafter described,) and turning the wheels G, G, near the bottom of the pit, (as represented in fig. 4, 5, and 11,) give motion to the wheels L, L, and likewise to the wheels M, M, with their axes N, N. On the same axes are the wheels O, O, and revolve with them; and, by means of the short chain I, I, communicate motion to the wheels P, P, with their axes Q, Q, and the upper wheels, on the same axes D, D. This, of course, gives motion to the long endless chain C C, together with the cross bars E, E, and the full and empty corves B, B, which are thus carried, in rotation, to and from the interior parts of the mine, and the bottom of the pit or shaft.

Fig. 2 and 3, are side-views or sections, representing the interior parts of a coal-mine, with part of the pit or shaft, where the same letters refer to the same parts.

Fig. 6, 7, and 8, are an example of this method of communicating motion from the endless chains or ropes F, F, that are represented in fig. 4 and 5; where the wheels L, L, give motion to the wheels M, M, with their axes N, N, and the lower chain-wheels O, O, which communicate motion to the short endless chain I I, together with the wheels P, P, before described. By this contrivance, the machinery may be stopped, or put in motion, as occasion may require, without stopping or retarding the endless chains F, F, when drawing coals up the pit or shaft, as described in fig. 4, 5, and 11.

Fig. 6, is a section of this method of stopping and giving motion to the short endless chain I I, which communicates motion to the endless chain C C. The wheels M, M, being put in motion, together with their axes N, N, which revolve in the center of the wheels O, O, carry round the cylindrical block or chuck S S, with its projections, by means of a prominence in the cylindrical hole of the block, fig. 8, which slides in a groove, near the bottom end of the axis N N. This block is suspended, as occasion requires, by the lever T, fig. 2, and is thereby prevented from coming in contact with the wheels O, O. When it is found convenient to have the endless chain C C put in motion, by the communicating chain I I, a man lifts up the long end of the lever T, and depresses the cylindrical block, until it comes in contact with the notches in the wheels O, O, which are then carried round by the projections on the block S S fig. 8, and the axis N N, together with the endless chains I I and C C. This motion may be stopped at pleasure, by pressing down the long end of the lever T, which lifts the block S S clear from the notches in the wheels O, O; by which means, the machinery in the interior parts of the mine is managed with certainty and expedition.

Fig. 4 and 5, represent my addition to, and improvement in, the manner of delivering coals, ores, &c. at the mouth of the pit, where A A is a shaft or axis, worked by a steam-engine, as expressed in the annexed engraving at Y, or by some other power, on which are fixed two wheels working into the wheels C, C, which may be made to revolve either on or with their own axis D. These wheels, in their motion, carry round with them what I term the chain-wheels E, E, and which have projections on their surface, to prevent the chains from slipping. F, F, are endless chains, or ropes, supported by the wheels E, E, and are put in motion by them. These chains are kept in their proper position, at the bottom of the pit, by the wheels G, G. H, H are cross bars, fixed to the endless chains, or ropes, F, F, from which the corves or baskets B, B, are suspended, by means of short chains or ropes I, I. The endless chains or ropes being put in motion, as above described, and as many loaded corves or baskets being in the act of ascending up the pit, at the same time, as may be found convenient, when the cross bars H, H, come in contact with the chain-wheels E, E, they vary their motion from the perpendicular direction, and are carried over the top of the wheels E, E; then, acquiring a descending motion on the opposite side of the wheels E, E, and consequently on the opposite side of the pit, carry with them the loaded baskets suspended as before-mentioned, which, in their perpendicular descent, are deposited on the sledge K, as in fig. 4. The loaded corves being then disengaged from the short chains or ropes I, I, empty corves or baskets are hung on in their stead, and are carried, by the same descending motion, to the bottom of the pit, where they are again disengaged, and full baskets hung on; by which means, a regular succession of full and empty corves or baskets is constantly produced.

Fig. 5, is a side-view of this method of delivering coals, ores, &c. at the mouth of the pit, where the same letters refer to the same parts. The wheels L, L, which I call *conducting-wheels*, are placed near the top of the pit, immediately under the platform, which is commonly called the *settleboards*, and which is on the same side of the pit with the descending side of the endless chain F F. These wheels, being fixed as above described, press against the endless chain F F, and cause that part of the endless chain which comes from the wheels C, C, to the wheels L, L, to alter its perpendicular direction; but, on passing these wheels, it again acquires a perpendicular direction in the pit. The descending side of the endless chain F F being thus pressed nearer the ascending side, and the settleboards fixed, with the sledge K placed on them, as described in the annexed engraving, the corves or baskets B, B, suspended to the cross bars H, H, and descending from the wheels E, E, in a perpendicular direction, are deposited on the sledge K.

Fig. 9, is a plan of another method of giving motion to the wheels C, C, and chain-wheels E, E, as expressed in fig. 4 and 5, from the steam-engine Y, or any other given power; where F F is a crank and wheel, with its axis, on which are the wheels G and H, connected together by the cylindrical box or chuck I, which gives motion to the pinion-wheels K and L, with their axis A A, and pinion-wheels B B, together with the wheels C, C. The motion being thus communicated by the axis F F, and the wheel G working into the pinion-wheel K, on the axis A A, and such motion being properly adapted to drawing coals, ores, &c. out of pits of great depth, where many corves or baskets are in the act of ascending at the same time, (as in fig. 4, 5, and 11,) the motion thus produced requires more time than is found convenient for the man, when ascending the pit or shaft; therefore it is necessary to accelerate the motion, which may be done with expedition, by shifting the pinion-wheel K on the axis A A, out of the wheel G, on the crank-axis F F, and putting the small pinion-wheel L, to come in contact with the wheel H, on the crank-axis. By this method, the chains and machinery, from the crank-axis F F, may be accelerated, in a short time, to any degree of motion that is most convenient; the first moving cause proceeding, without increased velocity.

Fig. 10, represents an example of a method of applying a parallel joint to a crank, by which contrivance, the reciprocating steam-engine may be worked without what is

is commonly called a *beam*, and a rotative motion may be communicated to any machinery, as in fig. 4 and 5, where it is applied to drawing coals by the steam-engine. My addition to, and improvement of, machinery for raising coals, ores, &c. out of mines, consists in a method of applying one endless chain, or rope, instead of two; and of this machinery, whereby a considerable saving is made, as well in the first expence of machinery as in upholding the same, and likewise of room in the pit, as is more fully explained in the engraving.

Fig. 11, is a profile of the machinery of this addition and improvement, for raising coals, ores, &c. out of pits or mines, where the same letters refer to the same parts. A, unites with a wheel, worked by a steam-engine, or any other power, and which communicates motion to the wheel B, with its axis C C, and the cylindrical barrel or wheel D. On this barrel are projections E E, to prevent from slipping the endless chain, or rope, F F, which is carried round and supported by it. G G, is a chain-wheel, placed near the bottom of the pit, by which the endless chain, or rope, is kept in its proper position, and which, at the same time, may be applied to give motion to the machinery for putting, as already described, and expressed both here and in fig. 1, 2, and 3. H, H, are bars, projecting from the endless chain F F, and supported by it, and by what I call the brace-chains, or ropes, I, I, which are fastened to the endless chain. These brace-chains or ropes alternately support, in their ascent and descent, the projecting bars H, H, to which are suspended the full and empty corves or baskets B B, by means of the short chains, or ropes, K, K. One end of these short chains, or ropes, is hung on the outer end of these projecting bars, and close to the brace-chains or ropes, in any manner that will admit the projecting bars to revolve within the end of these short chains, or ropes, when the projecting bars come in contact with the cylindrical barrel or wheel D, and the chain-wheel G G. The endless chain F F, with the brace-chains I, I, and the projecting bars H, H, being put in motion, revolve with the cylindrical barrel or wheel D, which causes the corves or baskets, suspended from the extreme end of the projecting bars, as before described, to ascend and descend; and they are carried from one side of the pit to the other, alternately, but are prevented from revolving with the cylindrical barrel or wheel D, and the chain-wheel G G, by the ends of the projecting bars extending beyond the end of the barrel or wheel D, while the projecting bars are in contact, and revolve with it; consequently, the short chains, or ropes, K, K, by which the corves are suspended, cannot come in contact or revolve with the wheels D, and G, G, but are carried from one side of the pit to the other, in front of the barrel or wheel D, and are kept clear of it, and its axis, by the ends of the projecting bars extending beyond the end of the barrel, as before mentioned; by this means the baskets preserve their perpendicular direction, and are deposited on the sledge K, (which of course is on the descending side of the endless chain F F,) in the same manner as was before explained in fig. 5. L, in fig. 11, is a lever to apply friction, by means of human strength, to the cylindrical barrel or wheel D, for the purpose of stopping or retarding the motion of the endless chain, when required.

Fig. 12, is a profile, taken from the projecting end of the cylindrical barrel or wheel D, and part of the endless chain F, as in fig. 4, (consequently the length of the cylinder of the wheel is invisible,) which is represented on the wheel D, and between its projections E E, by which it is kept from slipping, when a superior weight is suspended to one side of the chain."

When the coals are thus produced from the mine, they are conveyed in coal-waggons, down sloping ways, constructed for the purpose, and measured by Newcastle chaldrons into the ships, or else into keels or lighters, by which they are carried to the coal-vessels. The keel of coals is estimated at twenty-one tons and four hundred weight, and contains eight Newcastle chaldrons; so that each chaldron is fifty-three hundred weight. Yet a London chaldron contains no more than thirty-six heaped Winchester bushels, weighing only on an average 28½ cwt. according to the quality of the coal; which weights being nearly in the ratio of eight to fifteen, it is always reckoned that eight Newcastle chaldrons, or a keel of coals, make fifteen London chaldrons. How it came to pass that the same word at Newcastle and London should denote such different quantities, we know not; but both these chaldrons, as well in weight as measure, are settled by act of parliament.

Coals, though not an exclusive, may with truth be styled a peculiar blessing to this island, as well from their great plenty, as from their acknowledged excellence, and their superiority over all others yet known for fusing metals, and for all manufactures wherein a strong and lasting heat is required. It has been doubted whether the aboriginal Britons, or the Romans who conquered them, first explored this source of wealth in England. But Mr. Whitaker, in his History of Manchester, seems clearly to have shewn, that these mines were first opened by the labour of the Britons, long before the era of the Roman invasion. We have no certain account of the use of pit-coal in London earlier than the year 1305, when such of the traders as required much fuel first began to use it in their various avocations; against which practice several of the nobility complained to the king, as being a public nuisance. A commission of enquiry into the grounds of this complaint was ordered by Edward I. in consequence of which a proclamation was issued under certain pains and penalties, against all those who should in future make use of pit-coal. This will appear a matter of much less surprise, when we reflect that London, in those early times, was every way surrounded with woods; that fuel was in great plenty; and the carriage thereof, both by land and water, remarkably cheap. However, as these woods came gradually to be grubbed up, and converted into arable land, and wood and turf fuel in less plenty, the London manufacturers found they were obliged to make use of pit-coal, notwithstanding the above prohibition, which, in 1379, was entirely done away by Richard II. who, in lieu of it, imposed a duty of sixpence per ton each quarter of a-year, upon all ships from Newcastle laden with coal.

It does not appear that the inhabitants of Newcastle-upon-Tyne had any traffic in coal, or any authority to open mines, before the charter of king John, which was confirmed to them by his son Henry III. in 1234; and wherein he gives "the said honest men, (*probi homines*,) upon their supplication, licence to dig coals in the common soil without the walls, called the Castle-moor, and to convert them to their own profit, in aid of their fee-farm rent of one hundred pounds per annum." But, in 1357, Edward III. went much further in favour of Newcastle-upon-Tyne, by absolutely granting to the burgesses of that town, the Castle-moor and Castle-field, for the purposes of digging coal, stone, and slate, for their own use and benefit. Yet it does not appear that they exported much coal, though they sent some coastwise, and into the port of London. There certainly was no duty laid on this natural product of our soil, until 1379, by king Richard, of sixpence per ton each quarter of a year, which is recorded in Rymer's Fœdera. However, in 1421, the exportation or foreign consumption of Newcastle coal must have been very considerable, since by 9 Hen. V. c. 10, it is enacted, "That whereas there is a custom payable to the king of two-pence per chaldron on all coals sold to people not franchised, in the port of Newcastle-upon-Tyne; and whereas, the keels or lighters which carry the coals from the land to the ships in that port, ought to be of the just portage of twenty chaldron, according to which burden the custom aforesaid is paid; yet many now making their keels to hold twenty-two or twenty-three chaldrons, the king is thereby defrauded of his due. Wherefore it is now enacted, that all keels (or lighters) be

be measured by commissioners, to be appointed by the king, and to be marked of what portage they be, under the pain of forfeiting all the said keels (or lighters) which shall be found not marked." This duty, though it might appear trivial to us, was certainly a heavy tax at the time it was laid, when we consider the relative price of coals. Even in 1536, according to Stowe's Survey of London, coals at Newcastle were sold at only two shillings and sixpence per chaldron, which, brought to London, might produce about four or five shillings. There is, indeed, about this period, frequent mention of *a load of coals* at twelve shillings; but this, bishop Fleetwood, in his *Chronicum Preciosum*, assures us, is to be understood of charcoal, and not of pit-coal. In 1590, it is stated, by Strype, and other authors, "that, by reason of a combination at Newcastle-upon-Tyne, coals were raised in London to the excessive price of nine shillings per chaldron; whereas the usual price, for several preceding years, was but four shillings. Nevertheless, in 1615, the Newcastle coal-trade was so considerable as to employ four hundred sail of ships, two hundred for the port of London, and two hundred for the rest of England; the French ships came also in fleets of fifty together, from the ports of Picardy, Normandy, Bretagne, Rochelle, Bourdeaux, &c. and the ships of Bremen, Embden, Holland, and Zealand, to purchase Newcastle coal from the pit's mouth."

In the early stages of the coal-trade, the masters of vessels used to frequent a place in Lower Thames-street, called Room Land, adjoining to Billingsgate, where they met very early in the morning, and disposed of their coals by retail. But in proportion as their trade increased, this retail mode became very inconvenient; and therefore, as the persons who kept coal-barges and lighters were authorised to purchase by commission wholesale for the use of their employers, the captains rather chose to dispose of their cargoes at once, to these lightermen, than retail them in small quantities; at the same time allowing a discount for prompt payment. By this means they were enabled to fix one certain price for the whole cargo, and get their ships cleared in a shorter space of time. To establish this regulation generally, an intermediate person was required, who was then called a coal crimp, but now more properly a broker, or factor, to whom the ship's loading was regularly consigned, and who in consequence was to sell the cargo, give security, and pay the duties at the custom-house, collect the account of sales from the buyers, and settle with the owners. A similar method is adopted in the north, by the owners of the collieries, who appoint a person called a fitter, to vend their coal to the ship-owners, and who takes the risque both of ship and cargo, unless they are freighted on account of an indifferent person, which is sometimes the case. This is now the invariable method pursued in the regulation and management of the coal-trade.

The seams or beds of coal in the counties of Northumberland and Durham lie horizontally in general, with a gentle dip, and rise; and very free from dykes or troubles, but often subject to fire and water. This coal is mixed with a bituminous matter, and impregnated in general with particles of sulphur; the former causing a strong adhesion, and the latter giving additional heat and spirit to the natural good quality of the coal. Hence it is excellent for every kind of manufacture, as well as for all culinary and domestic purposes. In fact, no coal has yet been discovered, that will work metals to perfection equal with the English; for which reason all kinds of edged tools, and implements of war, are purchased from Great Britain by all nations, or else her coal to manufacture them. It is this good quality of the coal that gives these British goods the preference in all foreign markets.

The coal in Scotland lies in a very different manner to that in England, the intervening strata being in a state of great confusion; hence their coal is worked in all directions, from the horizontal to nearly the perpendicular; so that perpetual dykes, hitches, and troubles, intercept the coal, and make it frequently as difficult as it is expensive, to regain the seam. The best Scotch coal is in general a strong splint, without much bitumen, and worked in large pieces, that are sold by weight; the round made in the working, called *chews*, are sold by measure; and the small, or panwood, is chiefly used for salt-pans, which gives to the latter its name in Scotland, but which, in England, is called *culm*. The fine splint is a clean-burning coal, but in a large fire it consumes fast, from its dryness, and laying open, as well from its size, which, with the draft of the chimney, admits the air to operate strongly between the pieces, and adds to its speedier consumption. This coal has long been preferred in London for chamber fires, owing to its making little dust, and thereby not injuring the room or furniture. It is also made use of in Holland by the better sort, except in their kitchens; but these economical and wary people make it come as cheap as our common Newcastle coal, by altering the form of the grate, and only laying on one piece at a time. The splint coal does not answer so well for any other use than the above, from wanting the bituminous matter so strongly impregnated in the English coal; and for this reason coal is imported from England into the harbours of Aberdeen, &c. for smiths' use. But the Scotch coal, when coaked, answers well for founderies, in which great quantities are consumed in Scotland.

The coal of the best quality France produces, is like a mixture of Scotch and Welsh, burning quick, without any great heat, and soon consumes. Some of it is sent down the Scheldt into Holland, and sells on an average at fifteen shillings per Newcastle chaldron under the English, and in times of scarcity more than double that difference; yet it does not lessen the demand for British coal in Holland, which must be had for their manufactories. France, with her Netherlands, receives from England annually upwards of twenty thousand Newcastle chaldrons, for the use of smiths, and their distilleries. The coal transported down the Rhine from Germany into Holland, is like the middling Scotch, and sells on the same terms with the French, without any advance in price. The annual consumption of coal carried into the port of London, is found on an average to be seven hundred and sixty thousand London chaldrons; and it is computed that one million of chaldrons is received into the whole of the coasting ports together.

Mr. Beaumont, in his Treatise on the Coal Trade, strongly recommends the English coal owners to have their coal dug or curved down in the Scotch manner, in much larger pieces, so as to resemble the splint coal. For this purpose it is necessary to bring down the coal in the gentlest manner, and to make as little culm as possible; this can only be done by attending to the essential point of curving the coal with the greatest nicety in all parts, except at the top, so far as the curve, or nick, can possibly be made; which can be done by the English collier with greater dexterity than in any other country. But the English coal has hitherto been curved down on one side only, and at the bottom; but for want of proceeding further with the curve, it remains to be broken down in great part, which considerably tends to reduce the size of the coal, and makes more small and culm. This may be remedied by curving down both sides and bottom instead of one side and bottom, as at present; the only pressure by the wedge to be made at the top, which will readily give way when loosened at three parts, and consequently the coal will come down much more entire than by the present mode of working, and as large as it does in Scotland. The entire coal would by this means be in greater quantity, produce a better price, and the smaller coal and culm, which is the least advantageous, be much reduced. The dust from the fire by the English coals arises from a quantity of culm in general being mixed with it; whereas the weighable coal from Scotland has not

not a particle of dust put into the grate with it: hence arises the preference given to it for chamber use; for, although the best splint Scotch coal is more volatile in quality than the English, yet the latter, when laid on in large pieces, emits not any dust from the fire, but burns as clean and lively as the Scotch, is more durable, and maintains a stronger heat.

The different foreign ports receive annually from Great Britain nearly the following quantities, in Newcastle chaldrons, as calculated by Mr. Beaumont:

	Chaldrons.
Dutch United Provinces - - - - - -	50,000
France and Flanders - - - - - - -	20,000
Denmark - - - - - - - - - - -	10,000
Hamburgh - - - - - - - - - -	10,000
Sweden and Portugal - - - - - - -	5,000
Russia, Norway, and ports not mentioned	5,000
Newcastle chaldrons -	100,000

Coal is the fuel used in the Dutch provinces for every purpose; and although the importation of them from England is attended with so considerable an expence, yet the Dutch government impose a further duty on British coal equal to seven shillings and fourpence per ton for domestic use, and six shillings and threehalfpence for those used in their manufactories, amounting nearly to twenty shillings additional impost for every Newcastle chaldron. This fact shews the great importance of the British coal to the Dutch consumers, when they can afford, over and above the prime cost, to pay a revenue of nearly fifty thousand pounds annually to the states!

After establishing this fact, Mr. Beaumont asks, Why the Dutch revenue should be more advantaged than that of Great Britain, by an opportunity given to Holland to impose higher duties than England does, on the very article the latter supplies to the former; and for which the Dutch can find no other substitute, nor be supplied from any other country? Comparatively taken, the duties imposed by the United States on the British coal, produce, as above observed, a revenue of fifty thousand pounds to them, while Great Britain does not receive forty thousand. And it is not more singular than true, that even with the British duties included, the English coal is delivered to the Dutch at twenty shillings per chaldron less than to the London consumer. The ship master delivers his cargo in Holland, on an average, at fifteen guilders per hood, or one pound six shillings and threepence per London chaldron, (the Dutch hood being the same measure as the London chaldron;) while the price to the London consumer cannot be fixed under thirty-seven shillings the Dutch hood, or London chaldron, which makes a difference in favour of Holland, at least of twenty shillings the Newcastle chaldron. The other nations who import coal from this country are in the same situation with the United States, and can as little do without them for their manufactures; for, although France constantly raises her own coal, yet that country annually requires twenty thousand chaldrons from Great Britain.

The principal manufactories carried on in the Dutch provinces with English coal, are, the distillery, sugar-baking, and smiths' work. For the two former, they prefer a strong hot coal, of a lasting quality, and not too small, but with a good mixture of round; for the smiths use in all countries the strongest small, and for domestic use, as in England. France requires British coal for the use of smiths, and sugar-baking; and Flanders for distilleries, &c. In Denmark they use our coal chiefly for the sugar-houses, smiths, and lime-works: for the latter a considerable quantity, and for that purpose they prefer a hot brisk fire, such coal being of great consequence in burning their lime. Hamburgh uses English coal for the sugar-baking and smiths' work, as the former. Portugal for founderies, and smiths' use. Sweden for her distilleries; which, much increasing, with their smiths work, will make their consumption more considerable. Russia has a few cargoes to work their engines; but, from establishments at this time forming there, probably more of our coal will soon be required. Norway, and the ports not particularized, use the coal for their smitheries, &c.

The quantity of coal exported from Scotland into foreign countries, is not very considerable. Holland, and the ports in the Baltic, are their marts, and some to the light-houses; and from these ports they return loaded; from the Baltic always with a full cargo, and from Holland in great part. They send into England about twenty thousand tons and chaldrons together. Their internal consumption is very considerable, and will soon be as much more, by the iron-works establishing in different parts of the country, and the fisheries in the Western Highlands, which, if properly conducted, will prove a source of wealth to Scotland, and change an uncultivated and almost uninhabited country round the fishing stations, into a populous and lucrative district, formed for it by nature.

From what has been premised, Mr. Beaumont goes on to state the propriety, as well as equity, of putting the same impost on all other rivers where coal is navigated, as that originally put on the river Tyne. Soon after coal came into use in London, a tax of twopence on the Newcastle chaldron was laid upon all coals shipped from the river Tyne, at that time the only river in England from which any coal was shipped; the produce, however, was so trifling, that government, at first, did not think it worth collecting. But after some years, a demand of arrears was made upon the parties, who in consideration of that claim being dispensed with, agreed for the future to pay one shilling per chaldron; an offer which government readily accepted, and which was afterwards made a perpetual grant to the duke of Richmond. It is evident, that when the coal trade took place in other parts of the kingdom, this tax became a partial one; because coal is admitted to be shipped from all other rivers free from this impost. The produce of one shilling per chaldron levied on the Tyne, amounted in 1783, to seventeen thousand nine hundred and ninety-nine pounds, thirteen shillings; and as, by calculation, the proportion of coal shipped from Newcastle constitutes one-third of the quantity shipped in the kingdom, this tax, if made general, would increase the revenue at that time, to upwards of thirty-six thousand pounds per annum; but from the increased demand for coal since that period, it is estimated at fifty thousand pounds per annum at the least. And as the government have lately purchased this grant from his grace the present duke of Richmond, it is probable that an equalization of the duty will shortly take place.

The reason why coal, although the produce of our own country, costs the London consumer so much more than the same article costs the government in Holland, is that monopoly and combination too often take place in the pool, added to the duties of holiday fee, cocket, water-bailiff and return, trinity dues, lord mayor's dues, market dues, lights, king's duty, orphan's duty, mitage, ballast, labourers, &c. &c. But Mr. Beaumont wishes to see many of these imposts removed, and our own subjects benefited, by putting a much higher duty on the coals exported from this country.

Our abundant supply of coal may truly and emphatically be styled, the golden-mine and bulwark of Great Britain; not only as it affords an endless supply of wealth, but because it is an extensive nursery for excellent seamen, from which source our navy has often been made effective on a short notice, when other means have failed. It has been always asserted, and generally believed, "that the coals in this country are inexhaustible." But Mr. Williams, in his Natural History of the Mineral Kingdom, is of a different opinion, and thinks it a matter of such importance as deserve the serious attention of the legislature. Towards elucidating this point, it may be of

of ſome uſe to eſtimate what number of acres are wrought yearly in the counties of Northumberland and Durham, to ſupply the preſent demand: in order to accompliſh this object, the thickneſs and number of workable ſeams of coal muſt be firſt aſcertained; for which purpoſe we have been favoured with ſections exhibiting the thickneſs and depth of the various ſtrata, in ſome of the deepeſt pits in the county; which will not only be uſeful for the preſent purpoſe, but we hope will be acceptable to many of our readers, who are curious in reſearches of ſubterraneous geography. At St. Anthon's colliery (three miles eaſt of Newcaſtle) the different ſeams of coal are as follow:

Seams.	Thickneſs of each Seam. Ft.	In.		Depth to each Seam. Yds.	Ft.	In.
1. Coal - - - -	0	6	—	34	0	6
2. Ditto - - - -	0	8	—	44	1	2
3. Ditto - - - -	0	6	—	66	1	8
4. Ditto - - - -	1	0	—	82	2	2
5. Ditto - - - -	0	6	—	94	0	8
6. Ditto - - - -	0	8	—	101	2	4
7. Ditto - - - -	0	8	—	108	1	0
8. Ditto - - - -	1	0	—	128	0	0
9. High main coal	6	0	—	152	0	0
10. Coal - - - -	3	0	—	193	0	5
11. Ditto - - - -	0	6	—	200	2	2
12. Ditto - - - -	1	6	—	219	2	5
13. Ditto - - - -	3	3	—	247	0	2
14. Ditto - - - -	3	2	—	256	2	8
15. Ditto - - - -	0	9	—	258	1	5
16. Low main coal	6	6	—	270	1	8

In the above pit, or ſhaft, which is nearly the deepeſt in the kingdom, there are no leſs than ſixteen ſeams of coal. But many of theſe, from their thinneſs, are not workable. The 9th, called the *high main coal*, and the 16th, the *low main coal*, are the two principal ſeams for affording quantities of coal, being together twelve feet and a half thick, and are thoſe moſt generally wrought. But the 10th, 13th, and 14th, are all workable ſeams, and will afford conſiderable quantities of coal, the aggregate of the three making nearly nine feet and a half thick; ſo that the total thickneſs of the workable ſeams in this colliery amount to twenty-two feet. In Montague main colliery (three miles weſt of Newcaſtle) the different ſeams of coal are as follow:

Seams.	Thickneſs of each Seam. Ft.	In.		Depth to each Seam. Yds.	Ft.	In.
1. Coal - - - -	0	4	—	5	2	0
2. Ditto - - - -	0	6	—	44	1	0
3. Ditto - - - -	0	9	—	63	2	9
4. Benwell main -	5	3	—	69	1	10
5. Coal - - - -	1	0	—	79	2	10
6. Ditto - - - -	0	8	—	133	1	6
7. Ditto - - - -	3	4	—	137	1	10
8. Ditto - - - -	1	6	—	143	1	3
9. Ditto - - - -	1	3	—	147	2	2
10. Ditto - - - -	0	8	—	162	2	6
11. Low main coal	2	11	—	176	0	4
12. Lower main coal	2	10	—	199	2	10
13. Coal - - - -	0	6	—	226	0	10
14. Ditto - - - -	0	5	—	233	1	5
15. Ditto - - - -	0	3	—	241	1	10

In this ſhaft there are fifteen ſeams of coal, of which only four are workable, viz. the 4th, 7th, 11th, and 12th, making together four yards, one foot, and ſeven inches, of workable coal. If the medium be taken betwixt this and St. Anthon's, it will be nearly ſix yards thick of workable coal; from which may be formed a calculation of the quantity of coal in an acre of ground, ſuppoſing the aggregate thickneſs of the various ſeams amount to ſix yards.

An acre of ground contains -	4,840	ſquare yards,
which, multiplied by the thickneſs,	6	yards,
gives - - - - - - - - -	29,040	cubic yards in an acre.
From which deduct one-third for waſte, and the part or pillars neceſſary to be left in working -	9,680	
there remains - - - - - - -	19,360	cubic yards to be wrought.

And, as three cubic yards of coal, when wrought, afford a Newcaſtle chaldron,

therefore 19,360 divided by 3 } gives 6,453 Newcaſtle chaldrons per acre.

The coals exported yearly from the rivers Tyne and Wear, with Hartley and Blythe, amount to about 825,000 chaldrons, which, with the home conſumption of the two counties of Northumberland and Durham, will make the quantity of coals raiſed yearly about 1,000,000 chaldrons.

And the chaldrons raiſed yearly 1,000,000 divided by the chaldrons per acre 6,453 } gives 155 acres nearly per year, cleared of coal ſix yds. thick.

And, by eſtimating the breadth occupied by the caking coals to be on an average eight miles broad, and twenty-five long, in the two counties, we ſhall find there will be about 200 ſquare miles, or 128,000 acres, of coal proper for exportation.

Then the whole area 128,000 divided by the yearly conſumption - 155 } gives 825 years, the time before this ſpace will be wrought out.

But there are ſome reaſons to think that a thickneſs of ſeam, equal to ſix yards, will not be obtained over an extent of two hundred ſquare miles; probably not more on an average than four yards; in which caſe, the coal will be exhauſted in five hundred and fifty years: and, if the aggregate thickneſs of the ſeams to be obtained ſhould prove only three yards, then little more than four hundred years will be the term of continuance; but it is probable that, before the half of that time be elapſed, the price to the conſumer will be conſiderably increaſed, from the increaſed expence of obtaining them, and the increaſed length of carriage from the pits to the river. This laſt, we preſume, may be reduced, in ſome ſituations, by adopting canals inſtead of waggon-ways, which, we have often wondered, have never yet been attempted.

From the above inveſtigation, it appears that Mr. Williams's apprehenſions are not ſo chimerical as have been repreſented; how far it may be right for the legiſlature to interfere, we leave to the conſideration of thoſe more converſant in political ſpeculations. Of the coal found all through Bambro' ward, Iſlandſhire, and thoſe parts of Glendale ward eaſt of the river Till, the ſeams are very thin, moſtly from one to three feet thick, and of a very inferior quality, yielding a great quantity of aſhes, and neither caking in the fire, nor burning to a cinder: they are uſed only for home conſumption, and for burning lime; for the latter purpoſe they are well adapted, by their property of neither caking nor burning to a cinder; and it luckily happens, that through all this diſtrict, the coal and lime-ſtone are generally found together; a circumſtance which greatly facilitates and leſſens the expence of burning lime in that part of England.

The preſent exiſting laws for regulating the coal-trade, are as follow: Maliciouſly ſetting fire to coal-mines, or to any delph of coal, is felony, 10 *Geo.* II. c. 32. By 7 Edw. VI. c. 7. 16 and 17 Car. II. c. 2. made perpetual by 7 and 8 Will. III. c. 36 and 17 Geo. II. c. 35. the ſack of coals is to contain four buſhels of clean coals; and ſea coals brought into the river Thames, and ſold, ſhall be after the rate of thirty-ſix buſhels to the chaldron; and one hundred and twelve pounds the hundred, &c. The lord mayor and court of aldermen in London, and juſtices of

of the peace of the several counties, or three of them, are impowered to set the price of all coals to be sold by retail; and, if any person shall refuse to sell for such prices, they may appoint officers to enter any wharfs or places where coals are kept, and cause the coals to be sold at the prices appointed. The 12 An. c. 17. regulates the contents of the coal-bushel, which is to hold one Winchester bushel, and one quart of water. By 9 Hen. V. c. 10. 30 Car. II. c. 8. 6 and 7 Will. III. c. 10. 11 Geo. II. c. 15. 15 Geo. III. c. 27. and 31 Geo. III. c. 36. commissioners are ordained for the measuring and marking of keels and boats, &c. for carrying coals; and vessels carrying coals without being so measured and marked, shall be forfeited. For the duties and drawbacks on coals and culm, see 9 and 10 Will. III. c. 13. 9 An. c. 6. 22. 28. 8 Geo. I. c. 14. 14 Geo. II. c. 41. 22 Geo. II. c. 37. 31 G. II. c. 15. 33 Geo. II. c. 15. and 27 G. III. c. 32. For the duty on coals in London, see 9 An. c. 22. and 5 Geo. I. c. 9. the duties payable under which, of three shillings per chaldron, are made perpetual by 6 Geo. I. c. 4. and 1 Geo. II. c. 8. See also 27 Geo. III. c. 13. as to the one-shilling duty under 19 Car. II. c. 3. By 6 and 7 Will. III. c. 18. one mariner is allowed to each fifty ton of shipping employed in the coal trade in time of war, protected from being impressed. By 9 An. c. 28. contracts between coal-owners and masters of ships, &c. for restraining the buying of coals, are void, and the parties liable to forfeit one hundred pounds; and selling coals for other sorts than they are, shall forfeit fifty pounds. Not above fifty laden colliers are to continue in the port of Newcastle, &c. And work-people in the mines there shall not be employed who are hired by others, under the penalty of five pounds. By 3 Geo. II. c. 26. containing several regulations as to lightermen and coal-buyers, and explained by 11 Geo. II. c. 15. coal-sacks shall be sealed and marked at Guildhall, on pain of twenty shillings. Also sellers of coals are to keep a lawful bushel, which bushel, and other measures, shall be edged with iron, and sealed; and using others, or altering them, incurs a forfeiture of fifty pounds. The penalties above five pounds recoverable by action of debt, and under that sum before justices of peace. By 4 Geo. II. c. 30. owners or masters of ships shall not enhance the price of coals in the river of Thames, by keeping of turn in delivering of coals there, under the penalty of one hundred pounds. 13 Geo. II. c. 21. inflicts penalty of treble damages on persons damaging or destroying coal-works. See 6 Geo. III. c. 22. now in force, as to the loading coal-ships, at Newcastle and Sunderland in turn, according to lists to be made there.

By 7 Geo. III. c. 23. (in force by 17 Geo. III. c. 13. till the 1st of June, 1798,) the land coal meters' office for London, and between the Tower and Limehouse-hole, is established and regulated. And the duty of that officer, and the labouring coal-meters in measuring coals is ascertained. And, by 26 Geo. III. c. 83. further regulations are made as to coal-meters sacks, which, when sealed, are to be four feet four inches long, and twenty-six inches broad. Penalties are imposed on the labouring meters and drivers for misbehaviour, and the mode of re-measurement settled, if required by the consumer. By 26 Geo. III. c. 14. a land coal-meter's office is appointed for the parishes of Putney, Wandsworth, Battersea, Lambeth, Rotherhithe, and several parishes in Southwark. And, by c. 108. of the said session, a like office is appointed for the city and liberty of Westminster. The regulations of former acts are adopted and modified by these latter, according to their several districts. 28 Geo. III. c. 53. was passed to indemnify the London coal-buyers against certain penalties which they had literally incurred under 9 An. c. 28. and 3 Geo. II. c. 26. and also for the purpose of putting an end to the society at the Coal-exchange, formed to regulate (*i e.* to monopolize) the trade; subjecting all persons, above five in number, entering into covenant or partnerships, to punishment by indictment or information in the court of King's-bench.

To COAL, *v. a.* To burn wood to charcoal.—Charcoal of roots, *coaled* into great pieces, lasts longer than ordinary charcoal. *Bacon.*—To delineate with a coal.—Marvailing, he *coaled* out rhimes upon the wall, near to the picture. *Camden.*

COAL-BLACK, *adj.* Black in the highest degree; of the colour of a coal:

As burning Ætna, from his boiling stew,
Doth belch out flames, and rocks in pieces broke,
And ragged ribs of mountains molten new,
Enwrapt in *coal-black* clouds and filthy smoke. *F. Queen.*

COAL-BOX, *s.* A box to carry coals to the fire.—Leave a pail of dirty water, a *coal-box*, a bottle, a broom, and such other unsightly things. *Swift.*

COAL-FISH. See GADUS *carbonarius.*

COAL-MINE, *s.* A mine in which coals are dug; a coal-pit.—Springs injure land, that flow from *coal-mines. Mortimer.*

COAL-PIT, *s.* A pit made in the earth, generally to a great depth, for digging coals.—A leaf of the polypody kind, found in the sinking of a *coal-pit. Woodward.*

COAL-STONE, *s.* A sort of cannel coal.—*Coal-stone* flames easily, and burns freely; but holds and endures the fire much longer than coal. *Woodward.*

COAL-TAR, *s.* A substance obtained from pit-coal by distillation; the successful application of which, as a preservative to ship's bottoms, iron-work, sheds, barns, and out-buildings, affords abundant proof of its utility. It was the invention of the earl of Dundonald, to whom a fourteen years patent was granted, in April 1781, for the exclusive manufacture of it. But, becoming a considerable article of commerce, the term of the patent was extended by act of parliament, to twenty years, from June 1, 1785; so that the exclusive manufacture will remain in the earl of Dundonald until June 1, 1805. The method of preparing coal-tar, as stated in the words of the patent, is as follows: "I Archibald earl of Dundonald do hereby declare, that I have invented for the extracting of tar, pitch, essential oils, volatile alkali, mineral acids, and salts, and the making of cinders from pit-coal, consists in admitting the external air to have a passage or passages through the vessels or buildings in which the coal, from which any of the above substances are to be distilled, is put, whether by itself or along with lime-stone, flints, iron-ore, bricks, or any other substance, by which means the said coals, after being kindled, are enabled by their own heat, and without the assistance of any other fire, to throw off in distillation, or vapour, the tar, oil, alkalies, acids, and salts, they contain, into receivers or condensing vessels, communicating with the vessels or buildings containing the coals, and, at the same time, of roasting, calcining, or burning, any substances that may be mixed with them; it appears to me necessary, lest others encroach on my patent, to describe, as above, the principle upon which I act, in as few words as possible, and in such a manner as will admit of no ambiguity: therefore, according to what is above set forth and declared, persons who shall extract tar, &c. from pit-coals in vessels or buildings, (it matters not their shape or size,) whereby the coals are made to burn, or ignite, without flaming, by a regulated admission of the external air through different apertures in the buildings, so as by their own heat to throw off the tar, oils, &c. that they may contain; persons who do so, without my permission, are deemed to encroach upon my patent; as the only method used or known, until my new discovery, was a distillation of coal in close vessels, where the admission of the external air was prevented; and where other fuel or coals were required, besides the coals contained in the close vessel, to produce the heat necessary to pervade the same, and to cause the coals contained therein to throw off the tar, oils, &c. that they contained. I do not think it any ways of moment to subjoin any drawings of the buildings, or kilns, that may be used according to my new invention for the making of

of tar, &c. becaufe thefe buildings may be made either fquare, circular, or oval, as fancy may direct, the art depending upon the management of the air admitted into the kilns, which can only be acquired by experience; and, as it is by no means meant to keep the manufacture hid or concealed, thofe who want to fee the practical part will have an opportunity fo to do at the different places where the manufacture is carried on. Exclufive of the above invention, for which only the patent has been obtained, I promote the condenfation of the lefs coercible part of the vapour that comes off in diftillation, by commixing it with the fteam of boiling water, and complete the condenfation by the means of cold water, either in contact with the vapour, or applied externally to the veffels through which it paffes; and, by an admiffion of the external air into the condenfing veffels when needful, I alfo caufe the vapour to pafs through more condenfing veffels than one, to feparate, by that means, the different oils and fubftances, according to the different degrees of cold and moifture requifite to condenfe them; or occafionally I follow the ufual and common modes in practice for condenfing the vapours thrown off from any fubftances by the action of heat."

COAL-WORK, *f.* A coalery; a place where coals are found.—Our officers make their fureft remits from the *coal-works* and the mines.

COAL'ERY, *f.* A place where coals are dug.—Two fine ftalactitæ were found hanging from a black ftone, at a deferted vault in Benwell *coalery*. *Woodward.*

To COALE'SCE, *v. n.* [*coalefco*, Lat.] To unite in maffes by a fpontaneous approximation to each other.—When vapours are raifed, they hinder not the tranfparency of the air, being divided into parts too fmall to caufe any reflection in their fuperficies; but when they begin to *coalefce*, and conftitute globules, thofe globules become of a convenient fize to reflect fome colours. *Newton.*—To grow together; to join.

COALE'SCENCE, *f.* The act of coalefcing; concretion; union.

COALI'TION, *f.* [from *coalefco*, *coalitum*, Lat.] Union in one mafs or body; conjunction of feparate parts in one whole.—The world's a mafs of heterogeneous confiftencies, and every part thereof a *coalition* of diftinguifhable varieties. *Glanville.*—In the firft *coalition* of a people, their profpect is not great: they provide laws for their prefent exigence. *Hale.*

COAL'Y, *adj.* Containing coal.—Or *coaly* Tine, or ancient hallow'd Dee. *Milton.*

CO'ANE, *f.* [from *conus*, Lat. as ufed by Virgil.] The top point.—Each fide of an arch defcendeth alike from the *coane*, or top point. *Spelman.*

COAN'GO, a river of Africa, which rifes in the interior parts, and, when near the fea, changes its name to Zaire, or Zaira.

COAN'ZA, a river of Africa, which rifes far in the interior parts, and, after croffing the kingdom of Angola, runs into the Atlantic: thirty miles north-eaft of Cape Ledo.

COANENEPIL'LI, *f.* in botany. See PASSIFLORA.

COAPOI'BA, *f.* in botany. See COPAIFERA.

COAPTA'TION, *f.* [from *con* and *apto*, Lat.] The adjuftment of parts to each other.—In a clock, the hand is moved upon the dial, the bell is ftruck, and the other actions belonging to the engine are performed, by virtue of the fize, fhape, bignefs, and *coaptation*, of the feveral parts. *Boyle.*

To COA'RCT, or *to* COARCTATE, *v. a.* [*coarcto*, Lat.] To ftraiten; to confine into a narrow compafs.—The wind finding the room in the form of a trunk, and *coarctated* therein, forced the ftones of the window, like pellets, clean through it. *Bacon.*—To contract power; to reftrain.—If a man *coarcts* himfelf to the extremity of an act, he muft blame and impute it to himfelf, that he has thus *coarcted* or ftraitened himfelf fo far. *Ayliffe.*

COARCTA'TION, *f.* Confinement; reftraint to a narrow fpace.—The greateft winds, if they have no *coarctation*, or blow not hollow, give an interior found. *Bacon.*—Contraction of any fpace.—Straiten the artery never fo much, provided the fides of it do not meet, the veffel will continue to beat, below or beyond the *coarctation*. *Ray.*—Reftraint of liberty.—Election is oppofed not only to coaction, but alfo to *coarctation*, or determination to one. *Bramhall.*

COA'RI, a river of South America, which runs into the river of the Amazons, in Terra Firma.

COARSE, *adj.* Not refined; not feparated from impurities or bafer parts.—Of what *coarfe* metal are ye moulded? *Shakefpeare.*—Not foft or fine: ufed of cloth, of which the threads are large. Rude; uncivil; rough of manners. Grofs; not delicate:

'Tis not the *coarfer* tie of human law
That binds their peace. *Thomfon.*

Inelegant; rude; unpolifhed.—Praife of Virgil is againft myfelf, for prefuming to copy, in my *coarfe* Englifh, his beautiful expreffions. *Dryden.*—Not nicely expert; unfinifhed by art or education.—Practical rules may be ufeful to fuch as are remote from advice, and to *coarfe* practitioners, which they are obliged to make ufe of. *Arbuthnot.*—Mean; not nice; not elegant; vile:

Ill confort, and a *coarfe* perfume,
Difgrace the delicacy of a feaft. *Rofcommon.*

CO'ARSELY, *adv.* Without finenefs; without refinement.—Meanly; not elegantly.—John came neither eating nor drinking, but fared *coarfely* and poorly, according to the apparel he wore. *Brown.*—Rudely; not civilly.—The good cannot be too much honoured, nor the bad too *coarfely* ufed. *Dryden.*—Inelegantly.—Be pleafed to accept the rudiments of Virgil's poetry, *coarfely* tranflated, but which yet retains fome beauties of the author. *Dryden.*

CO'ARSENESS, *f.* Impurity; unrefined ftate.—Firft know the materials whereof the glafs is made; then confider what the reafon is of the *coarfenefs* or dearnefs. *Bacon.*—Roughnefs; want of finenefs. Groffnefs; want of delicacy.—Friends (pardon the *coarfenefs* of the illuftration) as dogs in couples, fhould be of the fame fize. *L'Eftrange.*—Roughnefs; rudenefs of manners:

A bafe wild olive he remains;
The fhrub the *coarfenefs* of the clown retains. *Garth.*

Meannefs; want of nicety.—Confider the penurioufnefs of the Hollanders, the *coarfenefs* of their food and raiment, and their little indulgences of pleafure. *Addifon.*

COASI'NA, a town of the ifland of Corfica; five miles north of Cervione.

COAST, *f.* [*cofte*, Fr. *cofta*, Lat.] The edge or margin of the land next the fea; the fhore. It is not ufed for the banks of lefs waters.—He fees in Englifh fhips the Holland *coaft*. *Dryden.*—It feems to be taken by Newton for fide, like the French *cofte*. It was likewife fo ufed by Bacon.—The fouth-eaft is found to be better for ripening of trees than the fouth-weft; though the fouth-weft be the hotteft *coaft*. *Bacon.*—The fea-coaft of Great Britain, from the figure of the ifland, but chiefly from the inlets of the fea, and the very irregular indented line which forms its fhore, comprehends, allowing for thofe finuofities, at leaft eight hundred marine leagues; we may, therefore, with fafety affirm, that in this refpect it is fuperior in extent to France, though that be a much larger country; and equal to Spain and Portugal in this circumftance, though Britain is not half the fize of that noble peninfula, which is fingularly happy in its advantages of coaft.—*The coaft is clear*, a proverbial expreffion. The danger is over; the enemies have marched off:

Going out, and feeing that *the coaft was clear*,
Zelmane difmiffed Mufidorus. *Sidney.*

The royal fpy, when now *the coaft was clear*,
Sought not the garden, but retir'd unfeen. *Dryden.*

To COAST, *v. n.* To fail clofe by the coaft; to fail within

within sight of land.—The ancients *coasted* only in their navigation, seldom taking the open sea. *Arbuthnot.*

But steer my vessel with a steady hand,
And *coast* along the shore in sight of land. *Dryden.*

To COAST, *v. a.* To sail by; to sail near to.—The greatest entertainment we found in *coasting* it, were the several prospects of woods, vineyards, meadows, and corn-fields, which lie on the borders of it. *Addison.*

CO'ASTER, *s.* He that sails near the shore:

In our small skiff we must not launch too far,
We here but *coasters*, not discov'rers, are. *Dryden.*

COAST'ING, *s.* Is that part of navigation in which the places are not far asunder, so that a ship may sail in sight of land, or within soundings between them.

COAST'ING-PILOT, A pilot who has become sufficiently acquainted with the nature of any particular coast, to conduct a ship or fleet from one part of it to another.

COAT, *s.* [*cotte*, Fr. *cotta*, Ital.] The upper garment.—He was armed with a *coat* of mail, and the weight of the *coat* was five thousand shekels of brass. 1 *Samuel.*—The *coat* of many colours they brought to their father, and said, This have we found: know now whether it be thy son's *coat* or no. *Genesis.*—Petticoat; the habit of a boy in his infancy; the lower part of a woman's dress.—A friend's younger son, a child in *coats*, was not easily brought to his book. *Locke.*—The habit or vesture, as demonstrative of the office:

Men of his *coat* should be minding their pray'rs,
And not among ladies, to give themselves airs. *Swift.*

The hair or fur of a beast; the covering of any animal.—Give your horse some powder of brimstone in his oats, and it will make his coat lie fine. *Mortimer.*

You have given us milk
In luscious streams, and lent us your own *coat*
Against the winter's cold. *Thomson.*

Any tegument, tunic, or covering.—The eye is defended with four *coats* or skins. *Peacham.*—The optic nerves have their medullary parts terminating in the brain, their teguments terminating in the *coats* of the eye. *Derham.*—That on which the ensigns armorial are portrayed. See HERALDRY.

Cropp'd are the flower-de-luces in your arms:
Of England's *coat* one half is cut away. *Shakespeare.*

"Cut your COAT according to your CLOTH." This proverb contains good advice to people of several ranks and degrees, to balance accounts betwixt their expences and their incomes, and not to let their vanity lead them; as, we say, *To out-run the constable*: and so say the Latins, *Sumptus censum ne superet*; and the French, *Fol est qui plus dépend, que sa rente ne vaut*; or, *La dépense ne doit pas excéder la recepte*; Our expences must not exceed our income. Or, *Selon le pain il faut le couteau*; Our knife must be according to our bread. The Italians say, according to the second French proverb, *Faciamo la spesa secondo l'entrata*: or, as we, *Bisogna tagliare il vestito secondo il panno*: or, in a proverbial rhime, *Amiro mio cortese, secondo l'entrate fatte le spese.*

To COAT, *v. a.* To cover; to invest; to overspread: as, to *coat* a retort; to *coat* a ceiling.

COAT-ARMOUR, or COATS OF ARMS, *s.* in heraldry, are what we term *armorial-bearings*, which are regulated by 38 Geo. III. c. 53. as follows: From and after the 24th of June, 1798, every person using or wearing any armorial bearing or ensign, or who shall be possessed of any carriage, or seal, or plate, or other article, on which the same shall be painted, marked, engraved, or affixed, shall previously enter his name, and annually take out a certificate thereof. And, upon every such certificate issued to any person keeping a coach or other carriage, on which such armorial bearing or ensign shall be painted, there shall be charged a stamp duty of two guineas. Upon every person not keeping any such coach or other carriage, who shall be charged to the duties on houses, windows, or lights, there shall be charged a stamp duty of one guinea. And, upon every certificate issued to any person not keeping any such coach or other carriage, nor being charged to the duties on houses, windows, or lights, there shall be charged a stamp duty of ten shillings and sixpence. Not to extend to any of the royal family, or any person who shall by right of office, or by appointment, wear or use any of the arms or insignia worn or used by the royal family, or used by any city, borough, or town corporate. No person who shall come into this kingdom from foreign parts, shall be required to obtain his certificate before the expiration of twenty-one days next after such arrival; and the proof of such arrival shall lie upon the party.

Coats of arms were not introduced into seals, nor into any other use, till about the reign of Richard I. who brought them from the Croisade in the Holy Land, where they were first invented and painted on the shields of the knights, to distinguish the variety of persons of every Christian nation who resorted thither, and who could not, when clad in complete steele, be otherwise known or ascertained. 2 *Comm.* 306. It is the business of the court-military, or the court of chivalry, according to sir Matthew Hale, to adjust the right of armorial ensigns, bearings, crests, supporters, pennons, &c. and also rights of place or precedence, where the king's patent, or act of parliament, (which cannot be over-ruled by this court,) have not already determined it. 3 *Comm.* 105.

COAT-CARD, *s.* [now corrupted into] Court-card.—We call'd him a *coat-card* of the last order, [a knave.] *Ben Jonson.*

COAT OF MAIL. See ARMOUR, vol. ii. p. 200.

COATZACUAL'CO, a navigable river of Mexico, or New Spain, which empties into the gulf of Mexico, near the country of Onohualco.

COA'VO, or CUAVO, a river of Africa, which runs into the Indian sea. Lat. 8. 40. S. lon. 38. E. Greenwich.

To COAX, *v. a.* To wheedle; to flatter; to humour. *A low word.*

CO'AXER, *s.* A wheedler; a flatterer.

COB, a word often used in the composition of low terms; corrupted from cop, Sax. *kopf*, Germ. the head or top.

COB, *s.* A sort of sea-fowl, called *sea-cob*. *Philips.*—In some provinces, and probably in old language, a spider; whence *cob-web.*

COBA'LT, *s.* One of the metals of a whitish grey colour, hard and brittle. The most remarkable property of this metallic substance is, that its calyx, or oxyd, when fused with borax, or with alkali and sand, produces a blue glass, known by the name of smalt. For its natural history, and chemical analysis, see the article CHEMISTRY, p. 269, of this volume.

Cobalt is a valuable article to potters and dyers. To fit it for their use it is well calcined, and sold either mixed or unmixed with fine sand under the name of *zaffer*; or it is melted with siliceous earth and pot-ashes to a kind of blue glass called *smalt*, which, when ground very fine, is known in commerce by the name of *powder blue*. All these articles, because they are most durable pigments, and those which best withstand fire, and because we can produce with them every shade of blue, are employed above all for tinging crystal and for enamelling; for counterfeiting opaque and transparent precious stones, and for painting and varnishing real porcelain and earthen and potters ware. This colour is indispensably necessary to the painter when he is desirous of imitating the fine azure colour of many butterflies and other natural objects; and the cheaper kind is employed by laundresses to give a bluish tinge to new-washed linen; and, by the manufacturers of paper, to heighten its colour, and take off the yellow cast of inferior rags, with which it is macerated and mixed in the vat. Professor Beckmann gives the following account of the

the paint prepared from cobalt: About the end of the fifteenth century, cobalt appears to have been dug up in great quantity in the mines on the borders of Saxony and Bohemia, discovered not long before that period. As it was not known at first to what use it could be applied, it was thrown aside as a useless mineral. The miners had an aversion to it, not only because it gave them much fruitless labour, but because it often proved prejudicial to their health by the arsenical particles with which it is combined; for from it the greatest quantity of arsenic is obtained that is used all over Europe; and it appears that the mineralogical name *cobalt* then first took its rise, which was about the beginning of the sixteenth century; and Mathesius and Agricola seem to have first used it in their writings. Frisch derives it from the Bohemian word *kow*, which signifies metal; but the conjecture that it was formed from *cobalus*, which was the name of a spirit that, according to the superstitious notions of the times, haunted mines, destroyed the labours of the miners, and often gave them a great deal of trouble, is more probable; and there is reason to think that the latter is borrowed from the Greek. It was even customary to introduce into the church service a prayer, that God would preserve miners and their works from *kobolts* and spirits. Kosler says, that the Bohemian cobalt is not so good as that of Misnia, and that its colour is more like that of ashes. We trust, however, that the qualities of foreign cobalt will soon be a matter of little importance to the British artist, as a rich mine of this mineral has lately been discovered near Penzance in Cornwall. See CHEMISTRY, p. 269.

COBA'YA, in zoology. See CAVIA.

COBB (Samuel), an ingenious poet, a man of taste, wit, and learning, was master of the grammar-school of Christ's hospital, where he was himself educated. He took the degree of master of arts in Trinity college, Cambridge. His principal works are, Observations upon Virgil, and a Collection of Poems, in 8vo. 1700. He assisted Mr. Rowe in his translation of the Callipædia, and Mr. Ozell in the translation of Boileau's Lutrin. Died at London, 1713.

COB'BE, a principal town in the kingdom of Dar-Fur, in the interior of Africa.

COB'BE, *s.* in botany. See RHUS.

COBBESCON'TE, or COPSECOOK, which, in the Indian language, signifies the land where sturgeons are taken, is a river of North America, which rises from ponds in the town of Winthrop, in the district of Maine, and falls into the Kennebeck, within three miles of Nahunkeag island, and fifteen from Moose island.

To COBBLE, *v. a.* [*kobler*, Dan.] To mend any thing coarsely: used generally of shoes. To do or make any thing clumsily, or unhandily:

Reject the nauseous praises of the times;
Give thy base poets back their *cobbled* rhimes. *Dryden.*

COB'BLE, *s.* [according to Ray, a north-country word for] pebble.—Their hands shook swords, their slings held *cobbles* round. *Fairfax.*

COB'BLER, *s.* A mender of old shoes; a clumsy workman in general.—Truly, sir, in respect of a fine workman, I am but a *cobbler*. *Shakespeare.*—In a kind of proverbial sense, any mean person:

Think you the great prerogative to enjoy
Of doing ill, by virtue of that race?
As if what we esteem in *cobblers* base
Would the high family of Brutus grace. *Dryden.*

COBBS, a town of United America, in the state of Virginia: twenty miles south-west of Richmond.

COB'DEN (Edward), D. D. and chaplain in ordinary to George II. became early in life chaplain to bishop Gibson, to whose patronage he was indebted for the following preferments, viz. the united rectories of St. Austin and St. Faith in London, with that of Acton in Middlesex, a prebend in St. Paul's, another at Lincoln, and the archdeaconry of London, in which last he succeeded Dr. Tyrwhit, in July 1742. His works were collected by himself, in 1757, under the title of Discourses and Essays, in prose and verse, by Edward Cobden, D. D. archdeacon of London, and chaplain to king George II. above twenty-two years, in which time most of these discourses were preached before him. Published chiefly for the use of his parishioners, one large quarto volume, divided in two parts. Of this volume two hundred and fifty copies only were printed, fifty of which were appropriated to a charitable use. He died April 22, 1764, aged more than eighty years.

CO'BEQUIT, or COLCHESTER RIVER, in North America, rises within twenty miles of Tatamogouche, on the north-east coast of Nova Scotia; from whence it runs southerly, then south-west and west into the Basin of Minas. At its mouth is a short bank, but there is a good channel on each side, which vessels of sixty tons burden may pass, and go forty miles up the river. Some scattered settlements are on its banks.

CO'BER, a river of England, in the county of Cornwall, which runs into the English channel, a little below Helston.

COB'HAM, a pleasant and populous village in the county of Surrey, situate on Bagshot-heath, and on the river Mole, over which are two very good bridges built within a few years at the expence of the county. In this parish are two medicinal springs, Cobham-wells, and the Spa, which were formerly much resorted to; but have been some time neglected on account of Jessop's-well, which is in the vicinity. These are all ranged among the weaker saline purging waters. The principal manufactory in this place is Raby's iron and copper works. It has a fair on December 11th, for horses, cows, and other cattle. Cobham park, late lord Ligonier's, is built in a singular taste, after the manner of an Italian villa. The principal rooms are richly ornamented; the ceilings are gilt; and the offices below are contrived with great judgment. The river Mole passes by the side of the gardens, and, being made here four or five times broader than it was naturally, has a happy effect, especially as the banks are disposed into a slope, with a broad grass walk, planted on each side with sweet shrubs. At one end of this walk is a very elegant room, which is a delightful retreat in hot weather, it being shaded with large elms on the south side, and having the water on the north and east. The house is situated about half a mile from the road to Portsmouth, and is so much hid by the trees near it, as not to be seen till you rise on the heath beyond Cobham. The beautiful gardens at Pain's-hill, from their vicinity to Cobham, being divided from the village only by the river Mole, ought not to be omitted here. They are extended in a semicircular form, between the winding river which describes their outward boundary, and the park which fills up the cavity of the crescent. The house, which was lately built, is an elegant villa, situated on a pleasing eminence, which has a very fine and commanding prospect; but is said to be incommoded by its too near approximation to the Portsmouth turnpike-road.

COB'HAM, a town of the American States in Virginia, on the south bank of James river, opposite Jamestown: twenty miles north-west of Suffolk, and nine south-west of Williamsburg.

COB'HAM, an island in the American seas, mentioned by captain Middleton, in the journal of his voyage for finding a north-east passage. Its two extremities bear north by east, and east by north. Lat. 63. N. lon. 7. 50. E. from Churchill, which he takes to be the Brook Cobham of Fox.

CO'BI, a desert part of Tartary, called by the Chinese *Chamo*, bounded on the north by the country of the Kalkas, on the east by the Moguls and Chinese Tartary, on the south by China, and on the west by Kalmuc Tartary.

COBI'JAH, a sea-port town of South America, on the coast of Chili, in the Pacific Ocean; with a good harbour for

for vessels carrying the metal from the neighbouring mines. Lat. 22. 20. S. lon. 52. 30. W. Ferro.

COB'IRONS, *s.* Irons with a knob at the upper end.—The implements of the kitchen; as spits, ranges, *cobirons*, and pots. *Bacon.*

CO'BISHOP, *s.* A coadjutant bishop.—Valerius, advanced in years, and a Grecian by birth, not qualified to preach in the Latin tongue, made use of Austin as a *cobishop*, for the benefit of the church of Hippo. *Ayliffe.*

COBI'TIS, *s.* in ichthyology, the LOACH; a genus of fishes belonging to the order of abdominales. The generic characters are these: the eyes are placed at the top of the head, and protruded; the body is round, and eel-shaped. The head is small, long, and without scales. The nape of the neck is flat, and the mouth small, with barbles. The coverings of the gills are long, consisting of one thin plate; they are attached to the body by a skin, but are loose above; so that the apertures of the gills are small, and only visible on one side. The membrane of the gills, which is also small, has from four to six rays. The body is covered with stripes, spots, and with a kind of slimy matter. The skin is covered with minute tender scales, hardly visible, but which easily rub off. The under part of the body is long, and the anus is not far from the tail. It has seven short fins: the pectorals are long, the tail round. The back is strait; there is only one dorsal fin, and the lateral line is hardly visible. The loach is a fresh-water fish, and feeds on worms, aquatic insects, &c. The Greeks and Romans seem not to have been acquainted with it; at least none of their descriptions answer to our loach. Gmelin, in his last edition of the Systema Naturæ of Linnæus, enumerates six species, which are natives of fresh-water streams and rivulets.

1. Cobitis barbatula, the bearded loach. This species is distinguished by six barbles attached to the upper lip, four in the middle, and one at each corner of the mouth. There are three rays to the membrane of the gills; ten to the pectoral fin, nine to the ventral and dorsal, eight to the anal, and seventeen to the tail. The head turns down, ending in a blunt point; the upper jaw protrudes; the mouth is small and toothless, the eye is little. The body is rounded, and variegated with grey and white spots, and covered with little scales. The fins are grey; those of the back and tail are marked with brown stripes, and are prickly.

This species rarely exceeds four or five inches in length. It is found in most rivulets which have a stony or flinty bottom; particularly in mountainous countries. On the continent it inhabits the Bober, the Neiske, and the meadows of Truenbreizen; at Paris, it is found in the Seine; also at Moscow in Russia, and in all the contiguous rivers. This fish soon dies after it is out of the water, and even if left long in stagnant or impure water. In such case its delicate taste as food is much injured; therefore the vessels in which it is carried to market, or even from the river to the kitchen, should be kept in motion. Sometimes they drown it in wine. In order to preserve them alive, they should be put into a trough with holes, and placed in the stream of a river, that it may continually receive a current of fresh water. This fish surpasses in taste all the rest of the genus, particularly in November and May. It is pretended that the taste is improved by the fish being stifled in wine or milk. Sometimes they are pickled like lampreys, and may be long preserved in that manner.

The bearded loach feeds on worms and aquatic insects; it spawns in March, and increases very fast; when young, they are often the prey of other fish; they are taken in nets placed in the open stream. They may be transported from one place to another; this must be done in spawning-time, and the vessel must be kept in motion. Frederic I. king of Sweden, had some brought from Germany, and naturalised them in his dominions. We think it hardly necessary to describe the methods pursued for breeding the loach, as it is not much esteemed in this country; those who have curiosity that way may consult Bloch's Ichtyologie, part i. p. 180.—The liver and gall-bladder in this species are large; the intestinal canal is short; the heart is lozenge-shaped, and of a vermillion colour. Viewing the tail through a microscope we easily discover the circulation of the blood. The vertebræ are forty in number, and the ribs twenty on each side.

2. Cobitis tenia, the ribbon-loach. This is distinguished by a forked prickle on each side of the head, not far from the eye, the lower point the longest. There are three rays in the membrane of the gills, eleven in the pectoral fin, seven in the ventral, nine in the anal, eighteen in the tail, and ten in the dorsal. The head is truncated, bending down in front, and compressed at the sides, as is the whole body; insomuch that from its thinness, and decorations, it derives its name. The upper jaw protrudes over the lower. The aperture of the mouth is narrow, long, and toothless: there are six barbles, two to the upper lip, and four to the under: those at the corners of the mouth are the longest; the others are short, but the shortest of all are those of the upper lip. The eyes are very small; the iris is white, inclining to yellow. The nape and back are brown; the ground-colour of the sides is a pale yellow, with four rows of brown spots and dots of irregular shapes. The lateral line, which divides the body into two equal parts, is hardly discernible. The whole body, which is seldom more than five or six inches long, and half an inch broad, is covered with a viscous matter, under which are the scales, which are minute, thin, and soft. The pectoral, anal, and tail, fins, are grey; the rest yellow; the dorsal is ornamented with five rows of black dots; the tail-fin is broad, round, and has four rows of black dots, of the same colour with those of the body, but standing in a contrary direction.

This species is found in rivers, commonly among stones. It is found, among other places, in the Volga, and the rivers that run into it. It is a hardy fish; and when taken makes a sort of hissing, like the pond-loach. Two of these fishes were put together into a glass of river-water with some sand; in fine weather the pond-loach remained quiet, but the other was continually in motion; its whole body was agitated, particularly the lips, which quivered in the manner of those of rabbits and frogs. The flesh of this fish is hard and tough, so that it is seldom eaten; its prickles are disagreeable, as they tear the hands when touched. But the pike, perch, and water-fowl, will devour them when other food is wanting; so that they might be of use to feed those fish in ponds where they are bred. The ribbon-loach feeds on worms, aquatic insects, little fish, and the larvæ of other fish. They spawn in April and May, laying their eggs at the bottom of the water. The heart in this species is not much larger than a grain of hemp-seed; the liver is long, and reddish; the gall-bladder is small; the intestinal canal short, and without any sinuosities. The spine of the back is composed of forty vertebræ, to which are attached twenty-eight ribs on each side.

3. Cobitis fossilis, the pond loach. Ten barbles to the upper lip, and four to the lower, are the distinguishing marks of this species. The first are larger than the others; and, of the small ones, those in the middle are the least. These have a singular effect, by placing the mouth, as it were, in the center of a star. There are four rays to the membrane of the gills; eleven to the pectoral fin; eight to the ventral and anal, fourteen to the tail, and seven to the dorsal. The head ends in a point. The aperture of the mouth is long, and in each jaw are twelve little sharp teeth, of which the third, fourth, and fifth, come out beyond the rest. The tongue is small and pointed. The nostrils are near the eyes, with a prickle above them. The pupil of the eye is black, surrounded with a golden-yellow iris. The cheeks, and the membrane of the gills, are yellow, with brown spots. The nape is broad. Black is the prevailing colour of the whole body, but diversified with yellow and brown longitudinal stripes, and here and

COBITIS.

1. The Bearded Loach. 2. The Ribbon Loach. 3. The Pond Loach. 4. The Four eyed Loach.

and there some spots. The belly is orange-coloured, with black dots. The pectoral, dorsal, and tail, fins, are yellow, spotted, and streaked with black; the tail is rounded off at the end; the ventral and anal fins are yellow; the ventral fin is nearly opposite the dorsal, which is nearer the tail than the head. The black viscous matter with which this fish is covered, made it long doubted whether it had scales or not; but their existence is now ascertained.

The pond-loach is found in most of the slow-moving rivulets of this country, whose bottom is muddy or slimy; also in rivers and lakes on the continent that have the same properties; and in the low muddy parts of the Volga in Russia; the Tartars call it *et-balik*, dog-fish. It is very tenacious of life, and will live either under the ice or in marshes, let there be never so little water. When the marshes are drained, it hides itself in the mud; which has given rise to a fable related by Fabricius, and copied by Bibon, a Swedish physician; which is, that this fish is born from the earth, and that hence Gesner has given it the name of *cobitis fossilis*. It is true, it is often found burrowing in miry places after the water has been drained off; which has made some believe that it comes out of the ground, and that it is only by inundations that it is carried into rivers. In stormy weather, it comes to the surface of the water, and appears very uneasy; it may therefore serve for a barometer, by putting it into a glass with a little mud and some rain or river water; for it will always be in agitation for four-and-twenty hours before a storm comes on; it moves up and down, and disturbs the water: but in calm weather it remains quiet in the mud at the bottom of the vessel. This fish may be kept alive in a room a whole year, only changing the water and mud twice a-week in summer, and once in winter: in cold weather it should be kept in a warm room, but near the window. This fish often ejects bubbles of air by the anus, which other fishes emit by the mouth: it is probable, that this fish, having no air-bladder, emits by the anus the air he takes in with the water; while other fishes provided with that vesicle, emit it by the mouth.

This species grows to the length of ten or twelve inches, or longer, according to Richter. During winter, they hide themselves in mud like eels; from whence they issue in the spring, to lay their spawn on the herbage. They multiply fast, though they are often the prey of the pike, perch, and even of the crab; which last seizes the young ones with its claws, and kills them: frogs also devour the young when just hatched. They live upon worms, insects, small fish, and slime; yet seldom bite at a hook; they are taken in nets with grass or weeds about them. Hoberg says they are fond of getting into the skeleton of a horse's scull. The flesh is soft and insipid, therefore little esteemed, but is by some reckoned delicious food when made into a kind of sauce; and we are told that sportsmen will sometimes swallow down a small one alive in a glass of wine. Those who eat it endeavour to take away the slimy taste by covering it alive with salt, which rubs off the viscous matter, and to which that taste is said to be owing: it must afterwards be well washed in water. Instead of salt, ashes will answer the purpose.

The stomach is small; the intestinal canal short, and without sinuosity. The gall-bladder is large; the ovary and roe double; the ovary contains about 137,000 brownish eggs about the bigness of poppy-seed. In the brain, near the back of the head, there are two vesicles which contain a milky substance. There are thirty ribs on each side; and forty-eight vertebræ in the back-bone. The colour, the stripes, and the spots, of this fish, differ according to the quality of the water they are bred in; so that the distinguishing marks which Artedius gives from the colours and the stripes are not correct. The colours are caused by that viscous matter with which it is covered; and, when its belly is cleaned, the bright yellow colour is washed away. As spirit of wine also takes away this viscous matter, it is apparent why the fish loses its colour in spirits.

4. Cobitis anableps, the four-eyed loach. Artedius and Bloch make this a separate genus, but Linnæus places it with the cobitis. It differs, however, greatly both in external and internal structure. 1. The *cobitis*, or loach, has the teeth in the gullet; but the jaws of the *anableps* are armed. 2. The air-bladder of the former is bony, of the latter membranous; and the one has this bladder at the nape of the neck, the other in the abdomen. 3. The former is oviparous, the latter viviporous. 4. The body of the former is compressed, of the latter flat as far as the ventral fin. 5. The eyes are extremely different. 6. The membrane of the gills has not the same number of rays. 7. The scales in this are large and obvious to the sight, whereas in the loach they are so small and thin, that more than one writer has denied their existence. The eyes extremely prominent, and two barbles at the mouth, form the specific character. The branchiostege membrane has five rays, the pectoral fin twenty-two, the ventral seven, the anal nine, the tail nineteen, and the dorsal seven.

The head of this species is broader than high, and foreshortened; the lower jaw is the longest, and it lengthens downwards, not in front like other fish. Both jaws, as well as the palate and tongue, are armed with teeth; the barbles arise from the corners or extremities of the upper lip. The nostrils are single, and near the mouth. The eyes are very remarkable: there are two diaphanous parts, or a double pupil, which has caused it to be called *four-eyes* at Surinam. The cavity of the eyes differs from other fishes: this cavity is not a funnel, as in other animals, but a part of one only; on each side at the top of the head there is an arched thin bone advancing towards the scull; these bones face each other with their concave surfaces; the eye is cylindrical, and is fixed in this cavity, but rises above it; the pupil is seen above the surface, enclosed in a black iris; as the cornea is equally luminous in the internal part, the pupil is seen double. A more minute examination of the eye exhibits the following phenomena: 1. A transverse line divides the eye externally into two pupils of unequal size. 2. A prolongation of the *tunica choroidea* and of the *tunica argentea*, which fishes only possess, divides the pupil within into two parts, the anterior and posterior. The upper pupil, which is the largest, is edged with a blackish iris, where the tunica argentea of that side is covered by the tunica choroidea. 3. The smaller and lower pupil has a silvery iris, as the upper edge of the lengthened tunica argentea is not covered by the tunica choroidea, any more than its lower part. The embryo of this fish, exhibited in the engraving at *a*, shews the prolongations of the two tunicles of the eye; but, as the coloured transverse line is wanting, and as the two prolongations do not meet in the middle, the pupil does not appear divided. The gill-coverts are smooth and slippery. The body upwards is broader than it is thick; but it takes a rounded form towards the tail. The sides are ornamented with five longitudinal dark-brown stripes; they run quite to the tail, where the two outermost are connected by a transverse stripe, and the three middlemost by another. The lateral line is scarcely visible; the anus is nearer to the tail than to the head. The dorsal fin is small, and near the tail. All the fins, except the ventrals, are covered mostly with small scales; on the body the scales are larger.

Besides the extraordinary structure of the eye, this fish is distinguished by three other peculiarities. 1. It is viviparous. The matrix consists of a large sac with a thin membrane; the sac seems divided in two parts, one somewhat longer than the other. This sac contains a quantity of young fish, each wrapped distinctly in a fine transparent membrane. Each fish appears lying in a yellow globule like the yolk of an egg, as shewn in the engraving at *a*. 2. The anal fin of the male differs greatly from that of the female. In this last, the nine rays of that

that fin are easily discernible; but in the male, only three are visible; the rest are bent round a projected tube, covered with a membrane, which becomes stiff, sticking out from the body. On removing the membrane carefully, the other six rays are unfolded, and the tube just spoken of is visible. This is the male organ of this viviparous fish. The seed and urine run through this tube; which is confirmed by the swelling of the seed-vessels, and of the ureters, when air is blown through that tube, as exemplified in the engraving, where *b b* shews the seed-vessels; *c*, the ureters; *d*, the tube; *e*, the six rays lost in the membrane. 3. The fins of the breast, anus, and tail, are almost entirely covered with scales; which is very rare in fishes of this class.

This singular fish is found in the rivers of Surinam. It multiplies fast, and is esteemed by the inhabitants as food. It grows from six to ten inches in length. The seminal vessels are double, as represented on the plate. It will naturally be asked if this species couples regularly, or whether propagation is performed by the mere contact or approach of the genitals, as in the thornback? It is most reasonable to suppose that there is a real intromission, as the male is provided with the proper instrument.

5. Cobitis heteroclita, the mudfish of Carolina; of which the specific character is, no barbles at the mouth; the dorsal and anal fins dotted with white, the tail striped with black. There are five rays in the membrane of the gills, twelve in the dorsal fin, fixteen in the pectoral, six in the ventral, ten in the anal, and twenty-five in the tail. The head is flat, the scales broad and thin; the lips are serrated; the dorsal fin lies farther back than the point of equilibrium, the anal is opposite to it; the tail fin is round. Found in most of the muddy and stagnant waters of North America, especially in Carolina.

6. Cobitis Japonica, the Japan loach. This species has a flat head, and teeth in the jaws, but no barbles. The dorsal fin has twelve rays, the pectoral eleven, the ventral eight, the anal nine, the tail twenty. It is of a taper shape, five inches long, and found in Japan.

COBLE'NTZ, a city of Germany, in the circle of the Lower Rhine, in the electorate of Treves, situated at the conflux of the Rhine and the Moselle, with a bridge of boats over the former, and a stone bridge over the latter. In the time of the Romans, it was the station of the first legion; after them the residence of the successors of Charlemagne. It was surrounded with walls in the year 1249, and fortified since that time. The elector has a palace here, built in a magnificent style, and finished about the year 1786. It contains three large churches, two of which are collegiate, a college, eight convents, &c. The town was formerly imperial, and at the time of the revolution in France, it afforded an asylum to two of the royal brothers, monsieur and the comte d'Artois, who held their court here; but it was taken by the French republican army in October, 1794. It is 36 miles north-west of Mentz, 54 north-east of Treves, and 82 east-south-east of Liege. Lat. 50. 24. N. lon. 29. 4. E. Ferro.

COBLEN'Z, a town of Swisserland, in the district of Baden, at the conflux of the Aar and the Rhine: ten miles north-north-west of Baden.

CO'BLESKILL, a new town of the American States, in the county of Schoharie, New York, incorporated in March 1797.

COB'LOAF, *s.* An uneven crusty loaf. *Shakespeare.*

COB'NUT, *s.* A boy's game; the conquering nut. The Barcelona hazle.

COBO'ZE, a small island in the Indian Sea, near the east coast of Siam. Lat. 12. 43. N. lon. 97. 20. E. Greenwich.

CO'BRA, or NAJA, *s.* a singularly dangerous species of viper. See COLUBER.

CO'BRAS, an island of South America, in the Atlantic, near the coast of Brasil, on the south side of the river Janeiro, opposite the city.

CO'BRE (El), a town of the island of Cuba: ten miles west of St. Jago.

CO'BSWAN, *s.* The head or leading swan:

I am not taken
With a *cobswan*, or a high-mounting bull,
As foolish Leda and Europa were. *Ben Jonson.*

CO'BURG (principality of), situated near the river Saal, between the territories of Bareith, Thuringia, Henneberg, and Bamberg, in the circle of Franconia, but dependent on the circle of Upper Saxony. It formerly belonged to the counts of Henneberg, but passed by marriage to the house of Saxony, and is divided among four branches, Saxe-Coburg-Saalfeld, or Saxe-Saalfeld, Saxe-Meinungen, Saxe-Gotha, and Saxe-Hildburghausen. The land is generally fertile, and the inhabitants export corn, wool, fat cattle, tiles, works in wood, pitch, and pot-ash.

CO'BURG, a town of Germany, in the circle of Upper Saxony, but insulated in Franconia, of which it formerly made a part when in the possession of the counts of Henneberg, in the fourteenth century. It is now the residence of the dukes of Saxe-Saalfeld, and is situated on the river Itsch, in a valley between two mountains; the town and suburbs are surrounded with a wall. Here are four churches and a college, founded by John Casimer, duke of Saxony, in 1597, and a public school; with manufactures of gold, silver, china, and petrified wood, with which the country abounds. It is twenty-three miles north of Bamberg, and forty south of Weimar. Lat. 50. 14. N. lon. 28. 47. E. Ferro.

COB'WEB, *s.* [*kopweb*, Dutch.] The web or net of a spider: from *cob*, a spider.—Is supper ready, the house trimmed, rushes strewed, and *cobwebs* swept: *Shakespeare.* —Any snare, or trap: implying insidiousness and weakness.—Laws are like *cobwebs*, which may catch small flies, but let wasps and hornets break through. *Swift.*

CO'CA, a town in Spain, in Old Castile, on the Eresma: twenty-four miles south-south-east of Valladolid, and twenty-two north-west of Segovia.

CO'CALUS, a king of Sicily, who hospitably received Dædalus, when he fled before Minos. When Minos arrived in Sicily, the daughters of Cocalus destroyed him. *Ovid.*

COCCE'IUS (Nerva), a friend of Horace and Mecænas, and grandfather to the emperor Nerva. He was one of those who settled the disputes between Augustus and Antony. *Horace.*

COCCE'IUS, an able architect of Rome, whom some have affirmed to be an ancestor of the emperor Nerva, who bore that name, made himself famous by several noble buildings. Some of them have escaped the ravages of time; such as the temple which Calphurnius dedicated to Augustus, in the town of Puzzoli, in the kingdom of Naples, and is at present the cathedral of that place. An enterprize still more considerable has immortalized his name, viz. the grotto that led from Cuma to the lake of Avernus. An ancient tradition, to which the construction of the temple of Puzzoli and the grotto of Cuma may have given rise, attributes to him likewise that of Naples or Puzzoli. It is a mountain hollowed to the length of about a mile, in which two carriages may easily pass. Our countryman, Addison, thought with great probability, that nothing more was at first intended than to dig stones from the mountain for building the city and moles of Naples; and that afterwards they conceived the idea of excavating the mountain through, in order to form a road. His conjecture is founded on this circumstance, that no heaps are to be seen about the mountain.

COCCE'IUS (John), professor of theology at Bremen, was founder of a sect called *Cocceians*: they held, amongst other singular opinions, that a visible reign of Christ would take place in this world, after a general conversion of the Jews and all other people to the true Christian faith, as laid down in the voluminous works of Cocceius. He died in 1699, aged sixty-six.

COCCE'IUS (Samuel), a German baron, born at Francfort on the Oder, towards the close of the seventeenth century,

century, and died in 1755. He rose, by his profound knowledge of the civil law, to the post of minister of state, and grand-chancellor to the great king of Prussia. That royal philosopher entrusted the baron Cocceius with the reform of the administration of justice throughout his dominions. The Frederician code, which this minister compiled in 1747, proved him worthy of the choice of his prince, and as much a philosopher as himself. Besides this work, which is in 3 vols. 8vo, the world is indebted to baron Cocceius for a Latin edition of Grotius de Jure Belli ac Pacis, more ample than any that had before appeared. It was printed in 1755 at Lausanne, 5 vols. 4to. The first volume, which serves as an introduction to the work, is by Cocceius the father, who was also a great civilian.

COC'CHI (Anthony), of Florence, professor of physic at Pisa, afterwards of surgery and anatomy at Florence, died in 1758, at the age of sixty-two. This great man was the intimate friend of Newton and Boerhaave. The late emperor made him his antiquary. He was esteemed both for his theoretical and practical knowledge. He wrote, Epistolæ Physico-medicæ, 1732, 4to. He published a Greek manuscript, with a Latin translation, on fractures and luxations, extracted from Oribasus and from Soranus, Florence, 1754, folio, and other works.

COC'CHI (Anthony Celestine), born at Mugello in Tuscany, in August 1695, was successively professor of physic at Pisa, of philosophy at Florence, and antiquary to the grand duke, who encouraged the learned of every country. Though the principal object of his studies had been medicine, he also excelled in polite literature. It was he who translated into Latin the romance of Ambrocomus and Anthia by Xenophon, which was printed at London in 1726, Greek and Latin 4to. He pronounced also several medical discourses in the Italian language; which were printed at Florence in 1761, two parts. His discourse on the Pythagorean regimen was translated into French, and published in 8vo.

COCCI'FEROUS, *adj.* [from κοκκος, Gr. and *fero*, Lat.] A term in botany for all plants or trees that have berries.

COCCINEL'LA, *f.* in entomology, a genus of insects of the order of coleoptera, the characters of which are these: the antennæ are subclavated, or a little thicker towards the end, the front of which is quite flat; the palpi are shaped like a club, the last articulation in form resembling a heart. The body is hemispherical; the thorax and elytra are margined; the abdomen flat. The genus is subdivided into four sections or families, from the following distinctive properties: 1. Those whose elytra are red, or yellow, with black spots. 2. Those spotted with white, on a red or yellowish ground. 3. Those with black elytra, spotted with red. 4. Black elytra, with white or yellowish spots. The larvæ of this genus devour the aphides, and other small insects which infest and injure plants; wherefore they are often seen on the leaves of trees covered with the plant-louse. When the time arrives for their metamorphosis, they settle on a leaf by the hinder part of their body, then bend and swell themselves, forming a kind of hook. The skin extends, grows hard; and, in a fortnight's time, the chrysalis, or pupa, opens along the back. The insect in its perfect state receives the impressions of the air, that gives its elytra a greater degree of consistence. It seldom flies, and cannot keep long on the wing. Of all the different larvæ of the coccinella, the most curious is the white hedgehog, a name given it by M. de Reaumur on account of the singularity of its figure, and the tufts of hair which render it remarkable. It seeks its food on the leaves of trees. After a fortnight it settles on one spot, and, without parting with its fur, turns to a pupa or chrysalis; three weeks after which it becomes a coccinella. The slough appears unimpaired by its transformation. M. de Reaumur has observed it on a plum-tree; and it is likewise found upon the rose-tree. When the coccinella first arrive at the state of perfection, the colours of their elytra are very pale, nearly bordering upon white or cream colour; and the elytra are very soft and tender, but soon grow hard, and change to very lively brilliant colours. Their eggs are of an oblong form, and of the colour of amber. Of the coccinella there are no fewer than one hundred and fifty-eight species, now separately named and defined by Dr. Gmelin. Their names are made up from their size, colour, number of lines, marks, or spots, with which they are decorated, and from the plants they inhabit, &c. To illustrate this beautiful genus of insects, we have in the annexed engraving, from fig. 1 to 15, exhibited some individuals of each family or section into which they are divided; and from attending to the conformation and habitudes of these, all the species may be readily known.

COCCOCYP'SELUM, *f.* [from κοκκος, a grain or feed, and κυψελιον, a chest, vessel, or measure.] In botany, a genus of the class tetrandria, order monogynia, natural order stellatæ. The generic characters are—Calyx: perianthium one-leafed, four-parted, superior; segments acute, erect. Corolla: one petalled, funnel-form; tube longer than the calyx, gradually widening towards the border, which is four-parted, the parts ovate, erect, Stamina: filaments four, the length of the tube, inserted into the base, filiform, erect; antheræ erect. Pistillum: germ ovate, inferior; style the length of the stamens, bifid at the tip; stigmas simple. Pericarpium: berry roundish, inflated, two-celled, crowned. Seeds: numerous, minute.—*Essential Character.* Calyx, four-parted, superior; corolla, funnel-form; berry, inflated, two-celled, many-seeded.

There is but one species, viz. Coccocypselum repens. It is very like the smallest species of ruellia both in leaves and appearance; it grows in spreading tufts, each stalk creeping eighteen or twenty inches from the root, and shooting out a few lateral branches as it runs; the leaves are opposite; the flowers and fruits rise on short divided peduncles from alternate axils. Native of Jamaica, frequent in the cooler mountains of Liguanea and Mont-Diable.

COCCOLO'BA, *f.* [named *coccolobis* by Browne, from the kernel being lobed at the bottom; and altered to *coccoloba* by Jacquin and Linnæus.] The SEA-SIDE GRAPE, in botany, is a genus of the class octandria, order trigynia, natural order holoraceæ. The generic characters are—Calyx: perianthium one-leafed, five-parted; divisions oblong, obtuse, concave, spreading most widely, coloured, permanent. Stamina: filaments eight, subulate, patulous, shorter than the calyx; antheræ roundish, twin. Pistillum: germ ovate, trigonal; styles three, short, filiform, spreading; stigmas simple. Pericarpium: none; calyx berried, thickened, converging, involving the seed. Seed: nut ovate, acute, one-celled.—*Essential Character.* Calyx, five-parted, coloured; berry, calycine, one-seeded.

Species. 1. Coccoloba uvifera, or round-leaved sea-side grape, or mangrove grape-tree: leaves cordate-roundish, shining. This is a lofty, spreading, branched, irregular, inelegantly-formed, tree, but rendered handsome by its leaves and fruits; bark cinereous, thin, in the younger trees smooth, in older ones full of chinks; timber hard ponderous red, but fit for little use, except to burn, on account of its fibrous texture, unless it should be found serviceable in dying; leaves quite entire, ending in a short blunt point, coriaceous, thick, large, alternate, deep green, with the midrib and veins connected with it more or less scarlet, on short petioles sheathing at the base; the berries are of the size of grapes, having under an outward reddish-brown or purplish membrane, a soft thin pulp, not unpleasantly astringent, covering a large round stone, containing a kernel. The fruit is a very great astringent, and may be used in emulsions, boluses, or electuaries, but its action is not of long continuance: it has all the taste of bistort. The berries have an agreeable flavour, but the pulp is not considerable. This tree is common in most of the sugar colonies, and is generally found near the sea. It frequently grows to a considerable size, and is

is then looked upon as a beautiful wood for all sorts of cabinet-ware; but it seldom rises straight or regular. The Spaniards call it *uvero*, and the French *raisinier du bord de la mer*. Introduced in 1696 by Mr. Bentick. All the species are either trees or shrubs bearing their flowers in racemes or bunches; except the three last, they are natives of the West Indies; some on the sea shores, where they form almost impenetrable thickets. The fruit of the first sort is frequently eaten by the inhabitants, but especially by the negroes; the other sorts are chiefly food for birds.

2. Coccoloba pubescens, or great-leaved sea-side grape: leaves orbiculate, pubescent. This is an upright tree, sixty or eighty feet high; the head has frequently no more than two or three thick branches, but little divided and irregular; the bole of the tree is sometimes forty feet in length, and puts forth a branch or two about the middle; the timber is deep red, heavy, very hard, and also incorruptible, but it is brittle; when used for posts, the part under ground becomes hard as stone; leaves roundish, cordate, quite entire, very much veined and wrinkled, frequently extremely hirsute, sometimes, however, almost smooth, alternate, few, two feet in diameter, on a short petiole sheathing at the base. It is common in the thick mountainous woods of Martinico. Browne says, that in Jamaica it seldom rises above five or eight feet in height; and that the berries are not esteemed. Jacquin had not seen the flower or fruit, but was informed that the latter is eatable. The French inhabitants call it *bois à grandes feuilles*. Jacquin cultivated it at Vienna about the year 1755; and Mr. Miller here in 1768.

3. Coccoloba excoriata, or oval-leaved sea-side grape, or mountain grape-tree: leaves ovate; branches, as it were, barked. This grows to a very large size, and the leaves, flowers, and fruits, are all large; the leaves are very smooth and of a lucid green. Browne informs us that it grows to a considerable size in Jamaica, and is looked upon there as a fine timber wood. It was introduced here before 1733, by William Houstoun, M. D.

4. Coccoloba nivea, or white sea-side grape: leaves elliptic, acuminate, veined, shining above; racemes almost upright. This tree grows to the height of twenty feet, is upright, and the boughs form a head; leaves quite entire, wrinkled, petioled, alternate, half a foot long; flowers small, yellowish; the calyx becomes thick, succulent, and snow-white, covering to the middle a three-sided, black, shining, nut; the fruit is sweet and pleasant. The French call it *raisinier de coude*. Native of St. Domingo, Jamaica, and Martinico.

5. Coccoloba leoganensis: leaves roundish, quite entire, shining, flat; racemes of the fruit erect. This is a small upright branching tree, ten feet high; leaves veined coriaceous, only half the size of those on the first sort. Native of Port-au-Prince and Leogane in St. Domingo.

6. Coccoloba obtusifolia, or blunt-leaved sea-side grape: leaves oblong, very obtuse. This is also a small, very branching, irregular, tree, about 12 feet high, with smooth ash-coloured branches; flowers small, white; the leaflets of the calyx increase and become succulent, closely embracing a dark shining nut, frequently naked at the end; however, they continue permanent, not uniting into a drupe; whence this species seems nearly allied to polygonum: the fruit is astringent. Native of Carthagena; flowering in August.

7. Coccoloba flavescens, or yellow sea-side grape: leaves lanceolate-oblong, blunt, with a point. A small branching tree, twelve feet high; native of St. Domingo, at Port-au-Prince.

8. Coccoloba punctata, or spear-leaved sea-side grape: leaves lanceolate ovate. A tree fifteen feet high; native of Carthagena.

9. Coccoloba emarginata: leaves cariaceous, roundish, gash-emarginated. Native of the West Indies. It is *guaiabasa foliis rotundioribus* of Houstoun's Catalogue, and is in Mygind's Herbarium.

10. Coccoloba Barbadensis, or Barbadoes sea-side grape: leaves cordate-ovate, waved. The leaves are very coriaceous, five inches long; wood red.

11. Coccoloba tenuifolia, or small sea-side grape: leaves ovate, membranaceous. This is of humbler growth than any of the former; the flowers and fruit are smaller than those of the other sort. It recedes from the other species in having membranaceous, not coriaceous, leaves; the petioles surrounded with a membrane instead of a stipule, and not issuing from their back; racemes terminating and quite simple; flowers scattered and pedicelled. Native of Jamaica.

12. Coccoloba australis, or southern sea-side grape: leaves cordate-ovate-acute; flowers polygamous. Native of New Zealand; found at Charlotte sound. It seems rather to be a polygonum by the drawing in sir Joseph Banks's collection.

13. Coccoloba Asiatica, or Asiatic sea-side grape: scandent; leaves oblong-ovate, veined; racemes terminating. Native of Cochinchina, in hedges and among bushes.

14. Coccoloba cymosa: scandent; leaves oblong-ovate, veined; flowers axillary and terminating in sessile cymes. This has the stem, leaves, and fructification, as in the foregoing sort; but the flowers are more numerous and heaped together in sessile cymes. Found in the hedges of Cochinchina.

Propagation and Culture. The plants of all the sorts are easily propagated by seeds, when they can be obtained fresh from the places of their natural growth, for none of the sorts have as yet produced either fruit or flowers in England. The seeds should be sown in small pots filled with earth from the kitchen-garden, and plunged into a hot-bed. If the seeds are good, and the bed of a proper temperature of warmth, the plants will appear in five or six weeks, and will be fit to transplant in about a month after; when they should be shaken out of the pots, parting their roots carefully, and each planted in a separate small pot filled with the like earth, plunging them into a hot-bed of tanners' bark, being careful to shade them in the day-time, until they have taken new root; after which they should be treated as other tender exotic plants, which require to be constantly kept in the bark-stove.

COCCONI'LEA, *s.* in botany. See RHUS.

COC'CULUS INDICUS, *s.* A poisonous berry, heretofore mixed with malt-liquors to make them intoxicating; which practice is now forbidden by act of parliament. It is the fruit of the plant menispermum.

COC'CUS, in entomology, a genus of insects belonging to the order of hemiptera. The rostrum proceeds from the breast; the belly is bristly behind; the wings of the male are erect; and the female has no wings. There are forty-three species, denominated principally from the plants they frequent. The most remarkable species are:

1. The coccus hesperidum, called the green-house bug, which is oval, oblong, of a brown colour, covered with a kind of varnish: it has six legs; with a notch and four bristles at the tail. It infests the orange-trees and other similar plants in green-houses. When young, it runs upon the trees; but afterwards fixes on some leaf, where it hatches an infinity of eggs, and dies. The male is a very small fly.

2. The coccus phalarides. The male of this species is very small; but its antennæ are long for its size. The feet and body are of a reddish colour, nearly pink, and sprinkled with a little white powder. Its two wings, and the four bristles of its tail, are snow white, and of those filaments two are longer than the rest. It is to be found upon the species of gramen which Linnæus calls *phalaris Canariensis*. The female contrives to make along the stalks of that grass, little nests, of a white cottony substance, in which she deposits her eggs. The small filaments of her tail are scarce perceptible.

3. The coccus cacti, a native of South America, is the famous cochineal insect, so highly valued in every part of the world for the incomparable beauty of its red colour, which

COCCOLOBO.

The Round-leaved Sea-side Grape.

which it readily communicates to wool and silk, but with much more difficulty to linen and cotton. This insect, like all others, is of two sexes, but exceedingly dissimilar in their appearance. The female, which alone is valuable for its colour, is ill-shaped, tardy, and stupid: its eyes, mouth, and antennæ, are fixed so deep, and are so concealed in the folds of the skin, that it is impossible to distinguish them without a microscope. The male is very scarce, and sufficient for three-hundred females or more; it is active, small, and slender, in comparison with the female; its neck is narrower than the head, and still narrower than the rest of the body. Its thorax is of an elliptic form, a little longer than the neck and head put together, and flattened below; its antennæ are jointed, and out of each joint issue long slender hairs that are disposed in pairs on each side. It has six feet, each formed of distinct parts. From the posterior extremity of its body two large hairs or bristles are extended, which are four or five times the length of the insect. It bears two wings that are fixed to the upper part of the thorax, which fall like the wings of common flies when it walks or rests. These wings, which are of an oblong form, are suddenly diminished in breadth where they are connected to the body. They are strengthened by two oblong muscles, one of which extends itself on the outside all round the wing; and the other, which is internal and parallel to the former, seems interrupted towards the summit of the wings. The male is of a bright red; but the female is of a still deeper and more beautiful red colour. They are bred on a plant which grows spontaneously throughout the Spanish settlements in South America, called by the natives *nopal*, and by the Spaniards *tuna*; and of which plantations are made for the purpose of breeding these insects. It is the cactus cochenillifera of Linnæus. See CACTUS, vol. iii. p. 582.

The juice of the plant on which these insects breed is their sole nourishment, and becomes converted into their substance; when, instead of being thin and waterish, and to all appearance of little or no use, it is rendered of a most beautiful crimson colour. The plant is in May or June in its most vigorous state, and at this most favourable season the eggs are deposited among the leaves. In the short space of two months, from an animalcule, the insect grows to the size above mentioned: but its infant state is exposed to a variety of dangers: the violent blasts of the north wind often sweep away the eggs from the foliage of the plant: and, what is equally fatal to their tender constitutions, showers, fogs, and frosts, in turn attack them, and destroy the leaves, leaving the careful cultivator this only resource, namely, that of making fires at certain distances, and filling the air with smoke, which frequently preserves them from the inclemency of the weather. The breeding is also greatly obstructed by birds of different kinds, which are very fond of these insects; and the same danger is to be apprehended from the worms, &c. which are found among the plantations.

The cochineal-insect may, in some circumstances, be compared to the silk-worm, particularly in the manner of depositing its eggs. The insects destined for this purpose are taken at a proper time of their growth, and put into a box well closed, and lined with a coarse cloth that none of them be lost; and in this confinement they lay their eggs and die. The box is kept close shut till the time of placing the eggs on the plant, when, if any motion is perceived, it is a sufficient indication that the animalcule has life, though the egg is so minute as hardly to be perceived; and this is the seed placed on the foliage, and the quantity contained in the shell of a hen's egg is sufficient for covering a whole plant. It is remarkable that this insect does not, in any visible manner, injure the plant, but extracts its nourishment from the most succulent juice, which it sucks by means of its proboscis through the fine teguments of the leaves.

The countries where cochineal insects are mostly bred, are Mexico, Peru, and the Portuguese settlements in South America. The following description of these insects, and method of cultivating them in the Portuguese settlement of Rio de Janeiro, is given by sir George Staunton, in his "Embassy to China," and which we can the more confide in, because the observations were made on the spot, while lord Macartney's squadron were taking in refreshments at that port.

The cochineal insect of Rio is convex, with legs of a clear bright red in both male and female, and the antennæ are moniliform, or bead-like. The male is a delicate and beautiful insect; the colour of the whole body a bright red, nearly resembling the pigment usually called red lake. The breast is elliptical, and slightly attached to the head. The antennæ about half the length of the body. The legs are of a more brilliant red than that of the other parts. Two fine white filaments, about three times the length of the insect, project from the extremity of its belly or abdomen. The wings are two, erect, of a faint straw colour, and of a very delicate texture. The female has no wings, is elliptic in its form, and convex on both sides, but most so on the back, which is covered with a white downy substance resembling the finest cotton. The abdomen is marked with transverse rugæ or furrows. The mouth is situated in the breast, having a brown beak, inclining to a purple tint, that penetrates the plant on which the insect feeds. Its six legs are of a clear bright red. It becomes pregnant about twenty days after it is born, and dies after bringing forth an innumerable offspring, of so minute a size as to be easily mistaken for the eggs only of those insects. For about the space of a day they remain without any appearance of life or motion; but soon afterwards shew signs of animation, and begin to move with great agility over the surface of the leaf on which the mother had deposited them. At this time they appear, under a magnifier, like small specks of red unshapen matter, thinly covered over with a fine cottony down. In three or four days this downy envelopement becomes visible to the naked eye; the insect it covered increasing rapidly in size, till the largest is nearly equal to a grain of rice. With this increase of size they decrease in motion, and when arrived at their full growth, they adhere to the leaf in a torpid state. At this period they are taken from the plant for use; but, if suffered to remain, will deposit their young, as already mentioned. Amongst the clusters of these insects, enveloped in their cotton, there are several cells, of a cylindric form, standing perpendicularly on the surface of the leaf. These cells are the chrysalides or coccoons of the male, and out of which the wings, in their nascent state, make their first appearance, and are visible about three days before the perfect insect is produced. It enjoys its existence, in that state, only three or four days, during which it impregnates the females. The plant, on which this insect feeds, is called at Rio, *orumbela*, and is the cactus cochenillifera of Linnæus. The leaves are thick and fleshy; the upper side more flat, or even concave, than the opposite; are somewhat of an oval form, growing without stalks, but rising one immediately from the other's edge, as well as from the stem, armed with round and tapering prickles, about an inch, or nearly so, in length, and having a reddish purple blossom growing out of the top, which is the rudiment of the fruit. These plants grow, sometimes, to the height of twenty feet; but they are generally prevented from rising above eight feet, which is a size more convenient to the cochineal breeder, and at which the leaves are thought to contain juices most nutritious to the insects. The young leaves are of a dark green, but incline towards a yellow colour as they advance in age. The internal substance of the leaf is of the same colour with its exterior surface. It is easy to discern when any insects are upon the plant; they first appear like a white powder thinly spread upon its flat or hollow side, which is marked, soon afterwards, with small protuberances of the same white downy substance, already said to resemble the finest cotton.

Another insect is found at the same time upon the cactus, which is supposed to be a species of ichneumon, that feeds upon the coccus or cochineal insect; but, it has only two wings. The larva, or caterpillar of this fly, insinuates itself into the cotton with which the coccus is enveloped, and is scarcely distinguishable from the latter, except that it is a little more elongated, with somewhat longer legs, and that the cotton does not stick to it, whereas from the coccus it is with difficulty separated. When this fly is prepared to change its skin, it creeps out of the cotton upon the naked part of the leaf, increases quickly in its bulk, and its colour changes from that of a bright red to a clear yellow, with rings of brownish spots about its body. In a few days it becomes torpid; but, soon afterwards, contracting its rings with violent agitation, it deposits a large globule of pure red colouring matter; after which it immediately hangs itself upon the prickles of the leaf, and becomes a chrysalis, out of which issues, shortly, the perfect fly. From the circumstance of the colouring matter being deposited by this insect, previous to its change into the pupa state, it might be inferred, that any other insect, feeding on the same plant, would be productive likewise of the same colouring matter. Yet the leaf itself constantly gave out, while under examination by sir George Staunton, only a transparent gelatinous fluid, perfectly colourless. The fruit, indeed, or fig of the cactus, when ripe, contains a scarlet juice, which colours some of the excretions of those who eat it.

The profit to the Portuguese at Rio de Janeiro, from the cochineal, is inconsiderable, owing to an error in the preparation. Twice or thrice a-week the slaves, appropriated to this employment, go among the cactus plants, and pick off carefully with a bamboo twig, shaped somewhat into the form of a pen, every full-grown insect they can find, with many not yet arrived to their perfect state; the consequence of which is, that the plants are never half stocked with insects, many of the females being destroyed before they have deposited their young. The natives of Mexico pursue a method very different. As soon as the periodical rains are over, and the weather is warmer, as well as drier, they fix, on the prickles of the cactus leaves, small parcels of the finest moss, serving as nests to contain each ten or a dozen full-grown female insects. These, in the course of a few days, bring forth an innumerable tribe of young, spreading themselves over the leaves and branches of the plant, till they become attached to those spots which they find most favourable for supplying nutritious juice; where, soon acquiring their full growth, they remain motionless, and then are gathered off for use; a sufficient number being always left for the production of new broods. The insects are soon converted into cochineal by a very simple process; but if, 'in corporal sufferance, the poor beetle feels a pang as great as when a giant dies,' this process is not more simple than it is cruel. The insects, which are collected in a wooden bowl, are thickly spread, from thence, upon a flat dish of earthen ware, and placed alive over a charcoal fire, where they are slowly roasted until the downy covering disappears, and the aqueous juices of the animal are totally evaporated. During this operation the insects are constantly stirred about with a tin ladle, and sometimes water is sprinkled upon them, to prevent absolute torrefaction, which would destroy the colour, and reduce the insect to a coal; but a little habit teaches when to remove them from the fire. They then appear like so many dark round reddish grains, and take the name of cochineal: preserving so little the original form of the insect, that this precious dye was long known and sought in Europe before naturalists had determined whether it was an animal, vegetable, or mineral, substance. The garden at Rio does not, annually, produce above thirty pounds weight of this commodity; though by proper treatment, from the same number of plants, ten times the quantity might be obtained. At Marica and Saquarama, both places contiguous to Cape Frio, are considerable plantations of the cactus, which are propagated easily from cuttings set into the earth during the cold and rainy season, though they afterwards thrive least where excluded from the sun. The insects breed and are collected, in dry weather, from October until March. The preparation of cochineal is encouraged by the trade being laid open, which had formerly been a monopoly to the crown of Portugal. In the annexed engraving we have delineated one of the leaves of the *cactus cochenillifer*, with the coccus, or cochineal insect, in its various stages of propagation. The white downy or cottony substance on the surface of the leaf, represents the egg and larvæ state of the coccus. Fig. 16 and 17, shew the male coccus insect of its natural size; 18 and 19, the same much magnified. The body of the insect is of a bright red colour; wings pale yellow; and the long filaments proceeding from the posterior extremity of the body, are white and very delicate. Fig. 20 and 21, shew the female coccus the size of nature, in two different stages of its growth: the body is of a mahogany colour; the legs of a bright red. Fig. 22, exhibits the first state of the larvæ or caterpillar of the ichneumon, supposed to feed on the coccus; 23, the same magnified; 24 and 25, the larvæ of the fly in different views and magnitudes, just before its change into the pupa state; 26, the pupa or chrysalis; 27, the perfect fly much magnified.—See the article COCHINEAL.

4. The coccus ilicis, or kermes insect, inhabits the quercus coccifera, a species of oak growing in the southern parts of Europe. M. Hellot, of the French Academy of Sciences, says it is found in the woods of Vauvert, Vendeman, and Narbonne; but more abundantly in Spain, towards Alicant and Valencia. It not only abounds in Valencia, but also in Murcia, Jaen, Cordova, Seville, Estremadura, la Mancha, and Serranias de Cuença; in all which places the kermes consequently abounds. In Xixona and Tierra de Relleu, in the district called *De la Grana*, the people of Valencia first began to gather it, whose example was followed all over Spain. It has some years produced 30,000 dollars (5000l.) to the inhabitants of Xixona alone.

Both ancients and moderns seem to have had very confused notions concerning the origin and nature of the kermes; some, considering it as a fruit, without a just knowledge of the tree which produced it; others taking it for an excrescence formed by the puncture of a particular fly, the same as the common gall observed upon oaks. Tournefort was among this number. Count Marsigli, and Dr. Nisole, a physician of Montpelier, made experiments and observations, with a view of further discoveries, but did not perfectly succeed. Two other physicians at Aix, Dr. Emeric and Dr. Gardel, applied themselves about the same time, and with greater success; for they discovered that the kermes was the body of an insect, transformed according to the course of nature. The progress of this transformation is to be considered at three different seasons. In the first stage, at the beginning of March, an animalcule, no larger than a grain of millet, scarcely able to crawl, is perceived sticking to the branches of the tree, where it fixes itself, and soon becomes immoveable; at this period it grows the most, appearing to swell and thrive with the sustenance it draws in by degrees. This state of rest seems to have deceived the curious observer, as it then resembles an excrescence of the bark; during this period of its growth, it appears to be covered with a down, extending over its whole frame like a net, and adhering to the bark; its figure is convex, not unlike a small sloe; in such parts as are not quite hidden by this soft net-work, many bright specks are perceived of a gold colour, as well as stripes running across the body from one space to another. At the second stage, in April, its growth is completed; its shape is round, and about the size of a pea: it has then acquired more strength, and its down is changed into dust, and seems to be nothing but a husk or a capsule, full of a reddish juice, not unlike discoloured blood. Its third

state

COCCINELLA, AND COCCUS

Fig. 1. to 15. different Species of Coccinella. Fig. 16. to 21. male and female Coccus.
Fig. 22. to 27. the Insect supposed to feed on the Coccus.

ſtate is towards the end of May, a little ſooner or later, according to the warmth of the ſeaſon. The huſk appears replete with ſmall eggs, leſs than the ſeed of a poppy. Theſe are ranged under the belly of the inſect, progreſſively placed in the neſt of down that covers its body, which it withdraws in proportion to the number of eggs; after this work is performed, it ſoon dies, though it ſtill adheres to its poſition, rendering a further ſervice to its progeny, by ſhielding them from the inclemency of the weather, or the hoſtile attacks of an enemy. In a good ſeaſon they multiply exceedingly, having from 1800 to 2000 eggs, which produce the ſame number of animalcules. When obſerved with the microſcope in July or Auguſt, we find, that what appeared as duſt, are ſo many eggs or open capſules, as white as ſnow, out of each of which iſſues a gold-coloured animalcule, of the ſhape of a cockroach, with two horns, ſix feet, and a forked tail.

The cuſtom of lopping off the boughs to take them, is very injudicious, as by this means they deſtroy the next year's harveſt. Strong dews will occaſionally make them fall from the trees ſooner than uſual; but when the proper ſeaſon paſſes, they fall off of themſelves, and become food for birds, particularly doves. Sometimes there will be a ſecond production, which is commonly of a leſs ſize, with a fainter tinge. The firſt is generally found adhering to the bark, as well as on the branches and ſtalks; the ſecond is principally on the leaves, as the worms chooſe that part where the nutritious juice preſerves itſelf the longeſt, is moſt abundant, and can be moſt eaſily extracted in the ſhort time that remains of their exiſtence, the bark being then drier and harder than the leaves.

Thoſe who procure the kermes to ſend to foreign parts, ſpread it on linen, taking care to ſprinkle it with vinegar, to kill the worms that are within, which produces a red duſt, which in Spain is ſeparated from the reſt. Then they let it dry, paſſing it through a ſearce, and make it up into bags. In the middle of each package, its proportion of red duſt, put in a little leather bag, alſo belongs to the buyer; and then it is ready for exportation, being always in demand on the African coaſt. The people of Hinojos, Bonares, Villalba, and other parts of Seville, dry it on mats in the ſun, ſtirring it about, and ſeparating the red duſt, which is the fineſt part, and being mixed with vinegar, goes by the name of *paſtel*. The ſame is done with the huſks; but theſe have but half the value of the duſt. The kermes of Spain is preferred on the coaſt of Barbary, on account of its goodneſs. The people of Tunis mix it with that of Tetuan, for dying thoſe ſcarlet caps ſo much uſed in the Levant.

5. The coccus ficus, or gum-lac inſect, a native of the Eaſt Indies. The head and trunk form one uniform, oval, compreſſed, red body, of the ſhape and magnitude of a ſmall aphides, conſiſting of twelve tranſverſe rings. The back is carinated; the belly flat; the antennæ half the length of the body, filiform, truncated, and diverging, ſending off two, often three, delicate diverging hairs, longer than the antennæ; the mouth and eyes cannot be ſeen with the naked eye. The tail is a little white point, ſending off two horizontal hairs as long as the body. It has three pair of limbs, half the length of the inſect. This is the ſtate in which it ſallies forth from the womb of the parent in the months of November and December. They traverſe the branches of the trees upon which they were produced for ſome time, and then fix themſelves upon the ſucculent extremities of the young branches. By the middle of January they are all fixed in their proper ſituations; they appear as plump as before, but ſhow no other marks of life. The limbs, antennæ, and ſetæ of the tail, are no longer to be ſeen. Around their edges they are environed with a ſpiſſid ſubpellucid liquid, which ſeems to glue them to the branch; it is the gradual accumulation of this liquid which forms a complete cell for each inſect, and produces what is called *gum lacca*, though it is not properly a gum. About the middle of March the cells are completely formed, and the inſect is in appearance an oval, ſmooth, red bag, without life, about the ſize of a ſmall cochineal inſect, emarginated at the obtuſe end, full of a beautiful red liquid. In October and November we find about twenty or thirty oval eggs within the red fluid of the mother. When this fluid is all expended, the young inſects pierce a hole through the back of their mother, and walk off one by one, leaving their exuviæ behind, which is that white membranous ſubſtance found in the empty cells of the ſtick lac. Theſe inſects are the inhabitants of four trees: 1. Ficus religioſa; 2. Ficus indica; 3. Plaſo, called by the natives *bihar*; and, 4. Rhamnus jujuba.

The lacca inſects generally fix themſelves ſo cloſe together, and in ſuch numbers, that ſcarcely one in ſix can have room to complete her cell: the others die, and are eaten by various inſects. The extreme branches appear as if they were covered with a red duſt, and their ſap is ſo much exhauſted, that they wither and produce no fruit, the leaves drop off, or turn to a dirty black colour. Theſe inſects are tranſplanted by birds; if they perch upon theſe branches, they muſt carry off a number of the inſects upon their feet to the next tree they reſt upon. It is worth obſerving, that theſe fig-trees when wounded drop a milky juice, which inſtantly coagulates into a viſcid ropy ſubſtance, which, hardened in the open air, is ſimilar to the cell of the coccus lacca. A red medicinal gum is alſo procured by inciſion from the plaſo-tree, ſo ſimilar to the gum lacca, that it may readily be taken for the ſame ſubſtance. Hence it is probable, that thoſe inſects have little trouble in animaliſing the ſap of theſe trees in the formation of their cells. The lacca is rarely ſeen upon the rhamnus jujuba; and it is inferior to what is found upon the other trees. The lacca brought into this country is principally found upon the uncultivated mountains on both ſides the Ganges, where bountiful nature has produced it in ſuch abundance, that, were the conſumption ten times greater, the markets might be ſupplied by this minute inſect. The only trouble in procuring the lac is in breaking down the branches, and carrying them to market. The beſt lac is of a deep red colour. If it is pale, and pierced at the top, the value diminiſhes, becauſe the inſects have left their cells, and conſequently the dye or colour muſt be very weak and imperfect. This inſect and its cell has gone under the various names of *gum lacca*, *lack*, and *loc-tree*. In Bengal, *lax*; and by the Engliſh it is diſtinguiſhed into three kinds, differently denominated; for which, and their ſeveral uſes, ſee the article Lac.

6. Coccus Polonicus, a ſpecies which may properly enough be called the *cochineal* inſect of the northern part of the world. As the cochineal loves only the warm climates, ſo this affects only the cold ones. It is collected for the uſe of dyers; but the crops of it are much ſmaller, more difficultly made, and the drug itſelf greatly inferior to the true cochineal. It is commonly known by the name of *coccus Polonicus*, or the *ſcarlet grain of Poland*. That country is the place where it is gathered in the greateſt abundance; but it is not the only one where it is found. It is to be met with in many of the northern countries; and poſſibly may be found in ſome of the more temperate ones, where it is not yet known; as it is very much obſcured by nature from the eyes of common obſervers. It is found affixed to the root of a plant, and uſually to plants of that ſpecies from thence called *polygonum cocciferum*; though authors have informed us of the ſame berry, as it is often called, being found at the roots of the mouſe-ear, rupture-wort, pimpernel, and pellitory of the wall; and that it is in no other than ſandy places that it is found at the roots of thoſe plants. Breynius, in 1731, printed at Dantzick a very curious account of this production, which proved it inconteſtably to be an animal. Towards the end of June the coccus is in a fit ſtate for being gathered. Every one of the inſects is then nearly of a ſpherical form, and of a fine violet colour. Some of them, however, are not larger than poppy-

poppy-seeds, and others of the size of a pepper-corn; and each of them is lodged, either in part or entirely, in a sort of cup like that of an acorn. More than half the surface of the body of the insect is covered by this cup. The outside of the covering is rough, and of a blackish brown; but the inside is smooth, polished, and shining. On some plants they find only one or two of these, and on others more than forty; and they are sometimes placed near the origin of the stalks of the plants. Breynius began his observations on the animals in this state, several of them being put into vessels of glass; and, by the 24th of July, there was produced from every one of them a hexapod, or six-legged worm, with two antennæ on its head. Several of these were kept a fortnight, and shewed no inclination to eat any thing. They ran about, however, very swiftly for some time; but then began to be more quiet, drew up their bodies shorter, and ceased to run any longer. They were now of a purple colour; but in this state, though they did not walk about, they were subject to various contortions. At length, when they were become wholly motionless, their bodies became covered with a fine down; this was white, and formed them a perfect covering, which was sometimes of a spherical and sometimes of an irregular figure; it was always, however, very elegant; and the downy matter plainly enough transpired out of the animal's body. The insects remained in this state of rest, and covered with this down, for five or six days; but, at the end of that time, every one of them had laid more than 150 eggs. These eggs were deposited upon the paper on which the animals were placed, and were enveloped in some measure by a downy matter. When the creatures had laid all their eggs, they died; and, about the 24th of August, there came from every egg a small insect, which, to the eye, scarcely seemed any other than a red point; it might, however, be observed very plainly to move about. These young animals lived a month wholly without sustenance. Breynius was induced at first to believe, that these insects came to be in a state to produce perfect eggs without any congress with the male; but farther observation convinced him of the error of his opinion. He saw afterwards a sort of very small flies with two white wings bordered with red, produced from several of the cocci. These flies are of a similar kind with the male gall-insect. It has before been observed, that these cocci differ in size. The flies are produced by the small ones not bigger than a poppy seed; the others produce the worms before described; and one observation of Breynius's affords a plain proof that these flies are the male insects of the species; since all those of the females, which had been a day or two accompanied by those flies, quickly covered themselves with down and began to lay their eggs; whereas those which had not this commerce with the flies remained in the same state, or else got only a very thin and slight covering of down, and never laid any eggs.

The proper season for gathering this insect, as we have already observed, is about the end of June, when it is quite full of purple juice. Those who gather it have a hollow spade with a short handle; then, taking hold of the plant with one hand, they raise it out of the ground with the tool held in the other; after which they very quickly and dexterously detach the insects, and replace the plant in the ground, where it again takes root. The coccus is then separated from the earth by means of a sieve; and, in order to prevent them from turning into worms, they sprinkle them with very cold water or vinegar. Lastly, They are killed by exposure to the sun, or keeping them for some time in a warm place; but this must be done with caution, as too hasty drying spoils the colour. Sometimes they separate the insects from the vesicles with their fingers, and form them into balls; but, by this operation, the price is increased. We are informed by Bernard de Bernitz, from whom this account is taken, that the harvest of coccus was farmed out to the Jews by some Polish lords, who had possessions in the Ukraine; that it was used by them, as well as the Turks and Armenians, for dying not only wool and silk, but the tails and manes of their horses; that, by its means, the Turkish women dyed the tips of their fingers of a beautiful carnation; and that it was formerly used by the Dutch, mixed with an equal quantity of cochineal, the coccus being purchased at a very dear rate; that beautiful paints may be prepared from this insect and pounded chalk, &c. This, however, Macquer supposes to have been exaggerated, as he never could produce with it any other than lilac, flesh-colour, or crimson; and he found it more expensive than cochineal, as not yielding one-fifth part of the colour.

COCCY'GRIA, *s.* in botany. See RHUS.

COCHABAM'BA, a town of South America, in Peru, situated in a valley to which it gives name, and capital of a jurisdiction. The plains are fertile, and the air healthy and serene: 140 miles south-west of Potosi.

CO'CHE, a small island in the Caribbean sea, between the island of Margarita and the continent of South America. Lat. 10. 57. N. lon. 63. 10. W. Greenwich.

COCHE'IM, or KOCHEIM, a town of Germany, in the circle of the Lower Rhine, and electorate of Treves, on the Moselle, formerly Imperial, but engaged to the electorate of Treves in the year 1240, by the emperor Adolphus de Nassau: thirty miles north-east of Treves, and forty-six north-east of Luxemburg.

CO'CHER, a river of Germany, which runs into the Neckar, near Wimpfen, in the circle of Swabia.

COCHERE'L, a town of France, in the department of the Eure, noted for a victory gained by Guesclin over the king of Navarre, in 1654: seven miles east of Evreux.

COCHE'RINGS, *s.* An exaction or tribute in Ireland, now reduced to chief-rents.

COCHIL'LA, a river of Italy, in the kingdom of Naples, which runs into the gulf of Tarento, between Cassano and Rossano, in the Province of Calabria Citra.

CO'CHIN, a sea-port of Hindoostan, on the coast of Malabar, in a country to which it gives name, chiefly resorted to for pepper. The Portuguese had a settlement here, but they were dispossessed by the Dutch: eighty-five miles south-south-east of Calicut, and 120 north-north-west of Travancore.

CO'CHIN, a country of India, with a city of the same name, on the coast of Malabar, situated to the northward of Travancore. The chief trade has long been in the hands of the Dutch. Cochin is situated in lat. 9. 58. N. on the southern side of the channel, on an island opposite to another that stretches to the south. It is a rajahship, formerly dependent on that of Travancore, who seems to have undertaken the defence of the whole tract southward, by erecting the famous lines of Travancore, which begin at Cranganore, and extend almost to the foot of the Ghauts. The coast is very low, scarcely discernible, except by the trees. The soundings are gradual, and are, at the distance of two miles from shore, ten or eleven fathoms. Ships usually lie three or four miles from land; a dangerous bar is an obstruction to entering the harbour; and a most furious serge at times beats on the shore. This was one of the first places visited by the Portuguese, after their arrival at Calicut. It was at that time governed by a prince, tributary to the Zamorin, but who shewed every act of friendship to the Portuguese admiral Cabral, and his companions. At this time the harbour was capacious and open. While he was there, two of the Christians of St. Thomas came and requested him to convey them to Portugal, that from thence they might visit Jerusalem and the Holy Land. Gama himself afterwards visited Cochin, and received every mark of respect. The tributary prince continued faithful to his new allies, and assisted them with a considerable army against the Zamorin. At length fortune declared against him; the Zamorin burnt his capital, and made himself master of his dominions. The Portuguese under Francis Albuquerque, says Lafitau, came, in 1503, to their assist-

tance, expelled the Zamorin, and Duarte Pacheco, whom Albuquerque had left behind, by his astonishing valour and prudence, reinstated Triumpara, the reigning prince; but only to prepare him for a new mortification. In the transports of his gratitude he permitted the Portuguese to build a strong fort. This gave them full power over their faithful ally; and, under pretence of reducing his rebellious subjects, they made a conquest of the whole country for themselves. In a little time, therefore, the poor prince found himself enslaved. Cochin became, under its new masters, a place of great commerce, till the year 1660, which was fatal to the Portuguese in this part of India. It was attacked by commodore Goens. The garrison made a gallant defence; nor was it taken till after great loss on both sides. The Dutch found the city much too large for their purpose; and they reduced it considerably. The titular king did not find much improvement in his new situation; he was placed, with his family, in a palace near Cochin, with an income of little more than six hundred a-year. Some of the race of the Jewish captives, and some of the Christians of St. Thomas, resided here; and the church of St. Andrea, not far from hence, is served by their clergy. In this city breathed his last the great Vasco de Gama, the discoverer of India. This place continued in the hands of the Dutch until November 1795, when it was captured by the English.

COCHIN-CHINA, a country of Asia, bounded on the north by Tong-quin, on the east by the Indian sea, part of which, between the continent and the island of Hainan, is called the *Gulf of Cochin-china*; on the south it is bounded by Chiampa, and on the west by Laos and Cambodia. This kingdom contains about fifty good sea-port towns, and is divided into six provinces, to each of which belongs a governor and a seat of justice. It is about 150 leagues in length, and thirty-five in breadth. The principal productions are rice of several sorts, millet, maize, pepper, indigo, saffron, carthamus, tea, silk, &c. Among the trees are the varnish-tree, cotton, mulberry, eagle-wood, aloes, rose-wood, and cinnamon. They have mines of gold and iron, and quarries of different kinds of marble. Among the animals are elephants, tygers, rhinoceroses, stags, antelopes, buffaloes, &c. The birds are various and abundant, and on the sea-coast are found those eatable birds' nests, white as snow, so much sought for in Asia as a delicacy at the tables of the luxurious and rich. The sugar-cane is eaten as fruit in Europe; the inhabitants cultivate two kinds, and the commerce is immense: China alone is said to take, one year with another, 800,000 quintals. Other articles of commerce are odoriferous woods, ivory, musk, honey, wax, silk, and pepper. The manners of the inhabitants are simple, they are affable, mild, laborious, and hospitable; their chief nourishment consists in rice and fish. As to their religion, they in general believe the *metempsichosis*, or transmigration of souls.

The country of Cochin-china is mild and luxuriant. The people have a great affinity with the Tong-quinese, with whom they have a common origin, and from whom they differ very little in their manners and customs; all of which they seem to have derived from the Chinese. M. le Poivre represents the Cochin-chinese as gentle, hospitable, frugal, and industrious. There is not a beggar in the country; and robbery and murder are said to be unknown. A stranger may wander over the kingdom from one end to the other (the capital excepted) without meeting with the slightest insult. He will be every where received with eager curiosity, but at the same time with the greatest benevolence. Their monarchs govern them as a father does his family, establishing no laws but those of nature. They honour and encourage agriculture, as the most useful employment of mankind. Every man, able to till the ground, pays to the prince a small sum proportioned to the strength of his constitution, and the vigour of his arm; and nothing more.

Cochin-china is recorded to have formed, anciently, a part of the Chinese empire; but on the Mongul invasion of China from Tartary, in the thirteenth century, the Chinese governor of the southern peninsula, containing Tong-quin to the northward, and Thompa and Cambodia to the southward, of Cochin-china, took the opportunity of setting up the standard of independence. He and his posterity resided in Tong-quin. In process of time, the Tong-quinese governor of Cochin-china imitated the example that had been set by the ancestor of his sovereign, and erected, likewise, his government into a kingdom. But both he and his former master continued to acknowledge, at least, a nominal vassalage to the Chinese empire; and, occasionally, paid homage at the court of Pekin. This slight connection with China, rendered it interesting to the persons belonging to the British embassy. The English ships had been for some time abreast of the kingdom of Cochin-china. The passage between its shore, and a vast multitude of small islands and rocks, called the Paracels, forming a lengthened cluster lying north and south for near four hundred miles, was not without great peril: and required no inconsiderable caution, to guard against the effect of easterly currents, which drive towards the rocks in calms; as well as, in the opposite case, against the violent tempests, which, in these seas, are called typhoons, as they are hurricanes in the Atlantic; both resembling each other in the extreme violence of the wind, and in the sudden shifting of its direction.

Many canoes were seen fishing between the ships and land. The nearest were hailed, in order to get, from among the fishermen, some one who might pilot the squadron into Turon-bay, which is the principal port belonging to Cochin-china. But these not caring to approach strange vessels, made sail and scudded away directly before the wind. One of those canoes was, however, overtaken by a boat, and a fisherman was conveyed on-board. He was an old man, with sunken eyes, his head thinly covered with a few grey straggling hairs, and a countenance haggard with age and terror. He left, in his boat, two young men, probably his sons; for, as he was extremely apprehensive of intended mischief, when the messenger from the ship insisted upon taking some one person from the canoe, he preferred freeing them from the danger, though by exposing himself to it. Of the Chinese on-board the embassy, none could render themselves intelligible to this poor man, or understand a word of what he uttered. Questions were written in the Chinese character before him; but he made signs to testify that he knew not how to read or write. The sound of the words Cochin-china and Turon, were perfectly unknown to him; these names not having been given by the inhabitants of that country, but by early European navigators and geographers. He repeatedly threw himself upon his knees and wept, notwithstanding the pains taken to soothe and satisfy him: and when, in the working and tacking of the ship, her head happened to be turned from the land, his alarms increased, and he fell into an agony of grief, imagining there was an intention to quit the coast, and carry him off for ever. Victuals were offered to him, of which he ate reluctantly and sparingly; but when a few Spanish dollars were put into his hands, he shewed he had a knowledge of their value, by carefully wrapping them up in a corner of his tattered garments. After repeated efforts, he was made to comprehend the object for which he had been brought on-board; and, being somewhat tranquillized, he pointed out the entrance into the bay of Turon, which is not readily perceived by strangers. The only chart, known to have been published, of that part of the coast of Cochin-china, was a rough sketch, taken by some officers of the Admiral Pocock Indiaman, that had been accidentally driven there by stress of weather many years ago; but it gives no information or instruction how to enter into the bay, and was afterwards found to be erroneous in many respects.

In making this part of the coast, from the southward, the most remarkable object that attracts attention, is a group of massy marble rocks, that look like an enormous castle,

castle, appearing to be insulated; and not unlike, though much larger, the rock of Dunbarton castle, rising perpendicularly from the Clyde, in Scotland. A few miles to the northward of this Cochin-chinese pile of rocks, is a bold and elevated promontory, surmounted by two peaks, one much higher than the other. To a stranger, the entrance into Turon bay would appear to lie between the mass of rocks first mentioned, and this elevated promontory; but these objects are joined, in fact, by a low and narrow isthmus. The entrance to the bay is round the north-easternmost point of this peninsular promontory, which was now called, by the squadron, *Lion Point*; not only in compliment to his majesty's ship, but on account of some faint or fancied resemblance, which a rocky bluff, jutting from the point, bears to a lion *couchant*, when seen at a little distance.

The Cochin-chinese fisherman, by way of describing where the Hindoostan ought to anchor, bent his left arm to represent the mountains which overlooked the bay, and dropped down the fore-finger of his right hand, to mark the relative proper spot for anchoring; but tornadoes, or sudden squalls of wind from different points, and accompanied by lightning and thunder, drove the ships again to sea; nor were they able, safely, to come to an anchor, within the bay, till the 26th of May. The old Cochin-chinese was now dismissed, with a compensation for his fright, as well as for his services. When he was carried to the shore, he jumped from the boat almost with the alertness of youth, and, hastening away, came never afterwards near the ships. Sir Erasmus Gower "moored the Lion in seven fathoms water, the north-west point of the bay bearing north-east by north, an island in the mouth of the bay, north, the watering-place on the peninsula, east by north; Campello isle, which is seen over the isthmus, south-east by east, a river on which the town of Turon is situated, south-south-east half east. The peninsula bore some resemblance to Gibraltar, which name was henceforward given to it by the squadron. The channel into the bay is round the north-east end of Gibraltar, having a large lump of an island to the north. All the coast is safe to approach, shoaling the water gradually from twenty to seven fathoms."

The Lion was scarcely at anchor, before an officer from shore came on-board, for the purpose of learning every particular relative to the squadron, the appearance of which, it seems, had spread alarm. Ships like the Lion and Hindoostan were seldom seen there. Besides these, and the Jackall and Clarence which attended them, a fifth vessel soon followed into Turon bay. She was under Genoese colours; but, chiefly, manned by Englishmen. She had found the squadron in the straits of Sunda, and kept company with it afterwards. The whole appeared particularly formidable to the people on shore, from a cause which the commander of a vessel in the bay explained. He mentioned that Turon, with a considerable part of the kingdom of Cochin-china, was then subject to a young prince, nephew of an usurper, whose antagonist, the descendant of the former sovereigns of the country, was still in possession of some of the southern districts of the kingdom, and was in daily hope of such succours, from Europe, as might enable him to recover all the possessions of his ancestors. His family had, occasionally, shewn kindness to European missionaries, and tolerated the exercise of the Christian religion among their subjects. The principal of those missionaries, who had been dignified with the title of bishop by his holiness the pope, was afterwards sent by his Cochin-chinese majesty as his ambassador to the court of France, where an uncommon degree of interest was taken in the young prince of Cochin-china, whom the bishop had conducted to Europe with him. Succour was promised for the re-establishment of his house; and, in case of success, benefit would, no doubt, have accrued to the commerce of the French. Measures were in preparation for sending out effectual aid, when the extraordinary revolution in France put an end to the expedition, and deprived the monarch who had ordered it, of the power of assisting either himself or others. Some individuals, however, from France did join the legitimate king of Cochin-china, and gave hopes of further assistance. These hopes were often repeated by way of encouragement to his partisans; and his enemies, in possession of Turon bay, began to be apprehensive lest the squadron now at anchor in it, should, in fact, be come with hostile intentions against them.

But a communication was soon opened between the officer who came on-board, and the Chinese interpreters. The neutral and pacific disposition of the squadron was announced, its general object declared, and a request made for the supply of its immediate wants. For the first two or three days very little was obtained. Few boats approached the ships with provisions for sale, though it be usual to do so, in great numbers, in most harbours. The market on shore was very scantily supplied; and extravagant prices demanded for every article. It was obvious that the governing magistrate of the place, who, it seems, had instantly dispatched a messenger to the capital, with an account of the arrival of the squadron, and for instructions how to act, had, in the mean time, checked the sale of all provisions. But a person of rank soon arrived at Turon, who delivered very handsome compliments from his master to lord Macartney. He came in a large decked galley, of a light and sharp construction, formed for quick sailing. The rowers, who were very numerous, rowed in an erect posture, and pushed the oars from them, making short and frequent strokes. A state cabin was erected, on the middle of the deck, painted in lively colours; each end of the galley was decorated with streamers of different colours and figures. The state cabin was, on the outside, surrounded with spears, and various ensigns of authority. The principal officer, who came in her, was dressed in loose robes of silk, had the polished manners of cultivated society, and was attended by a Chinese interpreter. His galley was followed by nine boats, calculated for carrying burdens, and full of rice and other provisions, animal and vegetable, as presents, for the use of the passengers and crews. From that moment the markets were plentifully supplied, and the prices reasonable. The governor of the district came, also, on-board to pay his respects, invited the ambassador and his suite a-shore, and proposed to keep an open table for them constantly. Every mark of attention was shewn henceforward; and every effort made to cultivate the best understanding with the squadron.

Overtures were made to lord Macartney for the purchase of arms and ammunition; and it was easy to perceive that any assistance given to the cause of the prince, then reigning at Turon, as well as at the capital and northern parts of the kingdom, would have been willingly purchased on any terms. His situation, indeed, was very far from being secure. Besides the province of Donai, or southern part of Cochin-china, which had reverted to the ancient family of its sovereigns, Quin-nong, or the middle province of the kingdom, was in the hands of the late usurper of the whole. He had entrusted to his younger brother the care of his conquests to the northward; but the latter availed himself of his command, first to invade the neighbouring kingdom of Tong-quin, with complete success, notwithstanding the assistance given to the latter by the Chinese, and then declared himself sovereign both of Tong-quin and Cochin-china, intending to wrest, for his own use, from his elder brother, whatever the latter still possessed of that kingdom, as well as whatever part had been recovered by the lawful sovereign. This new usurper was an able warrior, and had formed vast projects of conquest, even of some Chinese provinces; he was one of those politicians to whom all means are equally eligible that can contribute to their successes. He died in the midst of them in September, 1792. Of his sons he left the eldest, who was illegitimate, in the government of Tong-quin. The youngest, who was his legitimate offspring

ſpring by a Tong-quineſe princeſs, was at Turon at the time of his father's death. He inſtantly aſſumed the reins of government, as lawful ſucceſſor to his father, while his elder, but illegitimate brother, retained poſſeſſion of Tong-quin, and claimed a right to the whole of his father's conqueſts. The ſtate of rebellion in Cochin-china had begun upwards of twenty years before, in the courſe of which ſo very many of the combatants were ſlain, the country was ſo exhauſted, and the ſurviving parties ſo balanced, that, at this time, no conſiderable enterprize was undertaken by any of them; though each was buſy in preparing new plans for the ſupport of himſelf and the overthrow of his enemies. In the mean time the people began, in ſome degree, to breathe; but had the kingdom even been more ſettled, the ambaſſador did not think it would have been proper to enter into any ſort of commercial negociation, or even to preſent the credential letters, with which he had been entruſted for that kingdom, before he had delivered, in the firſt inſtance, thoſe he had in charge for the emperor of China. His excellency, therefore, determined to confine himſelf to meſſages of compliment and reſpect, and to a return of preſents for thoſe he had ſo ſeaſonably received for the uſe of the ſquadron. An uninterrupted communication was continued to be maintained with the people of Turon; but not without ſome marks of miſtruſt, and conſequent watchfulneſs, on both ſides.

The harbour of Turon abounds with fiſh. In ſome of the boats the fiſherman, his wife, and children, continue with him, ſheltered under a circular roof inſtead of a flat deck. Round the young children's necks are tied broad pieces of gourd or calibaſh, to keep their bodies a-float and their heads from ſinking, in caſe of their falling overboard. As often as the fiſhermen come on ſhore, they implore their deities for the ſafety of their families, and their ſucceſs in fiſhing, by erecting ſmall altars to them among the branches of large trees, or other elevated places, on which they make offerings of rice, ſugar, and other victuals, and burn ſhort pieces of odorous and conſecrated wood. At the ſouthern extremity of the harbour is the mouth of the river which leads to Turon town. On the point, which ſeparates the river from that harbour, is a watch-tower, conſiſting only of four very high pillars of wood, over which a ſlight roof is laid, and a floor is fixed upon croſs poſts into the pillars towards their upper ends. To this floor the watchman aſcends by a long ladder, and there he can readily ſee, through the harbour's mouth, any veſſels to the northward, and thoſe which are to the ſouthward over the iſthmus. Near the watch-tower is an office where the boats and ſmall veſſels, going into the river, are ſtopped to be examined. The river is about two hundred yards in width, and its current into the bay is ſufficiently ſtrong to work itſelf a channel in the bank of ſand, accumulated at its entrance into the harbour. On each ſide of this channel the ſand is raiſed ſo high as, at low water, to be uncovered by the ſea; and on this ſand was ſeen, for the firſt time throughout the preſent voyage, that celebrated bird called the pelican of the wilderneſs, whoſe gullet, bill, and wings, ſeem to be much beyond the proportionate ſize of its body, which is, however, equal to that of the largeſt Turkey. It frequents only waters where fiſh abound; of which its preſence argues plenty. The depth of the water in the river was upwards of two fathoms. One Chineſe junk, and ſeveral Cochin-chineſe large boats, were at anchor in the river, and others paſſing through it. The land on its weſtern bank, on which the town of Turon lay, about a mile above its mouth, ſloped down to the water's edge; and the naked infants, of two years old and upwards, came, from the houſes built among the ſhrubbery growing upon its borders, and played and ſwam like ducklings in the water.

Turon, to which, as well as to the river and harbour, the natives give the name of Han-ſan, was now little better than a village, but is ſaid to have been, during the peace and proſperity of the country, a much more conſiderable place. The houſes, which are low and chiefly built of bamboo, and covered with ruſhes, or the ſtraw of rice, were, except about the market place, interſperſed with trees. Many of the beſt buildings are in the center of gardens planted with the areca nut-tree, and various other pleaſing or uſeful ſhrubs. Behind the town were groves of oranges, limes, plantains, and areca-nut-trees, in the midſt of ſome of which were houſes, and in others only remains of buildings. The oppoſite ſide of the river was divided into fields, ſurrounded by fences, and cultivated with tobacco, rice, and ſugar-canes. The market in the town was plentifully ſupplied with all the vegetable produce of tropical climates, as well as with large quantities of poultry, particularly ducks; and, among other fowls, the black-bellied darter, a bird ſo called from its ſuppoſed propenſity to dart its ſharp and long beak at any ſhining object near it, particularly into any eye turned towards it; on this account thoſe animals are brought to the Turon market with their eyelids ſewn together, to deprive them of the opportunity of diſcerning the eyes of thoſe who come to purchaſe them. See PLOTUS.

There were no ſhambles or places containing the ſeparated parts of animals killed for ſale. At an entertainment, however, given by the chief of the place to a party from the Engliſh ſhips, many of the diſhes, or rather bowls, upon the table, were filled with pork and beef, cut into ſmall ſquare morſels, and dreſſed with a variety of ſavoury ſauces; other bowls contained ſtewed fiſh, fowls, and ducks; and many had fruits and ſweetmeats. The number of bowls, piled in three rows, one above the other, exceeded certainly an hundred. Before each perſon were placed boiled rice to ſerve inſtead of bread; and two porcupine quills, by way of a knife and fork. The ſpoons were made of porcelain, ſomewhat in the form of ſmall ſhovels. After dinner an ardent ſpirit, made from rice, was ſerved in ſmall cups around. Wine does not ſeem to be in uſe, or known; though vines are ſaid to grow ſpontaneouſly in the mountains. Had the art of ſtopping the fermentation of vegetable juices, before they paſſed from the vinous ſtate, been underſtood by them, it is probable that it would be, in moſt inſtances, preferred to diſtilled liquor, to the uſe of which this people ſeem to be much addicted. More of this Cochin-chineſe ſpirit, not ill reſembling what in Ireland is called whiſkey, was drunk by the hoſt than by his gueſts; though the former, by way of ſetting a good example, filled his cup to the brim, in a true European ſtyle of joviality, and, after drinking, turned up his cup, to ſhew he had emptied it to the bottom. As the gentlemen of the ſquadron were returning from this entertainment, they were requeſted, by ſigns, to ſtop, while an aged lady, with ſome difficulty, walked from her houſe towards them. She had heard that Europeans were paſſing by; and, not having before ſeen any, ſeemed anxious to take the opportunity, which might not offer again in her time. She approached them with looks of eager curioſity, but with much gentleneſs of manners, and a countenance implying a willingneſs to apologize for the freedom ſhe took, to ſtop and gaze at them. She obſerved, with great attention, their figures, dreſs, and countenances, and appeared perfectly to enjoy a ſpectacle ſo new to her. She at length retired, ſignifying her thanks to the gentlemen for their complaiſance, and expreſſed every mark of ſatisfaction, at being gratified in one of the moſt ardent wiſhes remaining in her mind.

The Cochin-chineſe ſeemed ſufficiently dexterous and attentive, though with ſcarcely any principles of ſcience, to make, on any ſubſtances which promiſed to be of uſe or comfort to them in private life, ſuch trials and experiments, as were likely to produce beneficial reſults. In the culture of their lands, and in the few manufactures exerciſed amongſt them, they were not behind nations where the ſciences are known; and, in ſome inſtances, they have fallen upon proceſſes not uſed elſewhere, though more

more convenient or effectual than those which are. In purifying sugar, after the gross syrup had been drained from it, and it was become already granulated and solid, they sometimes placed it in layers of about one inch in thickness and ten in diameter, under layers of equal dimensions of the herbaceous trunk of the plantain-tree; the watery juices exsuding from which, and filtrating through the sugar, carried down with them all the dross which had been boiled up with it, leaving the pure sugar crystallized and white. It was then very light and almost as porous as a honey-comb. When dissolved, it left no sediment at the bottom. This method appears, certainly, to be an improvement on the usual mode, elsewhere, which consists in pouring the sugar, as soon as granulated, into vessels of the form of inverted cones, and placing a layer of wet earth upon the upper surface of the sugar. That upper surface is, thus, indeed, much purified; but never so perfectly as in the Cochin-chinese method. The grain of the sugar is more broken, and the inverted point of the loaf always retains more dross than does its base, to which the filtrating liquid had been more immediately applied. It is not very probable, that the management of the sugar-cane and its juices, by the Cochin-chinese, is much more tedious, difficult, or expensive, than what is pursued elsewhere; because the sugar made by them, and brought to the open market-places in the neighbourhood of the manufacture, was sold at prices considerably inferior to what are demanded in any other part of the world, where that commodity is produced.

Though these people possessed not, scientifically, the art of reducing the metallic ore into the metal, they had attained the practice of making very good iron, as well as of manufacturing it afterwards, into match-locks, spears, and other weapons. Their earthen-ware was very neat. Their dexterity appeared in every operation they undertook. It was applied, indeed, sometimes to improper purposes. Many of them made little ceremony of appropriating, privately, to themselves, whatever suited them in the possession of another; nor were they much disconcerted by detection. They were liberal in their turn; and in instances, too, where few others are disposed to generosity. Wives and daughters were said to be transferred on easy terms, and with little scruple. All affairs of gallantry seemed, indeed, to be treated by them very lightly. These observations must, however, be considered as applicable, principally, to the more numerous, but lower classes of the people; and among them, to those who were so situated as to have most intercourse with strangers; while the upper orders were more comprehensive in their injustice, and more exclusive in their enjoyments; exercising their power over the weaker sex, in confining their many wives, and over the people in a variety of oppressions, which neither the inferior was emboldened to resist, by depending upon his right; nor the superior deterred from continuing, by a consciousness of doing wrong; as if no principle of religion, or maxim of morality, had been inculcated among them in support of justice, or for putting any limit to authority. Subordination was strongly marked by prostrations and other exterior acts of abject humiliation to those in power.

Though a great inequality of conditions tends, in some instances, to the cultivation of such of the fine arts as happen to be esteemed, because it provides means for their encouragement, there did not appear among the Cochin-chinese, that the gentlemen of the embassy could discern, the least traces of painting or of sculpture; but they had made some proficiency in music. The ambassador was induced to accept of an entertainment, given on shore on the 4th of June, 1793, being his Britannic majesty's birth-day. On this occasion a grand dinner was provided; after which a play was performed. The piece appeared to be a kind of historical opera, in which were the recitative, the air, and the chorus, as regular as upon the Italian stage. Some of the female performers were by no means despicable singers. They all observed time accurately, not only with their voices, but every joint of their hands and feet was obedient to the regular movement of the instruments. Both their string and wind-instruments were very rude, but formed on the same principles, and with a view to produce the same effect, as those of Europe. Such, however, is the force of habit and national attachment, that the performance of the musicians, in the service of the ambassador, which was very grateful to the European ear, was not much relished by the Cochin-chinese. The building, in which the ambassador was received, appeared to have been erected on the occasion. The inside was hung with printed cotton of British manufacture; and the soldiers, attending upon the governor of the district, who gave the entertainment, had outside vests of dark red cloth, which likewise appeared to have come from England. The Portuguese of Macao, who chiefly carry on whatever trade is still subsisting in the ports of Cochin-china, buy up the refuse goods of the Canton market, which they dispose of here to great advantage, though they sometimes are made to suffer many impositions from the governing people of the country.

The Cochin-chinese soldiery were generally armed, besides sabres, with pikes of vast length, ornamented with tassels of hair dyed red, which colour no subject, except in the service, or by the order, of the sovereign, was allowed to use in dress or equipage. The ambassador's guard, which attended his excellency on shore, besides firing a salute in honour of the day, went through several military evolutions, to the admiration, not only of the surrounding multitude, but of the native troops. Notwithstanding the decrease of population throughout the country, in the course of a long civil war, the number of men in arms was said to be still considerable. At Hue-foo, the capital of the kingdom, about forty miles to the northward of Turon, thirty thousand men were reported to be kept in garrison, and regularly exercised with muskets and match-locks every day. Their generals relied much also upon the use of elephants trained for war. With this view figures of soldiers are placed in ranks before the war-elephants, who are taught to attack them with great fury, seizing them with their trunks, tossing some of them in the air, and trampling others under their feet. The elephant, however, like most other animals who subsist entirely on vegetable food, is naturally gentle, except where pains are taken to train them to acts of violence, or when provoked by great personal injury. The keeper of this huge animal in Cochin-china is generally a boy, who rides upon his neck and governs him with ease; and the nice touch and contractile power of the lips of his flexile proboscis, render it, in some instances, equal to the human fingers in adroitness.

Cochin-china is among the few places where elephants serve for food. They are considered as a perfect dainty there. When the king, or any of his viceroys in the provinces, has one of these animals slaughtered for his table, pieces of it are distributed about to persons of rank, as gratifying marks of favour. Buffalo is preferred to other beef. Milk is not used as food; nor is the milking of any animal customary in the country. Yet the people have been driven to great distress for sustenance, during the famine which the destroying armies of contending tyrants had frequently occasioned; and human flesh is said to have been, sometimes, sold in the open markets of the capital.

The neighbouring Tong-quinese had taken, at one time, the advantage of the rebellion in Cochin-china, and invaded the northern provinces, in which the capital is situated, and, during the short period of their possession, they plundered whatever valuables they could find; and, in particular, as much of the precious metals as they could discover. A great proportion of what then escaped has been sent since to China, in return for the necessaries of life supplied by the junks from thence, the wretched

inhabitants being often compelled to that resource, as their cultivated lands were laid waste, and their manufactories destroyed. Before these calamitous events, gold was particularly plentiful in the country. Gold dust was found in the rivers, and their mines abounded in the richest ore, so pure as to require only the simple action of fire to extract it. Much of it was used in decorations of dress and furniture. The hilts and scabbards of their swords were frequently ornamented with plates of beaten gold. Payments were made in it to foreign merchants, in ingots, each weighing about four ounces. Mines of silver were formerly so little worked, that it was imported from abroad and exchanged for gold, upon terms of considerable advantage to the importers. More mines of silver have, however, lately been discovered; or a less expensive method of refining it has been practised. It is become the principal medium of exchange for merchandize from abroad, and is paid in ingots of very pure metal, each weighing about twelve ounces. Before the troubles in Cochin-china, great quantities of gold were brought from the hills in dust, and bartered by their rude inhabitants for rice, cotton, cloth, and iron. It was from them, also, that the sweet-scented aguila or eagle-wood, so valued in the East, was brought, as well as quantities of pepper, wax, honey, and ivory; but the communication between those hills and the low lands have, in a great measure, been cut off for several years past. The latter chiefly produce rice, areca-nut, betel-leaf, tobacco, cinnamon, silk, cotton, and, above all, sugar, which may be considered as the principal staple commodity of the country.

The original inhabitants of Cochin-china had retired to the chain of mountains bordering upon it to the westward, and those which separate it from Cambodia, when the ancestors of the present possessors of the plains invaded the country from China, in like manner as the ancient Britons, when attacked from Italy and Germany, betook themselves to the mountains of Wales. The mountaineers of Cochin-china are represented as a rude and savage people, differing by their coarse features and black complexions, as much as in their manners, from the well-looking and less dark complexioned lowlanders, who were considered as a courteous, affable, and inoffensive race, before the subversion of the ancient government, and mutual violence and treachery had loosened every principle of society, and roused the passions of avarice and ambition, which the convulsions of the country gave too many opportunities of indulging. The ancient simplicity of manners still, however, subsisted among the cultivators of the soil. The countenances of the peasants were, for the most part, lively and intelligent. The women, who were more numerous than the men, were actively employed in works of husbandry. Their cabins were clean, and sufficiently commodious for a people whom the climate enables to spend, out of doors, most of the time not allotted to repose.

Of rice, which is the most general object of cultivation, besides that species which requires to be sown in lands that are afterwards inundated, there is another known in Cochin-china, called sometimes mountain rice, which thrives in dry light soils mostly on the sides of hills, and opened by the spade; nor does it require more moisture than the usual rains and dews supply, neither of which is frequent at the season of its vegetation. Rice is of still more importance to this people here than bread is to Europeans, as the former require, with that grain, a very trifling relish of spices, oil, or animal food. Their principal indulgence is in spirituous liquors, tobacco, areca-nut, and betel-leaf; of the two last articles, mixed with a little paste of lime and water, they are extravagantly fond. These ingredients are obtained at easy rates, being produced upon the spot. Persons of both sexes, and of all ranks, chew the areca-nut with betel, and smoke tobacco. A silken bag, suspended from the girdle, containing those ingredients in separate divisions, constitutes a necessary part of dress.

The custom of smoking, to which the men are more addicted than the women, affords a sort of occupation that prevents the irksomeness of total inaction, without requiring exertion, or occasioning fatigue. It is, therefore, often preferred to more useful, but laborious, employment; and, except occasional efforts, made under particular circumstances, indolence was prevalent among the men; while the women were assiduously employed in domestic occupations, or in the labours of agriculture. In towns they serve frequently as agents or brokers to merchants from foreign countries, and live with them at the same time as their concubines; and, in both respects, they are remarkable for their fidelity. Concubinage is supposed to be no dishonour; and, in this instance, there seems to be less difference in the morals of the two sexes than in Europe. The exterior difference between the sexes appears also less glaring; for the dresses of both are nearly of the same form. They consist of loose robes, with small collars round the neck, and folding over the breast, with large long sleeves, covering the hands. People of rank, especially the ladies, wear several of these gowns, one over the other. The undermost reaches the ground; the succeeding ones are each shorter than that immediately under it. They are often of different colours, the display of which makes a gaudy appearance as the wearer walks along. Linen is not known amongst them. They have, next the skin, vests and trowsers of slight silk or cotton. Turbans are frequently worn by the men; and hats, sometimes, by the women, but never caps. The most richly dressed of either sex use no shoes.

In the dress of the Europeans nothing attracted more the attention or admiration of the Cochin-chinese than manufactured ornaments of polished steel. Steel-hilted swords were vastly coveted by the military men. This class hold the first rank in the country. Next come the judges; but the abuse of power in the former is not greater than in the latter; and among the several hardships, suffered by all classes, are the bad practices in the establishments intended for the administration of justice. Causes are tried, indeed, with much formality, and an apparent desire to find out the truth, in order to a fair decision; yet, in fact, a favourable decree is generally purchased by a bribe. Presents are accepted by the judge from both parties; but the richest is most likely to be successful.

Considering Cochin-china in a general view, it must be allowed to be excellently well adapted to commerce. Its vicinity to China, Tong-quin, Japan, Cambodia, Siam, the Philippines, Borneo, Sumatra, and Malacca, renders the intercourse with all these countries short and easy. The commodious harbours with which the coast is intersected, and particularly that of Turon, afford a safe retreat for ships of any burden, during the most tempestuous seasons of the year. The country is also supposed to be healthy, the violent heat of the summer months being tempered by regular breezes from the sea. September, October, and November, are the season of rains. The lowlands are then frequently and suddenly overflowed by immense torrents of water, which descend from the mountains. The inundations take place, generally, once a fortnight, and last for two or three days at a time. These inundations happening about the full and change of the moon, seem to indicate the influence of that satellite in the determination of their periods. In December, January, and February, there are also frequent rains, brought by cold northerly winds, which distinguish this country, by having a winter, from most others so near to the equator.

The inundations have the same effect here as the periodical overflowings of the Nile, and render this country one of the most fruitful of the globe. In many parts the land produces three crops of grain in the year. Its most valuable

valuable produce, beside the precious metals, consist in pepper, cinnamon, sugar, silk, and cotton, which are readily given, by the natives, in exchange for a variety of European manufactures; and, accordingly, several of the principal commercial nations of Europe, trading to the East, have had considerable intercourse with the Cochin-chinese, and their neighbours the Tong-quinese. But nothing is now to be seen in any of their harbours except their own galleys, a few Chinese junks, and now and then a small Portuguese vessel from Macao. The ravages of civil war have, no doubt, contributed to drain the sources of commerce; and the want of security and protection to foreigners inclined to trade there, must at present impede its revival. But if, says sir George Staunton, a solid settlement in Cochin-china were to be productive of advantage to any European nation, it must peculiarly be so to Great Britain; because, besides the opening it would make for the sale of its own manufactures, among the people of the country, the British possessions in Hindoostan would be sure of a very considerable demand from thence for their productions.

The whole of the Cochin-chinese dominions, since Tong-quin has yielded to the arms of the late usurper, fills the space between the twelfth degree of northern latitude and the tropic of Cancer; but their breadth do not amount to two degrees of longitude. They are bounded to the westward by a long chain of mountains, which border, on the other side, on the kingdoms of Laos, Siam, and Cambodia. The sea washes Cochin-china and Tong-quin to the east; the former has Tsiompa to the southward, and the latter the Chinese province of Yunnan to the northward of it. The whole comprehends about ninety-five thousand square miles.

COCHINEAL', *s.* [from *cochinilla*, Span. a woodlouse.] A valuable colouring matter, used principally in dying crimsons and scarlets, and for making carmine, &c. It was at first supposed to be a grain, but naturalists soon discovered that it was an insect. It was brought to us chiefly from Mexico, where the insect lives upon different species of the opuntia. Two sorts of cochineal are gathered in South America: the sylvestris, there known by the Spanish name *grana sylvestra*; and the fine, or *grana fina*, called also *mesleque*, from the name of a province in Mexico, where they are bred. The first is smaller, and covered with a cottony down, which increases its weight with a substance which is useless in dying; an equal weight of it therefore gives less colour, and is of a lower price than the fine cochineal; but these disadvantages are perhaps compensated by its being reared with greater facility, and at less expence, and even by the effects of its down, which enables it better to resist rain and storms. The cochinilla sylvestris, when bred upon the proper plant, like the true cochineal, loses part of its tenacity, and some of its cotton, and acquires double the size it has on the wild species of opuntia. It is therefore to be hoped that it might be improved by a continued attention to the rearing of it, and would approach more and more to the fine cochineal. M. Thieri de Menonville was led by his patriotic spirit and personal courage to expose himself to imminent danger, in going to observe the mode of rearing the cochineal in Mexico, in order to obtain from thence that valuable production, wherewith he might enrich the colony of St. Domingo. He brought back with him both species of cochineal, and the kind of opuntia which affords the best food for these insects. Upon his return, he employed himself in the cultivation of different kinds of opuntia, and in rearing the two species of cochineal; but death cut off that excellent citizen, and the fine cochineal soon perished. Some time after, the cochinilla sylvestris was found upon a kind of opuntia called *péreschia*, or *patte de tortue*, which grows there. This discovery did not remain unprofitable: M. Bruley employed himself successfully in rearing this species of cochineal; he communicated it to the Cercle des Philadelphes, now the royal society of arts and sciences at Cape François, who do not lose sight of that object, and have published a posthumous work of M. Thieri de Menonville, which contains very minute instructions with regard to every thing that respects the cultivation of the nopal, and the other species of opuntia that may be substituted for it more or less successfully for breeding or rearing the cochineal in St. Domingo. Fine cochineal, which has been well dried and properly kept, ought to be of a grey colour inclining to purple. The grey is owing to a powder which covers it naturally, a part of which it still retains; the purple tinge proceeds from the colour extracted by the hot water in which it is mostly killed. Cochineal will keep a long time in a dry place. Hellot says, that he tried some one hundred and thirty years old, and found it produce the same effect as new. If the extract which decoction of cochineal affords on evaporation be digested in alcohol, the colouring part dissolves, and leaves a residuum of the colour of wine-lees, of which fresh alcohol cannot deprive it. This residuum, analysed by fire, affords the common products of animal substances. The alcohol of cochineal leaves on evaporation a transparent residuum of a deep red, which when dry has the appearance of a resin. This also, if distilled, yields the product of animal substances; which shews that the colouring matter is an animal production. Yet the decoction of cochineal does not easily putrefy. Berthollet has kept some of it more than two months, both in an open vessel and in a bottle corked. At the end of that time the former shewed no signs of putrefaction, the latter had a slight putrid smell. The first grew turbid in a few days, and left a brown violet sediment on the filter; the second preserved its transparency a long time, and probably lost it only from the effect of an incipient putrefaction, or rather of a slight combustion, produced by means of a little vital air, probably united with the red particles of the cochineal. The colour of each had become crimson; but that of the former was more weak, because a greater part of the colouring matter had precipitated, in consequence of the effects produced on it by the air.—For its other chemical properties, see the article CHEMISTRY, p. 345, of this volume.

The importation of cochineal from ports in Spain is declared lawful by 6 Anne, c. 33. Any persons may import cochineal into this kingdom, in ships belonging to Great Britain, or other country in amity, from any place whatsoever, by 7 Geo. II. c. 18.

COCHI'NO, a town of European Turkey, in the island of Lemno. Lat. 39. 57. N. lon. 43. 8. E. Ferro.

COCHLÆ'US (John), a native of Nuremberg, canon of Breslau, disputed warmly against Luther, Osiander, Bucer, Melancthon, Calvin, and the other patriarchs of the reformation. His style is not only easy, but negligent. In 1539 he received from England a refutation by Richard Morrison, D. D. of the tract he had published against the marriage of Henry VIII. He replied in a publication bearing this title: "The Broom of Johannes Cochlæus for sweeping down the Cobwebs of Morrison." He defends what he had written against the divorce of Henry VIII. and boasts that Erasmus had approved his work. The principal productions of this author are, 1. Historia Hussitarum, folio; a scarce and curious work, and one of his best performances. 2. De actis & scriptis Lutheri, fol. 1549. 3. Speculum circa Missam, 8vo. 4. De vita Theodorici regis Ostrogothorum, Stockholm, 1699, 4to. 5. Consilium Cardinalium anno 1538, 8vo. 6. De emendanda Ecclesia, 1539, 8vo, very scarce. He died at Breslau, Jan. 10, 1552, at the age of seventy-two.

COCHLE'A, *s.* The shell snail. See HELIX.

COCHLE'A, *s.* One of the five mechanical powers, otherwise called the *screw*, being so named from the resemblance a screw bears to the spiral shell of the cochlea snail.

COCHLE'A, *s.* [from κοχλίζω, to turn round.] In anatomy,

anatomy, that part of the ear which turns spirally round a nucleus.

COCHLEA'RE, *s.* [from *cochlea*, a cockle, whose shell its bowl represents.] A measure for fluids, used by apothecaries in making up prescriptions, but not very judiciously, because not very accurately. Blanchard has thus determined its contents: the greatest contains four drachms, the second a drachm and a half, the smaller one a drachm, and the least half a drachm.

COCHLEA'RIA, *s.* [from the form of the leaves, which being slightly hollowed, resemble an old-fashioned spoon.] In botany, a genus of the class tetradynamia, order siliculosa, natural order of siliquosæ, or cruciformes. The generic characters are—Calyx: perianthium four-leaved; leaflets ovate, concave, gaping, deciduous. Corolla: four-petalled, cruciform; petals obovate, spreading, twice the size of the calyx; claws narrow, shorter than the calyx, patulous. Stamina: filaments six, subulate, length of the calyx, the opposite ones shorter; antheræ obtuse, compressed. Pistillum: germ heart-shaped; style simple, very short, permanent; stigma obtuse. Pericarpium: silicle heart-shaped, gibbous, turgid, emarginate, furnished with a style, two-celled, scabrous; valves gibbous, obtuse. Seeds: about four in each cell.—*Essential Character*. Silicle emarginate, turgid, scabrous; valves gibbous, obtuse.

Species. 1. Cochlearia officinalis, or common scurvy-grass: root-leaves cordate-roundish; stem-leaves oblong, a little sinuate. Root perennial; stem angular, branching; root-leaves kidney-shaped, entire, veined, smooth, fleshy, obtuse, with seven callous obscure crenules, sometimes slightly angular, on long petioles; stem leaves oblong, sessile, or clasping, the lower ones sometimes on broad petioles, deep green, slightly toothed, or with a few large angular dents on the edges; petals fleshy, clear white with greenish claws; silicles oval, gibbous, smooth, either not emarginate or scarcely sensibly so, on long slender peduncles, spreading and sometimes bent back; partition double, in each cell four rough seeds. Found on the sea-shores of the north of Europe; also on mountains. With us, on the coast of Norfolk, near Lynn and Yarmouth; near Hull, Boston, Whaplode, Holbeach; in Cornwall, Cumberland, Lancashire, Wales; and at a great distance from the sea near Castleton in Derbyshire; Penigent, Ingleborough, and Stanemore, in Yorkshire; near Settle, on the highlands of Scotland; and mountains of Wales.

Common scurvy-grass has long been held in very high estimation as an antiscorbutic and purifier of the blood. It has a somewhat unpleasant smell, and a warm bitter taste. Its active matter is extracted by maceration both in watery and spirituous menstrua, and accompanies the juice obtained by expression. The most considerable part of it is of a very volatile kind; the peculiar penetrating pungency totally exhaling in the drying of the herb, and in the evaporation of the liquors. Its principal virtue resides in an essential oil, separable in a very small quantity by distillation with water. Scurvy-grass is antiseptic, attenuant, aperient, and diuretic; and is said to open obstructions of the viscera and remoter glands, without heating or irritating the system. It has been long considered as the most effectual of all the antiscorbutic plants, of which we have the testimonies of the most celebrated physicians, and it has been observed that it naturally grows most in those high latitudes where the scurvy is most prevalent. In rheumatic pains of long continuance, accompanied with fever, this plant, combined with arum and wood-sorrel, is highly commended by Sydenham and Lewis. A remarkably volatile and pungent spirit, prepared from this herb, and called *spiritus antiscorbuticus*, was found by Werlhof to be a useful remedy in palsy and other disorders requiring an active stimulant, given in the dose of thirty drops several times a-day; but no preparation seems so beneficial by way of an antiscorbutic as the fresh plant eaten as a salad, or its expressed juice drunk. If the green herb be infused in ale or beer, and put into a bottle well corked, it will communicate to it all its antiscorbutic virtue or volatile spirit in three or four days time. Mr. Ray, from his own experience, recommends this ale to such as are troubled with the scurvy, to be taken for their ordinary drink. He says that it is not so good if the scurvy-grass has been long infused in it; for thereby the earthy and fixed parts are forced from the herb, and communicated to the ale, and the volatile parts either fly away, or, being jumbled with the more fixed parts, lose a great deal of their virtue. The juice of scurvy-grass with the bruised herb applied to the face has been recommended as a cosmetic, and should be afterwards washed off with a decoction of bran.

2. Cochlearia Danica, or Danish scurvy-grass: leaves hastate-angular, all deltoid. Lightfoot observes that the root-leaves are often rounded, as in the preceding, but they are smaller; the stalks are weak, and commonly trail upon the ground; the stem-leaves are hastate, with an angle or dent on each side near the base, and stand on short peduncles. He is disposed to consider this only as a variety, having observed the limits between it and the officinalis to vanish insensibly into one another. Found on the sea-coasts of Denmark, Sweden, and Britain, Portland, and about Plymouth; at Wells in Norfolk; isle of Walney, Lancashire; near Llanbadrick-church, Anglesea; and in Scotland.

3. Cochlearia Anglica, or English or sea scurvy-grass: all the leaves ovate-lanceolate. Leaves succulent, often reddish, many having no sinuses, but only such an angle as Linnæus describes. Ray affirms that even the lowest leaves are angular or indented. Hudson doubts whether this also may not be a variety of the first sort. Woodward thinks it to be out of all doubt distinct; and affirms, that at Yarmouth, where it grows abundantly, and elsewhere, it never appears to vary: Miller says that it flowers later in the season. Grows on the sea-coast in muddy soils; brims of the river Thames; Portsmouth, Bristol, &c. the salt-marshes of Kent and Essex; isle of Wight; King's Weston; rocks of Inch Columb, &c.

4. Cochlearia Groenlandica, or Greenland scurvy-grass: leaves kidney-form, entire, fleshy. Root-leaves very small, underneath very convex and fleshy, veinless, very entire, on long petioles. Stem-leaves hastate, angular, on short petioles. Not above two inches high. Only a starved variety of the first sort. Grows on the sea-coasts of Muscovy and Davis's Straits; also on the mountains of Caernarvonshire, about Llanberys; near Settle; on the highlands, and in the Orkneys. These three are said to be biennial plants; whereas the first, or common scurvy-grass, is perennial. This seems scarcely probable.

5. Cochlearia coronopus, or wild scurvy-grass, or swine's-cress: leaves pinnatifid, stem depressed. This species is found by road-sides, on rubbish, dunghills, &c. Annual; flowering from June to August. It is acrid, and tastes like garden-cress. The ashes were an ingredient in Mrs. Stephens's once-celebrated medicine for the stone.

6. Cochlearia armoracia, or horse-radish: root-leaves lanceolate, crenate; stem-leaves gashed. Root perennial, creeping. Leaves very large, varying much, sometimes deeply pinnatifid, sometime entire, and only crenated. Flowering-stem a foot or eighteen inches high, branching at top, almost naked. Flowers white, in loose panicles. Found on the sides of ditches, among rubbish, and in pastures; flowering in May.

Horse-radish is possessed of a volatile and pungent quality, which flies off in drying. It impregnates both water and spirit, by infusion or distillation, very richly with its active matter. Horse-radish is a moderate, stimulating, aperient, and antiseptic, medicine; it sensibly promotes perspiration, urine, and the expectoration of viscid phlegm, and excites appetite when the stomach is weakened or relaxed. It is principally used in paralytic and rheumatic complaints, in scurvies and impurities of the humours, in cachectic disorders, and in dropsies, particularly those which follow intermitting fevers. Taken in

considerable quantities, it provokes vomiting. Thomas Bartholin extols the virtues of horse-radish in the stone from experience; he affirms, that the juice of horse-radish dissolved a calculus or stony concretion that was taken out of a human body. The scraped root is used for many culinary purposes. An infusion of it in cold milk, makes one of the safest and best cosmetics.

7. Cochlearia glastifolia, or woad-leaved scurvy-grass: stem-leaves cordate-sagittate, stem-clasping. This sort is a biennial plant, which usually grows about a foot and a half high, with upright stalks; the flowers are produced in loose spikes at the end of the branches; they are very small, white, and are succeeded by short oval pointed swelling pods, having no style at the end, and filled with round seeds. It flowers in May, and the seeds ripen in July and August. According to Linnæus, it has the stature of turritis. Native of Germany, and the south of France; flowering from May to July.

8. Cochlearia draba: leaves lanceolate, stem-clasping, toothed. Root perennial, striking deep; stems several, upright, round below, somewhat angular at top, herbaceous, annual, slightly villose, about a foot in height. Branches strike up from the axils of the upper leaves to the same height with the stem, ending in corymbed racemes, and all together forming a close compound corymb. Abundant about Vienna, even in the suburbs; flowering from May to July; also in several parts of Germany, Italy, and France.

Propagation and Culture. The common scurvy-grass is propagated in gardens for medicinal uses, by sowing the seeds in July, soon after they are ripe, in a moist shady spot of ground; and when the plants are come up, they should be thinned, so as to be left at about four inches distance each way. The plants that are taken out may be transplanted into other shady borders, if there is occasion for them, otherwise they may be hoed out, (as practised for onions, carrots, &c.) and at the same time all the weeds may be hoed down, so as to clear the plants entirely from them, that they may have room to grow strong. In the spring these plants will be fit for use; and those that are suffered to remain will run up to seed in May, and perfect their seeds in June. If this plant is sown in the spring, the seeds seldom grow well; therefore the best time is soon after they are ripe. The plants rarely live after producing seeds, so that it should be sown every year to have it for use. The sea scurvy-grass growing in salt marshes, and being overflowed with sea-water almost every tide, can hardly be made to grow in a garden, or at most to last longer there than one year.

Horse-radish is propagated by cuttings or buds from the sides of the old roots. The best season for this work is in October or February; the former for dry lands, the latter for moist: the ground should be trenched at least two spits deep, or more, if it will allow of it. The manner of planting it is as follows: Provide yourself with a good quantity of offsets, which should have a bud upon their crowns, but it matters not how short they are; therefore the upper part of the roots which are taken up for use, may be cut off about two inches long with the bud to it, which is esteemed the best for planting. Then make a trench ten inches deep, in which you should place the offsets at about four or five inches distance each way, with the bud upward, covering them up with the mould that was taken out of the trench; then proceed to a second trench in like manner, and continue the same till the whole spot of ground is planted. After this, level the surface of the ground even, observing to keep it clear from weeds, until the plants are so far advanced as to be strong enough to overbear and keep them down. With this management the roots of the horse-radish will be long and straight, and free from small lateral roots, and the second year after planting will be fit for use. The ground in which this is planted ought to be very rich, otherwise the roots will make but a small progress. See Draba and Myagrum.

COCH'LEARY, *adj.* [from *cochlea*, Lat. a screw.] Screwform; in the form of a screw.—That at St. Dennis, near Paris, hath wreathy spires, and *cochleary* turnings about it, which agreeth with the description of the unicorn's horn in Ælian. *Brown.*

COCHLEA'TA, *f.* in botany. See Medicago.

COCH'LEATED, *adj.* [from *cochlea*, Lat.] Of a screwed or turbinated form.—Two pieces of stone, struck forth of the cavity of the umbilici of shells, of the same sort with the foregoing: they are of a *cochleated* figure. *Woodward.*

COCH'LITES, *f.* An appellation given to the petrified shells of the cochleæ or snails.

COCH'RAN (Robert), of the ancient family of Dundonald in Scotland, and educated at Padua in Italy, where he spent several years in the study of the fine arts, particularly architecture, in which he excelled. On his return to Scotland, he was employed by James III. as his architect to conduct and improve some public buildings; when such honours were heaped upon him, that he became an object of jealousy to the Scots nobility, who considered him as too much in the royal confidence. At last the factious nobles entered into a conspiracy against sir Robert Cochran, who had been created earl of Mar, and hanged him over the bridge at Lauder, in 1484.

COCIN'TUM, in ancient geography, a promontory of the Bruttii, reckoned the longest in Italy; and which Holstenius and Vossius have restored to Ovid, reading *Cocintia* for *Ceuraunia*, Metam. XV. v. 704. Cocintum, also a town, twenty-two miles to the south of Scylaceum, almost on the spot where now Stilo stands; from which the opposite promontory Cocintum is commonly called *Capo de Stilo.*

COCK, *f.* [cocc, Sax. *coq*, Fr.] The male to the hen; a domestic fowl, remarkable for his gallantry, pride, and courage. For its natural history, see Phasianus.—*Cocks* have great combs and spurs; hens, little or none. *Bacon.*

True *cocks* o' th' game,
That never ask for what, or whom, they fight;
But turn 'em out, and shew 'em but a foe,
Cry liberty, and that's a cause of quarrel. *Dryden.*

The careful hen
Calls all her chirping family around,
Fed and defended by the fearless *cock.* *Thomson.*

The male of any small birds.—Calves and philosophers, tygers and statesmen, *cock* sparrows and coquets, exactly resemble one another in the formation of the pineal gland. *Arbuthnot.*—The weathercock, that shews the direction of the wind by turning:

You cataracts and hurricanoes, spout
Till you have drench'd our steeples, drown'd the *cocks!* *Shakespeare.*

A spout to let out water at will, by turning the stop: the handle had probably a *cock* on the top. Things that were contrived to turn, seem anciently to have had that form, whatever was the reason:

Thus the small jett, which hasty hands unlock,
Spirts in the gard'ner's eyes who turns the *cock.* *Pope.*

The notch of an arrow. The part of the lock of a gun that strikes with the flint; [from *cocca*, Ital. the notch of an arrow. *Skinner.* Perhaps from the action, like that of a cock pecking; but it was probably so called before it had its present form.]—A seven-shot gun carries powder and bullets for seven charges and discharges. Under the breech of the barrel is one box for the powder; a little before the lock another for the bullets; behind the *cock* a charger, which carries the powder from the box to a funnel at the further end of the lock. *Grew.*—A conqueror; a leader; a governing man:

My schoolmaster call'd me a dunce and a fool;
But at cuffs I was always the *cock* of the school. *Swift.*

Cockcrowing; a note of the time in a morning.—We were carousing till the second *cock*. *Shakespeare*.—A cockboat; a small boat:

The fishermen, that walk upon the beach,
Appear like mice; and yond tall anchoring bark,
Diminish'd to her *cock*; her *cock* a buoy,
Almost too small for sight. *Shakespeare*.

A small heap of hay. [Properly *cop*.]—As soon as the dew is off the ground, spread the hay again, and turn it, that it may wither on the other side; then handle it, and, if you find it dry, make it up into *cocks*. *Mortimer*.—The form of a hat, [from the comb of the cock.]—You see many a smart rhetorician turning his hat in his hands, moulding it into several different *cocks*. *Addison*.—The style or gnomon of a dial. *Chambers*.—The needle of a balance.

COCK ON THE HOOP. Triumphant; exulting:

Now I'm a frisker all men on me look;
What should I do but set *cock on the hoop*? *Camden's Rem.*

For Hudibras, who thought h' had won
The field, as certain as a gun,
And having routed the whole troop,
With victory was *cock a hoop*. *Hudibras*.

To COCK, *v. a.* To set erect; to hold bolt upright as a cock holds his head.—This is that muscle which performs the motion so often mentioned by the Latin poets, when they talk of a man's *cocking* his nose, or playing the rhinoceros. *Addison*.—To set up the hat with an air of petulance and pertness:

Dick, who thus long had passive sat,
Here strok'd his chin and *cock'd* his hat. *Prior*.

To mould the form of the hat. To fix the cock of a gun ready for a discharge.—Some of them holding up their pistols, *cocked*, near the door of the house, which they kept open. *Dryden*.—To raise hay in small heaps:

Sike mirth in May is meetest for to make,
Or summer shade, under the *cocked* hay. *Spenser*.

To COCK, *v. n.* To strut; to hold up the head, and look big, or menacing, or pert:

Sir Fopling is a fool so nicely writ,
The ladies would mistake him for a wit;
And when he sings, talks loud, and *cocks*, would cry,
I vow, methinks, he's pretty company. *Dryden*.

To train or use fighting cocks.—Cries out 'gainst *cocking*, since he cannot bet, *Ben Jonson*.

"Every COCK is proud on his own dunghill." *Gallus in suo sterquilinio plurimum potest*. Lat. *Chien sur son fumier est hardi*. Fr. *Cada gállo canta* (crows) *en su muladar*. Sp. This proverb is used to shew that it is a sign of cowardice, and by no means of true courage, when any one struts, menaces, or insults, when he knows he is sure of protection, or out of the reach of his antagonist.

The COCK, hieroglyphically, denotes a noble disposition of mind, there being no bird of a more generous and undaunted courage at the sight of imminent danger.

COCK's-COMB, *s.* in botany. See CELOSIA.

COCK's-FOOT GRASS, *s.* in botany. See DACTYLIS.

COCK's-HEAD, *s.* in botany. See HEDYSARUM.

COCK'ADE, *s.* A ribbon worn in the hat.

COCK'AIN (Sir Aston), was a native of Ashbourn in Derbyshire, where his ancestors had been long seated, and possessed great estates. He studied at Oxford, and was fellow of Trinity-college, Cambridge. After residing some time in the inns of court, he went abroad with sir Kenelm Digby. The politeness of his manners, his love of the liberal arts, and his vein of poetry, though not of the purest kind, gained him much esteem. His being of the church of Rome gained him many enemies: this, together with his convivial disposition, and total neglect of economy, reduced him to sell his estate; he had however the prudence to reserve an annuity for himself. He died in 1684, aged seventy-eight. He wrote four plays, several poems, and a romance entitled Dianea, translated out of Italian.

COCK'ATRICE, *s.* [from *cock*, and аттер, Sax. a serpent.] A serpent fabulously supposed to rise from a cock's egg. It is used as a word of reproach.—This *cockatrice* is soonest crushed in the shell; but, if it grows, it turns to a serpent and a dragon. *Taylor*.

COCK'BOAT, *s.* A small boat belonging to a ship.—That invincible armada, which having not fired a cottage of ours at land, nor taken a *cockboat* of ours at sea, wandered through the wilderness of the northern seas. *Bacon*.

COCK'BROTH, *s.* Broth made by boiling a cock.—Diet upon spoon-meats; as veal or *cockbroths* prepared with French barley. *Harvey*.

COCK'BURN (Catharine), daughter of captain David Trotter, a Scots gentleman in the navy, born in 1679. She gave early proofs of a poetic imagination, by the production of three tragedies and a comedy, which were all acted; the first of them in her seventeenth year. But her talents were not limited to poetry, she had a deep philosophical turn of mind; she engaged in controversy, and defended Mr. Locke's opinions against Dr. Burnet of the Charter-house, and Dr. Holdsworth. She was induced to turn Roman catholic when very young, but returned from that faith in her riper years. In 1708 she married Mr. Cockburn, the son of an eminent Scots divine, when the cares of a family diverted her from her studies for near twenty years; which she nevertheless resumed with vigour. She died in 1749, and her works are collected in 2 vols. 8vo.

COCK'BURN, a township of the American States, in the northern part of New Hampshire, Grafton county, on the east bank of Connecticut river, south of Colebrook.

COCK'BURN ISLANDS, a group of small islands, near the north-east coast of New Holland.

COCK'BURNPATH, a fishing town of Scotland, on the sea-coast of the county of Berwick: fourteen miles north-west of Berwick, and eight south-east of Dunbar.

COCKCRO'WING, *s.* The time at which cocks crow; the morning.—Ye know not when the master of the house cometh; at even, or at midnight, or at the *cockcrowing*, or in the morning. *Mark*.

To COC'KER, *v. a.* [*coqueliner*, Fr.] To cade; to fondle; to indulge.—He that will give his son sugar-plums to make him learn, does but authorize his love of pleasure, and *cocker* up that propensity which he ought to subdue. *Locke*.

COCK'ER, a river of England, which runs into the Derwent, at Cockermouth.

COCK'ER, *s.* One who follows the sport of cockfighting.

COCK'EREL, *s.* A young cock:

What wilt thou be, young *cockerel*, when thy spurs
Are grown to sharpness? *Dryden*.

COCK'ERMOUTH, a borough-town in the county of Cumberland, on the river Cocker, from whence it derives its name, and by which it is divided into two parts nearly equal; the church, market-place, and castle, being situate on the east side, and the other part on the southwest. The castle stands on the conflux of the rivers Derwent and Cocker, upon an eminence which commands an extensive and beautiful prospect. Its ruins are much admired; and on the gates are the arms of the Multons, Umfrevilles, Lucys, and Percys; but they are now partly defaced. The approach has been kept by a draw-bridge over a deep foss. The gateway appears to be more modern than any other part of the building, is vaulted with Norman Gothic arches, and defended with a portcullis, over which is a lofty tower. Authors differ about the founder of this castle, though they agree that it was built soon after the conquest. The situation of Cockermouth is altogether very beautiful, being watered by two fine rivers. Beneath the Derwent is a plain of considerable extent.

extent. The river on one hand falls in cascades, and the opposite banks are formed of rich corn-lands; on the other, the level meads are bounded by a gentle rising ground covered with wood. One end of the view is terminated by lofty rocks scattered over with trees; the other by the ruins of the castle impending over the river, by a bridge of two arches, and the town of Derwent hanging on the distant hill.

Cockermouth is governed by a bailiff, who is the returning officer at all elections. The principal articles manufactured here are tanned leather, the annual profits on which amount to about 14,000l. hats, mostly for exportation, the annual returns on which are about 7,000l. and shalloons and other coarse woollens, on which their annual returns are about 6,000l. There is also a manufactory for coarse linen cloth. The number of inhabitants is about 3000. The principal market-day is on Mondays; and there is a small market on Saturdays; the former is well supplied with provisions and grain. Fairs, the Mondays after Martinmas and Whit-Sunday, for hiring servants; a fair for horned cattle, on the first Wednesday in May, and continues regularly on that day fortnight till the 10th of October, when it concludes, with the fair called Michaelmas fair, where is shewn a great number of horses. It is an excellent situation for trade and manufactories, the surrounding country populous and fertile, having a constant and plentiful supply of water by different streams, several valuable coal-mines, and three sea-ports, all within the distance of fifteen miles; and distant from London 299 miles.

COCK'ERMOUTH, a town of the American States, in Grafton county, New Hampshire, about fifteen miles north-east of Dartmouth-college. It was incorporated in 1766.

COCK'ET, *f.* [*cockettum*, Lat.] A seal belonging to the king's custom-house; or rather a scroll of parchment sealed, and delivered by the officers of the custom-house to merchants, as a warrant that their merchandizes are customed. The word *cocket* is also taken for the custom-house or office where goods to be transported were first entered, and paid their custom, and had a cocket or certificate of discharge; and *cocketta lana* is wool duly entered and cocketted, or authorised to be transported. 23 Edw. I. *Cocket* is likewise used for a sort of measure, *Fleta*, lib. 2. c. 9. *Panis vero integer quadrantalis frumenti ponderabit unum* cocket *& dimidium*; and it is made use of for a distinction of bread, in the statute of bread and ale; 51 Hen. III. where mention is made of wastel bread, *cocket* bread, bread of treet, and bread of common wheat; the wastel bread being what we now call the finest bread, or French bread; the *cocket* bread the second sort of white bread; bread of treet, and of common wheat, brown, or household bread, &c.

COCK'FIGHT, *f.* A battle or match of cocks.—In *cockfights*, to make one cock more hardy, and the other more cowardly. *Bacon*.—It must appear astonishing to every reflecting mind, that a mode of diversion so cruel and inhuman as that of cockfighting should so generally have prevailed, that not only the ancient barbarians, Greeks, and Romans, should have adopted it, but that a practice so savage should have been continued by Christians, and even pursued in these better and more enlightened times. The islanders of Delos, it seems, were great lovers of cockfighting; and Tanagra, a city in Bœotia, the isle of Rhodes, Chalcis in Eubœa, and the country of Media, were famous for their magnanimous race of game-cocks. The kingdom of Persia was probably included in the last, from whence this kind of poultry was first brought into Greece; and, if we may judge of the rest from the fowls of Rhodes and Media, the excellency of the broods at that time consisted in their weight and largeness. The Greeks had early a method of preparing the cocks for battle, by feeding; as may be collected from Columella. It seems that at first cockfighting was partly a religious, and partly a political, institution at Athens; and was there continued for the purpose of improving the seeds of valour in the minds of their youth; but was afterwards abused and perverted to a common pastime, without any moral, political, or religious, intention. As the Romans were prone to imitate the Greeks, we naturally expect to find them following their example in this mode of diversion, which they also perverted to a low and unmeaning sport. Columella stiles cockfighting a Grecian diversion; and speaks of it in terms of ignominy, as an expensive amusement, unbecoming the frugal householder, and often attended with the ruin of the parties that followed it. The first cause of contention between the two brothers, Bassianus and Geta, sons of the emperor Septimus Severus, happened, according to Herodian, in their youth, about the fighting of their cocks; and, if the battling between these two princes was the first instance of it, probably they had seen and learned it in Greece, whither they had often accompanied the emperor their father. It is observable, that cocks and quails pitted for the purpose of engaging one another, *à outrance*, or to the last gasp, for diversion, are frequently compared to gladiators. Hence Pliny's expression, *gallorum, ceu gladiatorum*; and that of Columella, *rixosorum avium lanistæ*; *lanista* being the proper term for the master of the gladiators. Consequently one should have expected, that when the bloody scenes of the amphitheatre were discarded, as they were soon after the Christian religion became the establishment of the empire, the wanton shedding of men's blood in sport, and this cruel and degrading sport of cockfighting, would both have ceased together.

It is unknown when the pitched battle first entered England; but it was probably brought hither by the Romans. The game-cock was known here before Cæsar's arrival; but no notice of its fighting occurs earlier than the time of William Fitz-Stephen, who wrote the life of Becket, some time in the reign of Henry II. From this time at least the diversion was continued amongst us. It was followed, though disapproved and prohibited, 39 Edward III. also in the reign of Henry VIII. and A. D. 1569. It has by some been called a *royal diversion*; and, as every one knows, the cock-pit at Whitehall was erected by a crowned head, for the more magnificent celebration of this sport; it was prohibited, however, by one of Oliver's acts, March 31, 1664; and, to the honour of our humanity, good sense, and feeling, this brutal diversion seems to have ceased in England. But we are told by Mr. Marsden, that at this day, in the East Indies, cockfighting is a very favourite and common diversion, as well between the English gentlemen and the nabobs, as amongst the inhabitants of Sumatra, and the other Malays. They pay even a greater attention to the training and feeding game-cocks, than was ever done in England, when that cruel amusement was at its height. They trim their cocks, and fight with gaffs, in Hindoostan; but in Sumatra they arm one of the legs only, not with a gaff, as usual with us, but with arms in form of a scymeter, which make most dreadful destruction. Their cocks are never trimmed, but fought in full feather. The Sumatrans fight their cocks for vast sums: a man has been known to stake his wife or his children, and a son his mother and sisters, on the event of a battle. In disputed points four umpires are appointed; and if they cannot agree there is no appeal but to the sword. Some of these deluded people have a notion that their cocks are *betooah*, or invulnerable; a father on his death-bed has, under that delusion, directed his son to wager his whole property on a certain cock, under the full conviction of consequent success. The cocks are of a great size, and often weigh ten pounds each, and fight with the same spirit as the best in Britain. We are told that *quail-fighting* is now as much the vogue in Persia and China, as cockfighting ever was in England; and that similar pains are taken in rearing and training quails for this purpose.

COCK'HORSE,

COCK'HORSE, *adj.* On horseback; triumphant; exulting:

Alma, they strenuously maintain,
Sits *cockhorse* on her throne the brain. *Prior.*

COC'KLE, *s.* [*coquille*, Fr.] A small testaceous fish. See the article CARDIUM.—We may, I think, from the make of an oyster, or *cockle*, reasonably conclude, that it has not so many, nor so quick, senses as a man. *Locke.*—A little or young cock. *Obsolete:*

They bearen the crag so stiff and so state,
As *cockle* on his dunghill crowing crank. *Spenser.*

COC'KLE, *s.* A term among the Cornish miners, for the substance called *schorl*, or *shirl*.

COC'KLE, *s.* [coccel, Sax. *lolium*, *zizania*, Lat.] A weed that grows in corn, the same with corn-rose. See AGROSTEMMA.

Good seed degenerates, and oft obeys
The soil's disease, and into *cockle* strays. *Donne.*

To COC'KLE, *v. a.* To contract into wrinkles, like the shell of a cockle.—Show'rs soon drench the camblet's *cockled* grain. *Gay.*

COC'KLE-SHELL BAY, a bay on the east coast of the island of St. Christopher. Lat. 17. 22. N. lon. 62. 22. W. Greenwich.

COC'KLE-STAIRS, *s.* Winding or spiral stairs. *Chamb.*

COC'KLED, *adj.* Shelled; or perhaps cochleate, turbinated:

Love's feeling is more soft and sensible
Than are the tender horns of *cockled* snails. *Shakespeare.*

COCK'LOFT, *s.* The room over the garret, in which fowls are supposed to roost; unless it be rather corrupted from *coploft*, the *cop* or *top* of the house:

If the lowest floors already burn,
Cocklofts and garrets soon will take their turn. *Dryden.*

COCK'MASTER, *s.* One that breeds game-cocks.—A *cockmaster* bought a partridge, and turned it among the fighting cocks. *L'Estrange.*

COCK'MATCH, *s.* A cockfight for a prize. When a match is made with several cocks on each side, it is called *a main of cocks*, or *fighting a main*.—Though quail-fighting is what is most taken notice of, they had doubtless *cockmatches* also. *Arbuthnot.*

COCK'NEY, *s.* [A word of which the original is much controverted. The French use an expression, *païs de cocaigne*, for a country of dainties: *Paris est pour un riche un païs de cogaigne. Boileau.* Of this word they are not able to settle the original. It appears, whatever was its first ground, to be very ancient, being mentioned in an old Normanno-Saxon poem:

Far in see by west Spayng,
Is a lond yhote cocayng.

On which Dr. Hickes has this remark: Nunc *coquin*, *coquine*: quæ olim apud Gallos, otio, gulæ, et ventri deditos, *ignavum*, *ignavam*, *desidiosum*, *desidiosam*, *segnem*, significabant. Hinc *urbanos*, utpote à rusticis laboribus ad vitam sedentariam et desidiosam avocatos, pagani nostri olim *cokaignes*, quod nunc scribitur *cockneys* vocabant. Et poeta hic noster in monachos & moniales, ut segne genus hominum qui, desidiæ dediti, ventri indulgebant, & coquinæ amatores erant, malevolentissime invehitur; monasteria & monasticam vitam inde scriptione terræ *cockaineæ* parabolicè perstringens.] A native of London, by way of contempt.—So the *cockney* did to the eels, when she put them i'th' pasty alive. *Shakespeare.*

For who is such a *cockney* in his heart,
Proud of the plenty of the southern part,
To scorn that union, by which we may
Boast 'twas his countryman that writ this play? *Dorset.*

Any effeminate, ignorant, low, mean, despicable, citizen.—I am afraid this great lubber the world will prove a *cockney*. *Shakespeare.*

COCK'PIT, *s.* The area where cocks fight.—And now have I gained the *cockpit* of the western world, and academy of arms, for many years. *Howel.*—A place on the lower deck of a man of war, where are subdivisions for the purser, the surgeon, and his mates. *Harris.*

COCK'ROACH, *s.* in entomology. See BLATTA.

COCK'SHUT, *s.* The close of the evening, at which time poultry go to roost:

Surrey and himself,
Much about *cockshut* time, from troop to troop
Went through the army. *Shakespeare.*

COCK'SPUR, *s.* in botany, Virginian hawthorn, or wild service-tree. See CRATÆGUS.

COCK'SURE, *adv.* Confidently certain; without fear or diffidence. *A word of contempt.*—I thought myself *cocksure* of his horse, which he readily promised me. *Pope.*

COCK'SWAIN, or COCKSON, *s.* [coggrpaine, Sax.] An officer on board a man of war, who hath the care of the cockboat, or sloop, and all things belonging to it. He is to be ready with his boat's crew, to man the boat on all occasions. He sits in the stern of the boat, and steers; and hath a whistle to call and encourage his men.

COCK'WEED, *s.* The name of a plant; called also *dittander*, or *pepperwort*.

COC'LES (Pub. Horat.) a celebrated Roman, who alone opposed the whole army of Porsenna at the head of a bridge, while his companions behind him were cutting off the communication with the other shore. When the bridge was destroyed, Cocles, though wounded by the darts of the enemy, leaped into the Tiber, and swam across it with his arms. A brazen statue was raised to him in the temple of Vulcan, by the consul Publicola, for his eminent services. *Livy.*

CO'COA, or COCOA NUT, *s.* in botany. See COCOS.

CO'COA PLUM, *s.* in botany. See CHRYSOBALANUS.

CO'COA POINT, a cape on the coast of the island of Tinian.

CO'COA-NUT ISLAND, a small island at the entrance of Carteret's Harbour, on the south-east coast of New Ireland.

COCONA'TO, a town of Italy, in the principality of Piedmont: four miles south of Crescentio.

COCOR'TO, a town of Asia, in the country of Thibet: fifty miles south-south-west of Tchontori.

CO'COS, *s.* [the fruit is called by the Portuguese *coco* and *coquen*, from the three holes at the end of the shell, giving it the appearance of a monkey's head.] In botany, a genus of the class monoecia, order hexandria, natural order of palms. The generic characters are—Male flowers in the same spadix with the females. Calyx: spathe universal, univalve; spadix branching; perianthium three-parted, very small; divisions subtriquetrous, concave, coloured. Corolla: petals three, ovate, acute, patulous. Stamina: filaments six, simple, length of the corolla; antheræ sagittate. Pistillum: germ scarcely manifest; styles three, short; stigma obsolete. Pericarpium: abortient. Female flowers on the same spadix with the males. Calyx: spathe common with the hermaphrodites, as likewise the spadix; perianthium three-parted; divisions roundish, concave, converging, coloured, permanent. Corolla: petals three, permanent, like the calyx, but rather larger. Pistillum: germ ovate; style none; stigma three-lobed. Pericarpium: drupe coriaceous, very large, roundish, obscurely triangular. Seed: nut very large, subovate, acuminate, one-celled, valveless, obtusely three-cornered, the base perforated by three holes; kernel hollow.—*Essential Character.* Male. Calyx, three-parted; corolla, three-petalled; staminas, six. Female. Calyx, five-parted; corolla, three-petalled; stigmas three; drupe coriaceous.

Species. 1. Cocos nucifera, or cocoa-nut-tree: unarmed;

armed; fronds pinnate, leaflets folded back, ensiform. This useful tree is common almost every where within the tropics, and is cultivated in both Indies. It is supposed, however, to be originally a native of the East Indies, and is found in a wild state in the Maldives and Ladrones, &c. as also in the islands of the South Seas. The roots are very slender, simple, and flexile; they arise separately from the bottom of the trunk, and spread in all directions; some running to a great depth, while others creep almost parallel to the surface. The trees grow to a great height; their stems are composed of strong fibres like net-work, which lie in several laminæ over each other, out of which come the branches, or rather leaves, which grow twelve or fourteen feet long. The midrib has sword-shaped leaflets, whose borders fold backward; the first leaves which push out from the nut when planted, are very different from those which are afterwards produced, for they are very broad, and have many folds in each; whereas the after leaves have a strong midrib, twelve or fourteen feet long, on which the leaflets are placed alternately; these are from six to eight or nine inches long, and are almost triangular, having very sharp points, and are very stiff. The flowers come out round the top of the trunk of the tree in large clusters; they are inclosed in a large spathe or sheath, and the nuts afterwards are formed in large clusters, ten or twelve together. When all the parts of the flowers have gained a due degree of perfection, the spathe splits on the under side, from the bottom upwards, and exposes the common bunch, with all its flowers, to the open air: most of these are males, and fall off gradually as the spathe withers, leaving the embryo fruit, which is generally fixed to the lower and stronger part of the stalk, to increase and ripen gradually. This fruit is properly a berried drupe, superior, very large, ovate, rounded-three-cornered, umbilicate both ways, tawny or reddish, becoming finally of a very pale red or brownish colour; the skin is thin and very tough, the substance under this investing the shell is extremely fibrous. The shell itself is of a bony substance, ovate-three-sided and acuminate, marked with three raised spurious sutures, and having three holes at the base closed with a black membrane; it is one-celled, valveless, and of a dark-brown colour. The kernel adheres all round the inner wall of the shell, and the cavity is filled with a milky liquor. The kernel in some nuts is near an inch thick, and the hollow contains about a pint of a sweet, delicate, wholesome, refreshing liquor. While the nut is growing, all the inside is full of this liquor; but, as the nut grows towards maturity, the kernel begins to settle round the inside of the shell, and is soft like cream; as the nut ripens, it increases in substance, and becomes hard. The ripe kernel is sweet enough, but very hard to digest, therefore seldom eaten, unless by strangers; but while it is young and soft like pap, some will eat it, scraping it out with a spoon, after they have drunk the liquor. The liquor is very pleasant, while the nuts are young; as they grow old it becomes more sharp and cooling, and far more agreeable to over-heated habits. The kernel is very nourishing, is much used in making soups, curries, &c. and may be substituted for almonds, in emulsions and apozems, where it can be had fresh. A pure sweet oil is extracted from it, fit both for the table and medicinal uses; in the Society Isles they scent it with santal-wood and other perfumes, in order to anoint their hair and skin with it. Beside the liquor in the fruit, there is a sort of wine drawn from the tree, called *toddy*, which looks like whey. It is sweet and very pleasant, but it is to be drunk within twenty-four hours after it is drawn, for afterwards it grows sour. They who have a great many trees draw a spirit from the sour wine, called *arack*. It is also distilled from rice, &c. but none is so much esteemed for making punch, as this sort made of toddy, or the sap of the cocoa-nut tree; but it must have a dash of brandy to hearten it, because this arack is not strong enough to make good punch of itself. This sort of liquor is chiefly used about Goa; and therefore it has the name of *Goa arack*.

In order to make arack, the tree must be kept from bearing fruit; for this purpose, the sprout which produces the nut, and which shoots every month, is cut, and jars fastened to it to receive the liquor; or the body is bored, and a plug put into the orifice, which is occasionally taken out when the liquor is wanted; this liquor is suffered to ferment, and is distilled into the spirit called *arack*, which far exceeds what is drawn from rice. If this liquor is exposed to the sun, it soon turns to vinegar. The coat or husk of the shell is composed of strong fibres, and is two or three inches thick. With these fibres, after soaking them in water, they make sail-cloth, cables, and cordage even for their largest ships; as also oakum, and yarns, used in the constructions of ships, boats, houses, &c. The shell serves for a variety of houshold vessels; and when these are worn out, they are burnt to make lamp-black for painting, &c. The trunk is formed into gutters, and occasionally employed for inclosing and roofing out-houses, and, being nailed close, is so hardy as to resist the weather for many years. The Indians make boats, rafters, and the whole frames of their houses, from the body of this tree. The leaves are used for thatching them, and are wrought into mats, baskets, and many other things for which osiers are employed in Europe. The tender shoots at the top afford a pleasant green, or cabbage; but for this the tree is destroyed. It was cultivated in 1739, in Chelsea garden.

2. Cocos butyracea: unarmed; fronds pinnate, leaflets simple. The pulp of the nut is very mucilaginous, and is used for fatting hogs. An oil or butter prepared from it is in constant use among the Indians in South America, both in food and medicine.

3. Cocos Guineensis, or prickly pole: the whole spiny, spines bristle-shaped; fronds distant; root creeping, knotty, round, thicker than the trunk, short, horizontally bent in directly below the surface, creeping, and presently putting out another trunk, so as to make a thicket, whilst it fixes itself firmly in the soil by slender fibrous roots. Trunk erect, armed with very numerous prickles, and furnished with some semilacerate withering stipes; it is about an inch in diameter, and in open situations seldom exceeds twelve feet in height; in woods it grows somewhat higher. The bark is brownish. Flowers with a very slight tinge of yellow, and without scent. Fruits dark purple, the size of a common cherry, containing an acid juice, of which the Americans make a sort of wine; they are eatable, but not pleasant. However they furnish the wild hogs with abundance of food in Jamaica. Canes are made of the trunk deprived of its bark; they are black, shining, jointed, and very light: the French call them *cannes de Tobago*, and they are sometimes brought to Europe; from this use of them for walking-canes, Jacquin has named this palm *bactris*, απο του βακτρου. The outward part is extremely hard and elastic, and looks much like whalebone; it is fit for bows and rammers. Native of Carthagena in South America.

4. Cocos aculeata, or great macaw-tree: aculeate-spiny, trunk fusiform, fronds pinnate, stipes and spathes spiny. This has a trunk the thickness of the human body, thirty feet in height, with an ash-coloured bark, and very thick set with sharp black prickles, of different lengths, placed usually in rings. The fruit is as large as a crab, and of the same shape: under a green skin it has a thin sweetish astringent pulp; and within that a nut full of a white sweet eatable kernel. The fruit is thus more particularly described by Gærtner: it is globular, flatted a little, about an inch in diameter, terminated by three acuminate sessile stigmas, and retaining the six-leaved calyx at the base; skin thick, coriaceous; pulp fibrous, succulent, finely fungose and coriaceous, adhering to the nut, which is globular, sublenticular, of a stony substance, thick, one-celled, with three holes on the side, two of which are blind, and the third pervious. Seed single, subglobular, flattish,

COCOS.

[illegible] of a Male Flower magnified b.b. The [illegible] of a [illegible] Female Flower cut open d.e.f. Different Sections of the Germ

[illegible]

COCOS.

1. The Cocoa Fruit as it grows upon the Tree. 2. A Section of the same to shew the Formation of the Nut. 3. A Section of the Nut to shew the Kernel. 4. The perfect Kernel extracted.

flattish, or slightly depressed near the hole of the shell, netted all over with arched streaks, of a brown bay colour. It differs from the cocoa in the horizontal situation of the embryo. Browne says, that the husks both of this and the small macaw-tree are full of oil, and the nut black and shining. The negroes say that it yields the true palm-oil. The outside of the trunk is made into laths, bows, and darts. It is common in the Caribbee islands.

5. Cocos nypa: unarmed; fronds pinnate; spadixes to the male flowers round, to the females roundish; drupe grooved. This is a very thick palm, only four feet high, frequently shorter, or even without any stem. Fronds fifteen feet long, almost upright, irregularly pinnate, with a subcylindric rachis or midrib. It is very frequent in salt-marshes, and at the muddy mouths of rivers in Cochin-china, Cambodia, the Philippine islands, the straits of Malacca, &c.

Propagation and Culture. The coccoa-tree is propagated by planting the nuts in places where they are designed to remain; for it will not bear transplanting, unless the operation is performed while the trees are very young, for their roots shoot deep and wide; so that, if these are cut or broken, the plants seldom survive it; which is generally the case with most of the palms. Where any persons are desirous of having a plant or two of this sort, they should procure some fresh nuts from the nearest place of their growth, which, on their arrival in England, should be buried in a warm bed of tanners' bark, laying them on one side, that the young shoot which comes out from one of the three holes may not be injured by wet, covering them about six inches deep with the tan. In this situation, if the nuts are good, they will put out shoots in six weeks or two months, so should be then carefully taken up, and each planted in a separate pot filled with kitchen-garden earth, and plunged into the tan-bed in the stove, where the plants should always remain, for they are too tender to thrive in any other situation; but, as the plants advance in their growth, they should be shifted into larger pots or tubs, being careful not to cut or tear their roots in the operation. Few of the nuts that are brought to England are ripe, being commonly gathered in an unripe state, that they may keep during their passage. The best way to bring them for planting, is to put some that are fully ripe in dry sand in a tub, where vermin cannot come to them. These will often sprout in their passage, which is an advantage, because they may be immediately planted into pots of earth, and plunged into the bark bed. These trees make considerable progress in the West Indies, but in Europe they are many years before they advance to any considerable height; the young leaves however being pretty large, they make a good appearance among other tender exotic plants in two or three years. The other sorts must be propagated by seeds in the same way.

CO'COS, a small island in the Pacific Ocean. Lat. 5. 15. N. lon. 72. W. Ferro.

CO'COS, a small island in the eastern Indian sea, a little to the west of the coast of Sumatra. Lat. 2. 40. N. lon. 95. 25. E. Greenwich.

COCOXIHUI'TL, *s.* in botany. See BOCCONIA.

COC'TILE, *adj.* [*coctilis*, Lat.] Made by baking, as a brick.

COC'TION, *s.* [*coctio*, Lat.] The act of boiling. It is also applied to humours when ripened by digestion.—The disease is sometimes attended with expectoration from the lungs, and that is taken off by a *coction* and resolution of the feverish matter, or terminates in suppurations, or a gangrene. *Arbuthnot.*

CO'CULA, *s.* A cogue, or little drinking-cup, in form of a small boat, used especially at sea, and still retained in a cogue, cag, or kegue, of brandy.

COCUMO'NT, a town of France, in the department of the Lot and Garonne: two leagues south-west of Marmande.

COCY'TUS, a river of Epirus. The word is derived from κωκυειν, to weep and to lament. Its etymology, the unwholesomeness of its waters, and, above all, its vicinity to the Acheron, have made the poets call it one of the rivers of hell. *Virgil.*

COD, or CODFISH, *s.* in ichthyology. See GADUS.

COD, *s.* [codde, Sax.] Any case or husk in which seeds are lodged.—They let pease lie in small heaps as they are reaped, till they find the hawm and *cod* dry. *Mortimer.*

Thy corn thou there may'st safely sow,
Where in full *cods* last year rich pease did grow. *May.*

To COD, *v. n.* To inclose in a cod.—All *codded* grain being a destroyer of weeds, an improver of land, and a preparer of it for other crops. *Mortimer.*

COD ROY, a river of Newfoundland, which runs into the sea, between Cape Ray, and Cape Anguille.

COD'S-HEAD, a cape on the south-west coast of Ireland. Lat. 51. 36. N. lon. 9. 59. W. Greenwich.

CODA'GA-PA'LA, *s.* in botany. See NERIUM.

CODA'GA PILA'VA, *s.* in botany. See MORINDA.

CODAGA'M, *s.* in botany. See HYDROCOTYLE.

COD'BECK, a river of England, in the north-riding of Yorkshire, which passes by Thirsk, and joins the Willowbeck about two miles below that town, and both together fall into the Swale about two miles after the union.

COD'DA-PAN'NA, *s.* in botany. See CORYPHA.

COD'DAM-PUL'LI, *s.* in botany. See CAMBOGIA.

COD'DED-CORN-VIO'LET, *s.* in botany. See CAMPANULA HYBRIDA.

COD'DERS, *s.* Gatherers of pease.

CODE, *s.* [*codex*, Lat.] A book of rules or regulations. A book of the civil law. We find in the Theodosian and Justinian *code*, the interest of trade very well provided for. *Arbuthnot.*

Indentures, cov'nants, articles, they draw,
Large as the fields themselves; and larger far
Than civil *codes* with all their glosses are. *Pope.*

CODECEI'RO, a town of Portugal, in the province of Beira: six miles south from Guarda.

CO'DEN, a town of United America, in the state of Virginia: nine miles south-east of Cumberland.

CODE'SI, a town of European Turkey, in the province of Epire: fixteen miles east of Valona.

CO'DI-AVANACU', *s.* in botany. See TRAGIA.

CO'DIA, *s.* [from κωδια, a little ball; the flowers growing in a small head.] In botany, a genus of the class octandria, order digynia. The generic characters are—Calyx: common, four-leaved; leaves reflected below the head; proper, four-leaved; leaflets elliptic, erect. Corolla: petals four, linear. Stamina: filaments eight, filiform, two, each growing to the base of a petal, longer than the corolla; antheræ ovate-angulate. Pistillum: germ very small, superior, extremely villose; styles two, subulate, the length of the stamens; stigmas simple. Receptaculum: common, villose. It has a very great affinity to brunia. The fruit, when known, must determine whether it be a separate genus. Many of the brunias have two styles.—*Essential Character.* Calyx; four-leaved; petals four; common receptacle involucred.

There is but one species called codia montana. Leaves opposite, petioled, elliptic, very smooth, entire, obtuse; heads globular, terminating, and axillary, very short, peduncled; perhaps a species of brunia; a shrub, native of New Caledonia; found there the 8th of Sept. 1774.

CODIÆ'UM, *s.* in botany. See CROTON.

CO'DICIL, *s.* [*codicillus*, Lat. from *codex*, a book, or writing.] A schedule or supplement to a will, where any thing is omitted which the testator would add, or where he would explain, alter, or retract, what he hath done. See the article WILL.

CODIL'LE, *s.* [*codille*, Fr. *codillo*, Span.] A term at ombre, when the game is won:

She sees, and trembles at the approaching ill;
Just in the jaws of ruin, and *codille*. *Pope.*

CODI'NA, a town of the island of Sardinia: fourteen miles east-south-east of Oristagni.

To CO'DLE, *v. a.* [*coquo*, *coctulo*, Lat. Skinner.] To parboil; to soften by the heat of water.

COD'LING, *s.* An apple generally codled, to be mixed with milk, &c.

Their entertainment at the height,
In cream and *codlings* rev'ling with delight. *King.*

CODLING-TREE, *s.* in botany. See PYRUS MALUS.

COD'LINGS AND CREAM. See EPILOBIUM.

CO'DON, *s.* [κωδων, Gr. a little bell; from the form of the flower.] In botany, a genus of the class decandria, order monogynia. The generic characters are—Calyx: perianthium one-leafed, ten-parted; leaflets subulate, permanent, somewhat erect; alternately shorter. Corolla: one-petalled, bell-shaped, torulose at the base; border ten-parted, equal; nectary ten-celled, consisting of ten scales inserted into the claws of the stamens, converging, covering the receptacle. Stamina: filaments ten, length of the corolla; antheræ thick. Pistillum: germ superior, conic; style simple, length of the stamens; stigmas two, long, setaceous, divergent. Pericarpium: two-celled. Seeds: several, roundish, echinate, with soft papillæ, situated in a juiceless coloured pulp.—*Essential Character.* Calyx; ten-parted, permanent; leaflets alternately shorter; corolla, bell-shaped, ten-cleft; nectaries, ten-celled, composed of ten scales; pericarpium, two-celled, containing several seeds.

There is but one species, called codon royeni. The stem is herbaceous, firm, eighteen inches in height, round, with rising branches; leaves alternate, petioled, cordate-ovate, subrepand, undivided, acuminate, subcoriaceous, smooth, without veins on the upper surface; flowers supra-axillary, solitary, peduncled, having the appearance of the corolla of atropa belladonna, whitish, with ten purple streaks on the outside. The whole herb is striated. The fruit is a capsule, contained within the segments of the calyx, which are linear, keeled, converging, and prickly; it is of an ovate-acuminate shape, terminated by the compressed forked style, and marked along both sides with a sharp suture; in other parts it is smooth; it has two valves, and within is divided into two cells; the partition is contrary to the valves, is cloven and spongy next the axis; seeds numerous, small, variously angular, of a shining blood-red, and covered with soft papillæ of the same colour.

COD'MA, a town of Persia, in the province of Segestan: 154 miles south-south-west of Zareng.

CODOCE'LE, *s.* [from κωδια, a bulb, and κηλη, a tumour.] A venereal bubo.

CODOG'NO, a town of Italy, in the Lodesan, at the conflux of the Adda and the Po, where the Austrians were forced in 1746: twelve miles south-south-east of Lodi. It is now a considerable place in the Cisalpine republic, where the revolutionary army defeated the Austrians, on the 9th of May, 1796, and compelled them, after a bloody battle, to retreat partly towards Lodi, and partly towards Piccighitone, over the Adda, where, on the day following, they lost the famous battle of Lodi.

COD'RINGTON (Christopher), a brave soldier and admirable scholar, born at Barbadoes in 1668, and had part of his education in that island. He afterwards came to England, and was admitted a gentleman-commoner of Christchurch in Oxford, in 1685; where he was elected a probationer fellow of All Souls college in 1689. He became very accomplished, and soon recommended himself to the favour of king William. He was made captain in the first regiment of foot-guards, and was instrumental in driving the French out of the island of St. Christopher's, which they had seized. He was also at the siege of Namur in 1695. Upon the conclusion of the peace of Ryswick, he was made captain-general and governor in chief of the Leeward Caribbee Islands, in which office he met with some trouble; for, in 1701, several articles were exhibited against him in the house of commons in England, but he was honourably acquitted from all imputations. In 1703 he was at the attack upon Guadaloupe, in which he shewed great bravery, though that enterprize happened to be unsuccessful. Some time after, he resigned his government of the Leeward Islands, and led a studious and retired life. For a few years before his death, he chiefly applied himself to church history and metaphysics; and his eulogist tells us, that "if he excelled in any thing, it was in metaphysical learning, of which he was, perhaps, the greatest master in the world." He died in Barbadoes, but his body was brought over to England, and interred, June 19, 1716, in All Souls chapel, Oxford. By his last will he bequeathed his two plantations in Barbadoes, and part of the island Barbuda, to the society for propagating the gospel in foreign parts; and left a noble legacy to All Souls college, of which he had been fellow. This legacy consisted of his books, which were valued at six thousand pounds, and ten thousand pounds in specie, to be laid out; six thousand pounds in building a library, and four thousand pounds in furnishing it with books. He was the author of some poems in the Musæ Anglicanæ, printed at London in 1741; and of a copy of verses inscribed to sir Samuel Garth upon his Dispensary.

CODRO'PIO, a small town in Maritime Austria, formerly belonging to the state of Venice, in the country of Friuli, on the Stella, and on the road to Germany; having in its vicinity the pleasant country-seat and palace of Passerino, which was made the residence of general Bonaparte, during the negociations at Udine: ten miles south-south-west of Udine.

CO'DRUS, the seventeenth and last king of Athens, son of Melanthus. When the Heraclidæ made war against Athens, the oracle said that the victory would be granted to that nation whose king was killed in battle. The Heraclidæ upon this gave strict orders to spare the life of Codrus; but the patriotic king disguised himself and attacked one of the enemy, by whom he was killed. The Athenians obtained the victory, and Codrus was deservedly called the father of his country. He reigned twenty-one years, about 1153 years before the Christian era. To pay more honour to his memory, the Athenians made a resolution that no man after Codrus should reign in Athens under the name of *king*; which was from hence changed to *archon*.

CŒ'CUM, or BLIND-GUT. See ANATOMY.

COEFFETEAU' (Nicolas), a dominican, and bishop of Dardania *in partibus*, was born at St. Calais in the Maine, in 1574. He rose by his merits to the first charges of his order, and died in 1623, after having been named to the bishopric of Marseilles by Louis XIII. He was eloquent in his sermons, and wrote with purity, considering the age. His principal pieces are a Roman history, from Augustus to Constantine, in folio, which was read with pleasure in the seventeenth century. He translated Florus, and was chosen by Henry IV. of France, at the recommendation of cardinal du Perron, to answer the book which James I. of England had put out; and, at the instance of Gregory XV. he wrote against Duplessis Mornay, and Marc. Anton. de Dominis, archbishop of Spalatro.

COEF'FICACY, *s.* [*con* and *efficacia*, Lat.] The power of several things acting together to produce an effect.—We cannot in general infer the efficacy of those stars, or *coefficacy* particular in medications. *Brown.*

COEFFI'CIENCY, *s.* [*con* and *efficio*, Lat.] Co-operation; the state of acting together to some single end.—The managing and carrying on of this work, by the spirits instrumental *coefficiency*, requires that they be kept together, without distinction or dissipation. *Glanville.*

COEFFI'CIENT, *s.* [*con* and *efficiens*, Lat.] That which unites its action with the action of another.

COEFFI'CIENTS, in algebra, are numbers, or given quantities, ufually prefixed to letters, or unknown quantities, by which it is fuppofed they are multiplied; and fo, with fuch letters, or quantities, making a product, or coefficient production; whence the name. See the article ALGEBRA.

CO'EL, a town of Hindooftan, in the country of Delhi: fixty-five miles fouth-eaft of Delhi, and thirty-three north of Agra. Lat. 27. 48. N. lon. 78. 27. E. Greenwich.

CŒLES'TIAL. See CELESTIAL.

CŒ'LI RO'SA, *f.* in botany. See AGROSTEMMA.

CŒ'LIA, *f.* [from κοιλια, Gr.] with anatomifts, any kind of original cavity in an animal body; and hence difeafes feated in the cavities or venters of the body, are called cœliac affections.

CŒ'LIAC PASSION, *f.* [from κοιλια, the belly.] A diarrhœa, or flux, that arifes from the indigeftion or putrefaction of food in the ftomach and bowels, whereby the aliment comes away a little altered from what it was when eaten, or changed like corrupted ftinking flefh. *Quincy.*—For *cœliac* artery and vein, fee ANATOMY.

CŒ'LIT LAWAN, *f.* in botany. See LAURUS.

CŒLO'MA, *f.* [from κοιλος, hollow.] A round hollow ulcer in the tunica cornea of the eye.

CŒLOS'TOMY, *f.* [from κοιλος, hollow, and στομα, the mouth.] A defect in fpeaking, where the voice founds unufually hollow, or as if it proceeded from a cavern.

CŒLOSY'RIA, in the larger fenfe of the word, was the name of the whole country lying fouthward of Seleucia, and extending as far as Egypt and Arabia; but is principally applied to the valley lying between Libanus and Antilibanus. This word occurs only in the apocryphal writings of the Old Teftament.

CŒ'LUS, Heaven, in pagan mythology, the fon of Æther and Dies, or Air and Day.

CŒ'LUS, or URANUS, in fabulous hiftory, an ancient deity, fuppofed to be the father of Saturn, Oceanus, Hyperion, &c. He was fon of Terra, whom he afterwards married. The number of his children, according to fome, amounted to forty-five. They were called Titans, and were fo clofely confined by their father, that they confpired againft him, and were fupported by their mother, who provided them with a fcythe. Saturn armed himfelf with this fcythe, and deprived his father of the organs of generation, as he was going to unite himfelf to Terra. From the blood which iffued from the wound, fprang the giants, furies, and nymphs. The mutilated parts were thrown into the fea, and from them, and the foam which they occafioned, arofe Venus the goddefs of beauty. *Hefiod.*

COEMP'TION, *f.* [*coemptio*, Lat.] The act of buying up the whole quantity of any thing.—Monopolies and *coemption* of wares for refale, where they are not reftrained, are great means to enrich. *Bacon.*

COEMPTIONA'LES, *f.* among the Romans, an appellation given to old flaves, which were fold in a lot with others, becaufe they could not be fold alone.

COENA'KER, a town of the ifland of Ceylon, near the fouthern coaft: 100 miles fouth of Candi.

COEN'NERN, or KONNERN, a town of Germany, in the circle of Lower Saxony, and duchy of Magdeburg, containing about 333 houfes: thirty-eight miles fouth of Magdeburg.

CŒNO'BITE. See CENOBITE.

CŒNOLO'GIA, *f.* [from κοινος, common, and λογος, a difcourfe.] A medical term for a confultation, or common confideration of a difeafe, by two or more phyficians.

COE'QUAL, *adj.* [from *con* and *equalis*, Lat.] Equal; being of the fame rank or dignity with another:

Henry the fifth did fometimes prophefy,
If once he came to be a cardinal,
He'll make his cap *coequal* with the crown. *Shakefpeare.*

COEQUA'LITY, *f.* The ftate of being equal.

To COER'CE, *v. a.* [*coerceo*, Lat.] To reftrain; to keep in order by force.—Punifhments are manifold, that they may *coerce* this profligate fort. *Ayliffe.*

COER'CIBLE, *adj.* That may be reftrained. That ought to be reftrained.

COER'CION, *f.* Penal reftraint; check.—Government has *coercion* and animadverfion upon fuch as neglect their duty; without which coercive power, all government is toothlefs and precarious. *South.*

COER'CIVE, *adj.* That which has the power of laying reftraint:

All things, on the furface fpread, are bound
By their *coercive* vigour to the ground! *Blackmore.*

That which has the authority of reftraining by punifhment.—The virtues of a general, or a king, are prudence, counfel, active fortitude, *coercive* power, awful command, and the exercife of magnanimity, as well as juftice. *Dryd.*

CO'ESFELD, a town of Germany, in the circle of Weftphalia, and bifhopric of Munfter, the ordinary refidence of the bifhop; it contains two parifh churches, and five convents, it was formerly Anfeatic: fourteen miles weft of Munfter.

CO'ESNON, a river of France, which runs into the fea, between Pontorfon and Mont St. Michael.

COESSEN'TIAL, *adj.* [*con* and *effentia*, Lat.] Participating of the fame effence.—The Lord our God is but one God, in which indivifible unity we adore the Father, as being altogether of himfelf; we glorify that confubftantial Word, which is the Son; we blefs and magnify that *coeffential* Spirit eternally proceeding from both, which is the Holy Ghoft. *Hooker.*

COESSENTIA'LITY, *f.* Participation of the fame effence.

COETA'NEOUS, *adj.* [*con* and *ætas*, Lat.] Of the fame age with another: with *to.*—Eve was old as Adam, and Cain their fon *coetaneous unto* both. *Brown.*—Every fault hath penal effects, *coetaneous to* the act. *Government of the Tongue.*—Through the body every member fuftains another; and all are *coetaneous*, becaufe none can fubfift alone. *Bentley.*

COETER'NAL, *adj.* [*con* and *æternus*, Lat.] Equally eternal with another.—Or of the eternal *coeternal* beam! *Milton.*

COETERN'ALLY, *adv.* In a ftate of equal eternity with another.—Arius had difhonoured his *coeternally* begotten Son. *Hooker.*

COETER'NITY, *f.* Having exiftence from eternity equal with another eternal being.—The eternity of the Son's generation, and his *coeternity* and confubftantiality with the Father, when he came down from heaven, and was incarnate. *Hammond.*

COE'VAL, *adj.* [*coævus*, Lat.] Of the fame age:

Even his teeth, and white, like a young flock,
Coeval, and new-fhorn, from the clear brook. *Prior.*

Of the fame age with another; followed by *with.*—This religion cannot pretend to be *coeval with* man. *Hale.*

Silence, *coeval with* eternity!
Thou wert, ere nature firft began to be:
'Twas one vaft nothing all, and all flept faft in thee! *Pope.*

Sometimes by *to.*—Although we had no monuments of religion ancienter than idolatry, we have no reafon to conclude that idolatrous religion was *coeval to* mankind. *Hale.*

COE'VAL, *f.* A word contemporary; but properly one not only living at the fame time, but of the fame time of life.—As it were not enough to have outdone all your *coevals* in wit, you will excel them in good-nature. *Pope.*

COE'VOUS, *adj.* [*coævus*, Lat.] One of the fame age. —Then it fhould not have been the firft, as fuppofing fome other thing *coevous* to it. *South.*

CŒUR (James), an eminent French merchant, and the richeft fubject in Europe in the fifteenth century. He enjoyed an office of truft in the court of Charles VII. of France.

France. He had established the greatest trade that had ever been carried on by any private subject in Europe; and, since his time, Cosmo de Medicis is the only person that equalled him. He had three hundred factors in Italy and the Levant. He lent two hundred thousand crowns of gold to his master Charles VII. without which he never could have recovered Normandy; and of this Charles was so sensible, that, when he made his triumphal entry into Rouen, he ordered Jacques Cœur to ride with the general, Dunois, in the procession. By means of his commercial connections, he negociated a peace between the knights of Rhodes and the sultan of Egypt; and he was afterwards employed by the king to persuade Amadeus duke of Savoy to resign the triple crown, which had been conferred on him by the council of Basil. But neither his excellent character, nor the services which he had rendered, could secure the gratitude of the king, nor protect him from the malignity of courtiers, envious of his merit, and jealous of his greatness. He was said to have contributed to alienate the affections of the king from Agnes Sorel; but that she was either convinced of the falsehood of the charge, or was cordially reconciled to him, is evident from her conference with him after her removal from court, and from the confidence which she reposed in him by appointing him her executor. His enemies, however, taking advantage of this report, accused him of having poisoned her; and when, by the clearest proof of his innocence, they were disappointed in this attempt to destroy him, they laid other crimes to his charge, which seem to have been equally void of foundation. For these he was condemned to die; but, in consideration of his former services, the king changed the sentence to a fine of four hundred thousand crowns and banishment for life. Instead, however, of being exiled from the kingdom, he was ordered to retire to a convent of cordeliers at Beaucaire. He found more virtue in his clerks, than in the courtiers who ruined him; the former contributed to relieve him under his misfortunes; and one of them particularly, who had married his niece, facilitated his escape out of his confinement and out of France. He went to Rome, when Calixtus III. filled the papal chair, who gave him the command of a fleet which he had equipped against the Turks. He died on his arrival at the isle of Chio, in 1456; therefore M. de Voltaire is mistaken in saying, in his Essay on Universal History, and the Spirit of Nations, that "he removed to Cyprus, where he continued to carry on his trade; but never had the courage to return to his ungrateful country, though strongly invited."

CŒ'US, a son of Cœlus and Terra. He was father of Latona, Asteria, &c. by Phœbe. *Virgil.*

CŒU'VRES, or ESTREES, a town of France, in the department of the Aisne, and chief place of a canton, in the district of Soissons: seven miles south-west of Soissons.

To COEXI'ST, *v. n.* [*con* and *existo*, Lat.] To exist at the same time.—Of substances no one has any clear idea, farther than of certain simple ideas *coexisting* together. *Locke.*—Followed by *with.*—It is sufficient that we have the idea of the length of any regular periodical appearances, which we can in our minds apply to duration, *with* which the motion or appearance never *coexisted*. *Locke.*

COEXIST'ENCE, *s.* Having existence at the same time with another: with *to.* Locke, who in the preceding lines has *coexisted with*, has here *coexistence to* — The measuring of any duration, by some motion, depends not on the real *coexistence* of that thing *to* that motion, or any other periods of revolution. *Locke.*—More commonly followed by *with.*—We can demonstrate the being of God's eternal ideas, and their *coexistence with* him. *Grew.*

COEXIST'ENT, *adj.* Having existence at the same time with another: with *to.*—To the measuring the duration of any thing by time, it is not requisite that that thing should be *coexistent to* the motion we measure by, or any other periodical revolution. *Locke.*—Sometimes *with.* —This proves no antecedent necessity, but *coexistent with* the act. *Bramhall.*—Time is taken for so much of duration as is *coexistent with* the motions of the great bodies of the universe. *Locke.*

To COEXTE'ND, *v. a.* [*con* and *extendo*, Lat.] To extend to the same space or duration with another.—Every motion is, in some sort, *coextended* with the body moved. *Grew.*

COEXTEN'SION, *s.* The act or state of extending to the same space or duration with another.—Though it be a spirit, I find it is no inconvenience to have some analogy, at least of *coextension*, with my body. *Hale.*

CŒY'MANS, a township of the American States, in Albany county, New York, twelve miles below Albany. By the state census of 1796, three hundred and eighty-nine of its inhabitants were electors.

COFFE'A, *s.* [so named from the kingdom of *Caffa* in Africa, where it grows abundantly.] The COFFEE-TREE; in botany, a genus of the class pentandria, order monogynia, natural order of stellatæ. The generic characters are—Calyx: perianthium five-toothed, very small, superior. Corolla: one-petalled, salver-shaped; tube cylindric, slender, many times longer than the calyx; border flat, five-parted, longer than the tube; divisions lance-shaped; sides rolled back. Stamina: filaments five, subulate, placed on the tube of the corolla; antheræ linear, incumbent, length of the filaments. Pistillum: germ roundish, inferior; style simple, length of the corolla; stigmas two, reflected, subulate, thickish. Pericarpium: berry roundish, umbilicated by a one or two-celled puncture. Seeds: one or two, solitary, elliptically-hemispherical, gibbous on one side, flat on the other, where it is furrowed longitudinally, involved in an aril.—*Essential Character.* Corolla, salver-shaped; stamina, upon the tube; berry, inferior, two-seeded; seeds arilled.

Species. 1. Coffea Arabica, or eastern coffee-tree: flowers five-cleft, berries two-seeded. The coffee-tree seldom rises more than sixteen or eighteen feet high in its native country, or more than ten or twelve in Europe. The main stem grows upright, and is covered with a light brown bark. Branches horizontal, opposite, brachiate at every joint, long, simple or undivided, slender, smooth, lax, and inclined to bend downwards; the lower ones longest, the others gradually decreasing to the top, so as to form a pyramid. Leaves opposite, when fully grown four or five inches long, and an inch and a half broad in the middle, ovate-lanceolate, the borders waved, the surface of a lucid green, smooth, beneath paler. Petiole only two or three lines in length; from the sides of the midrib, which is a continuation of it, issue twenty or more secretory punctures. The leaves generally continue three years. The flowers are produced in clusters (two to four) at the base of the leaves, sitting close to the branches; they are of a pure white, with a very grateful odour, but of short duration; they are succeeded by berries, which are first green, but turn red when fully grown, and change to black when ripe. They are of an oblong spheroidal form, with a little circular area at the top, within which is a callous dot; the pulp is pale, insipid, and gelatinous; within it is two-celled, and the partition is fleshy and vascular; this is the only receptacle, and penetrates the cleft of the seeds. In each cell is one seed only, of an elliptic form, convex on one side, flat on the other, with a longitudinal cleft, of a pale glaucous colour, loosely covered with an elastic diaphanous aril, the substance of paper.

The liquor which we call *coffee*, prepared from the berry of this tree, is said to have been drunk in Ethiopia from time immemorial. The Galla, a wandering nation of Africa, in their incursions on Abyssinia, being obliged to traverse immense deserts, and being also desirous of falling on the Abyssinians without warning, that they may be encumbered as little as possible with baggage, carry nothing with them to eat, but coffee roasted till it can be pulverized, and then mixed with butter into balls, and put into a leathern bag. One of these, about the size of a billiard-ball, keeps them, they say, in strength and

and spirits during a whole day's fatigue, better than a loaf of bread, or a meal of meat. It was introduced into Aden in Arabia from Persia, by Gemaleddin, only about the middle of the fifteenth century. Not long after, it reached Mecca, Medina, &c. and Grand Cairo. Hence it continued its progress to Damascus and Aleppo, and in 1554 became known at Constantinople, being introduced there by two persons whose names were Shems and Hekin; one from Damascus, the other from Aleppo: each of these men opened a public coffee-house in that city. It is not certain at what time the use of coffee passed from Constantinople to the western parts of Europe; but it is probable that the Venetians, on account of the proximity of their dominions, and their great trade to the Levant, were the first acquainted with it; and Pietro della Valle, a Venetian, in a letter from Constantinople written in 1615, tells his friend, that upon his return he should bring with him some coffee, which he believed was a thing unknown in his country. M. Thevenot, the French traveller into the East, at his return in 1657, brought with him to Paris some coffee for his own use. It was known some years sooner at Marseilles, namely, in 1644. M. Du Tour, who wrote on coffee in 1685, says that the French knew nothing of it until 1645. M. La Roque, who published his journey into Arabia Felix in 1715, contends that his father, having been with M. de la Haye, the French ambassador at Constantinople, did, when he returned to Marseilles in 1644, drink coffee every day. He allows notwithstanding that Thevenot was the first who taught the French to drink it. However, till the year 1660, it was drunk only by such as had been accustomed to it in the Levant, but that year some bales were imported from Egypt; and in 1671 a coffee-house was opened at Marseilles. Before the year 1669, coffee was not known at Paris, except at M. Thevenot's, and some of his friends. This year it was effectually introduced by Solyman Aga, ambassador from sultan Mahomet IV. and, two years after, Pascal, an Armenian, sold it publicly at the Foire St. Germain, and afterwards set up a coffee-house on the Quai de l'École; but, meeting with little encouragement, he left Paris, and came to London. However, not long after, spacious rooms were fitted up at Paris in an elegant manner, for selling coffee and other refreshments; and in a short time the number of coffee-houses increased to three hundred. The use of coffee was introduced into London some years earlier; for, in 1652, Mr. Daniel Edwards, a Turkey merchant, brought home with him a Ragusian Greek servant, whose name was Pasqua Rossee, and who understood the roasting and making of coffee. This servant was the first who sold coffee, and kept a house for this purpose in George-yard, Lombard-street: or rather, according to Mr Houghton, in a shed in the church-yard of St. Michael's, Cornhill, which is now, says he, (1701,) a scrivener's brave house. Mr. Houghton adds, that one Rastall, whom he knew, went to Leghorn in 1651, and there found a coffee-house: that he met Mr. Daniel Edwards there, with his Greek servant; and that Mr. Edwards was the first who brought the use of coffee here, except it was the famous Dr. Hervey, who some say did frequently use it. Pasqua being no freeman, the ale-sellers petitioned the lord-mayor against him. This made alderman Hodges, whose daughter Mr. Edwards married, join his coachman, Bowman, who was free, as Pasqua's partner; and thus Mr. Rastall found them in 1654. But Pasqua, for some misdemeanor, was forced to run the country; and Bowman by his trade, and a contribution of 1000 sixpences, turned the shed to a house. Bowman's apprentices were first John Painter, then Humphry, from whose wife Mr. Houghton had this account. The first mention of coffee in our statute books was in 1660; 12 Car. II. c. 24. In 1688, Mr. Ray affirms, that London might rival Grand Cairo in the number of its coffee-houses; and that they were to be found not only in the capital, but in every town of note in England. Probably the ill-judged proclamation of Charles II. in 1675 against coffee-houses, contributed much to establish them.

The first European author who has made any mention of coffee is Rauwolff, who was in the Levant in 1573; but the first who has particularly described it is Prosper Alpinus, in his Medicina Ægyptiorum, 1591, and in his History of Egyptian Plants, published at Venice in 1592. Faustus Naironus Bainesius wrote the first treatise expressly on coffee. It was printed at Rome in 1671, and intituled, De saluberrima potione Cahu, seu Cafe, nuncupata. Two English travellers notice this beverage at the very beginning of the seventeenth century: Biddulph about 1603, and William Finch in 1607. The former says, "The Turks have for their most common drink *coffa*, which is a black kind of drink, made of a kind of pulse like pease, called *coava*." The latter, that "The people in the island of Socotora have, for their best entertainment, a China dish of *coho*, a black bitterish drink, made of a berry like a bay-berry, brought from Mecca, supped off hot." Lord Bacon makes mention of it in 1624. Mr. Ray, in his History of Plants, published in 1688, speaking of it as a drink very much in use, supposes that the Arabs destroyed the vegetable quality of the seeds, in order to confine their commodity within themselves; and adds, that he wondered the neighbouring nations did not contrive to bring away some sound seeds or living plants, in order to share in so lucrative a trade. This was soon done: for Nicolas Witson, burgomaster of Amsterdam, and governor of the East-India company, desired Van Hoorn, governor of Batavia, to procure from Mocha, in Arabia Felix, some berries of the coffee-tree, to be sown at Batavia; which he having accordingly done, and about the year 1690 having raised many plants from seeds, sent one over to governor Witsen, who presented it to the garden at Amsterdam: it there bore fruit, which in a short time produced many young plants. From these the East Indies, and most of the gardens in Europe, have been furnished; and, so early as the year 1696, the coffee-tree was cultivated at Fulham, by bishop Compton. In 1714, the magistrates of Amsterdam presented Louis XIV. with a coffee-tree, which was sent to the royal garden at Marly, under the care of M. de Jussieu, who had written a memoir, printed in the history of the academy of sciences for 1713, describing the characters of the genus, with a figure of it, from a smaller tree, which he had received from M. Pancras, burgomaster of Amsterdam, and director of the botanic garden there. In 1718, the Dutch colony at Surinam began first to plant coffee; and, in 1722, M. de la Motte Aigron, governor of Cayenne, contrived by an artifice to bring away a plant from Surinam, which, in the year 1725, had produced many thousands. Rochon, in his account of Madagascar, asserts, that in 1718 the inhabitants of the isle of Bourbon sent to Mocha and Aden for some young plants of the coffee-tree, which being cultivated with care, became in a few years very productive, and the island soon afforded the French East-India company a very important article of trade. In 1727, the French, perceiving that this acquisition might be of great advantage in their other colonies, conveyed some of the plants to Martinico. M. Fusee Aublet indeed affirms, that M. Clieux carried the first coffee plant to Martinico in 1720; and that the French East-India company sent some plants to the isle of Bourbon in 1717; that one plant only survived, which bore fruit in 1720, and many were produced from it. From Martinico it most probably spread to the neighbouring islands; for, in the year 1732, it was cultivated in Jamaica, and an act was passed to encourage its growth in that island.

The first plant which appeared in Jamaica, was carried there by sir Nicolas Laws, and placed in the garden of Townwell, at present called Temple-hall, the property of Mr. Lutterell. But he, dying in 1731, did not see the cultivation of it make any considerable progress. In the year 1752, the export of coffee from Jamaica was rated

rated at 60,000 pounds weight; in 1775 it was 440,000 pounds. The abbé Raynal says, that 12,550,000 pounds weight is annually exported from Arabia Felix. Dr. Patrick Browne, who resided many years in Jamaica, informs us, that the coffee-tree thrives best in a rich soil, and cool shaded situation, where it produces so great a quantity of fruit, that the branches can hardly sustain the weight, and even the very trunk yields to the load. This fruit is large and succulent, and the berries lax and clammy; they are gathered when only half ripe; and, instead of being stripped of their pulp, and the seeds being carried down to the low lands to be dried, they are left soaking in their clammy juices, to dry slowly in a damp air. This alone will sufficiently account for the supposed inferiority of the Jamaica coffee to the Arabian, which grows in a sandy, dry, hot, soil, where the berries have but little pulp, and are soon dried, spread upon mats, and exposed to the sun. Dr. Browne however is of opinion, that the West-India islands might furnish coffee equal in quality to the Turkey, if the following remarks were attended to: 1. New coffee will never parch or mix well, from the natural clamminess of the juices. 2. The smaller the grain, and the less pulp the berry has, the better the coffee, and the sooner it will parch, mix, and acquire a flavour. 3. The drier the soil, and the warmer the situation, the better the coffee it produces will be. 4. The larger and more succulent the grain, the worse it will be. 5. The worst coffee produced in America will, in a course of years, not exceeding ten or fourteen, be as good as the best we now have from Turkey; due care being taken to keep it in a dry place, and to preserve it properly. 6. Small-grained coffee, or that which is produced in a dry soil and warm situation, will in about three years be as good as that which is commonly used in the coffee-houses at London. These, the doctor tells us, are facts founded on repeated experiments.

Mr. Miller advises those who cultivate the coffee-tree in the West Indies, first, to make choice of a soil rather dry than moist; secondly, to permit the berries to remain upon the trees, till the skin shrivels and turns black; thirdly, to gather them, or rather shake them from the trees when they are perfectly dry, spreading them upon cloths or mats in the sun to dry, as they do in Arabia Felix, carrying them every evening under cover; and when they are perfectly dry, deprived of their husks and winnowed, to pack them up carefully in bags, and, when they are shipped, not to send them with rum or other goods from which they may imbibe any disagreeable flavour.

Dr. Browne recommends such as possess large coffee-walks to have a convenient platform to dry the seeds on; and he thinks it would be worth while to try whether sweating would destroy the clamminess of the large berries. They should however be pulped and dried as soon as possible, then husked and cleared from all the outward coverings. This is generally done in Jamaica by pounding the dried berries lightly in a large wooden mortar; they are then winnowed, cleared, exposed afresh to the sun for some days, and then casked for the market. If it be not well dried, it is apt to heat on-board ships, and then it loses all its flavour. Long, in his History of Jamaica, (1774,) observes, that the berries ought never to be gathered till the pulp is exhaled, and the coat suffered to become thoroughly dry and shrivelled, so that they appear ready to drop off, and actually fall upon a slight touch. In confirmation of this, he affirms, that he has experienced the best-flavoured coffee to have been collected from under the trees, where it had recently fallen, quite dry, black, and shrivelled. He adds, that the trees should be planted at distances proportioned to their growth, which in the low lands is five feet, in the mountains ten feet, or more; and that the produce of a good tree is from one pound and a half to two pounds weight. He thinks that the mountain coffee might be improved by sending the berries to the low lands, where the heat is greater, and the air more dry; and by having a drying-house under a roof, with one or more platforms, admitting a free current of air, and excluding the rain and sunshine. He informs us that the husk is no longer beat off in mortars, but by rollers turned by mules; that wooden ones are preferable to stone or iron; and that the most approved machine, invented by Mr. Latham, will clean one hundred hogsheads in a day.

Dr. Fothergill suggests very reasonably, that the removal of the coffee-tree from the dry sterile sandy soil of Arabia, into the rich deep staple of Batavia, where the quantity of wet that falls in the rainy season is excessive; its removal thence into Holland and France, and its transportation afterwards to a climate much more abounding with moisture than that of which it was a native, may so far have altered the quality of the fruit, as that it may not be easily brought back to its original excellence. This however he thinks may be done, by making the plantations in soils as similar to its natural one as possible. He also hints, that the fruit of young trees is in general more insipid, or has a less refined taste, than at a more advanced age: that probably this may be the case in the coffee-tree; and he affirms that in old trees the fruit is smaller. The French, both in the East and West Indies, cultivate coffee with great attention, and accordingly theirs is much superior to ours, and is even thought by some to be equal to the best Turkey. They are also more careful in shipping it home, not mixing it, as we do, with cargoes of rum and coarse sugars, which communicate a taste scarcely to be driven off by fire. But it ought to be observed, that whilst the industry and genius of the French coffee-planters have been cherished, ours have been restricted by a duty, which lessens the consumption. Dr. Fothergill also thinks it probable that our plantation-coffee is used too soon; and that one part of the excellence of the Mocha coffee may arise from the intervention of two and three years between its growth and consumption. In confirmation of this, the doctor found that some raw coffee, which was sent him from the West Indies, and was so ill-tasted as to be unfit for use, being laid in a very dry closet, was tried again the year after, and found to be greatly amended. He therefore recommends the importing it without other goods; and the keeping it in dry airy places, till such a quantity is got together as may be sufficient to load a vessel. This scheme, says Mr. Miller, of keeping the American coffee-berries several years, is contrary to all the experience I have had, and the information I can obtain from those who have seen the whole management of coffee in Arabia. Two gentlemen who had lived there some years assured me, that the berries, when first gathered, were much better than those which are kept any time. And a curious gentleman, who resided in Barbadoes two years, also told me, that he never drank better coffee in any part of the world, than what he made from the fresh berries which he gathered himself, and roasted as he had occasion for them. This account is confirmed by trials with berries produced in our English stoves, which make a better flavoured liquor than the best Arabian coffee-berries that can be procured in England. The difficulties attending the keeping coffee any length of time to the planter are also apparent. His profit is not sufficient to enable him to keep it so long as is proposed; and a tree in a rich soil producing almost twice as much as one in a light one, whereas the difference in price in the European markets between small well-prepared coffee and that which is of the worst kind, is only from fifteen to twenty per cent. the planters find their account in making their coffee-walks in the richest soil, where also the trees last a much longer time. The dampness of the climate in the islands is such, that it is very difficult to dry the berries well; and the negroes being lazy, ignorant, and frequently ill-disposed, will not attend properly to the gathering of them perfectly ripe: besides, the season for this being near the winter, the rains, which are then very frequent, often make the berries fall before they are perfectly ripe.

COFFEA.

Branch of the Arabian or Eastern Coffee Tree

It appears, however, that the Jamaica planters, after a multitude of experiments and the most laudable exertions, have discovered the art of cultivating, picking, and curing, the berries, so as to make their coffee equal to the growth of Arabia. Some samples have been produced, which were pronounced by the London dealers even superior to the best brought from the East. Two of them were equal to the best Mocha coffee; and two more were superior to any that could be had at the grocers' shops in London, unless the price of picked coffee be paid, which is two shillings the pound more than what they call the best coffee. The other samples were little, if at all, inferior to what the grocers call best coffee.

The coffee-tree having been transported to Europe, and to the possessions of Europeans both in the East and West Indies from Arabia, has been commonly supposed to be indigenous of that country. It seems, however, according to Mr. Bruce, to have been brought originally from the kingdom of Caffa, the south province of Narea, in Africa. It is the wood of the country, produced spontaneously every where in great abundance, from Caffa to the banks of the Nile. The foot of the mountains, or edge of the marshes nearest Narea, is thick overgrown with coffee-trees, which, if not the only, is the largest tree known there.

Coffee is named by the Persians *cahwa* and *coho*; by the Turks, *chaube* and *cahvey*; by the Arabians, *cachua*, *caoua*, and *caoouah*. The Egyptians call it *cleave*. The annexed engraving exhibits a branch of the Arabian or eastern coffee-tree, with its fructification; viz. *a*, the blossom dissected, to shew the stamens; *b*, the germen and pistillum; *c*, the ripe fruit or berry; *d*, a section of the berry, shewing that each contains two seeds, which is the coffee; *e*, an horizontal section, with the seeds erect; *f*, a single, covered with its aril or membrane; *g*, a single seed, with its membrane opened; *h*, the naked seed, which is the pure coffee.

2. Coffea Occidentalis, or western coffee-tree: flowers four-cleft, berries one-seeded. This coffee-tree is upright, branching, and six feet high. Native of St. Domingo, about Cape François, where it flowers in December. It is also pretty common in the lower woods of Jamaica. Browne names it the wild jessamine, the flowers having much of the shape and smell of our white jessamine.

3. Coffea racemosa, or branched coffee-tree: very much branched, leaves rugged, racemes terminating. This is a small tree, only four feet high, with many diffused round branches. Native of the island of Mozambique.

4. Coffea Zanguebariæ, or Zanguebar coffee-tree: corollas six-cleft, fruit angular-nerved. This is a small upright tree, six feet high, with thick, short, spreading, branches. Leaves ovate-lanceolate, smooth, opposite. Flowers white, axillary, several together, on short one-flowered peduncles; border six or seven-parted. Berries red, oblong-ovate, angular, with longitudinal nerves, having two seeds. Native of Africa on the coast of Zanguebar; and cultivated near Mozambique with the foregoing sort.

5. Coffea Guianensis, or Guiana coffee-tree: flowers four-cleft; berries small, violet-coloured, two-seeded. Stem branching, from one to two feet in height. Native of Guiana, in the great forests of Orapu; flowering and fruiting in September.

6. Coffea paniculata: branches quadrangular; leaves ovate-oblong, acute; corollas four-cleft; berries two-seeded. Trunk seven or eight feet high, and five or six inches in diameter, covered with a grey, wrinkled, cloven, bark. Native of Guiana; flowering and fruiting in April.

7. Coffea sambucina: leaves oblong-lanceolate, acute; cymes corymbed, terminating. 8. Coffea opulina: leaves ovate-lanceolate; cymes contracted, globular, terminating. 9. Coffea odorata: leaves ovate, acute; cymes corymbed, axillary. 10. Coffea triflora; leaves ovate-lanceolate, acuminate; peduncles terminating three together, one-flowered. These were found by our late circumnavigators in the islands of the South Seas. The 7th in the Friendly Islands; the 8th in New Caledonia; the 9th in Tanna and the Friendly Islands; and the 10th in Otaheite.

Propagation and Culture. As the coffee-tree is an evergreen, it makes a beautiful appearance at every season in the stove, but particularly when it is in flower; and also when the berries are red, which is generally in the winter; as they continue a long time in that state, there is scarcely any plant that more deserves a place in the stove than this. It is propagated by the berries, which must be sown soon after they are gathered from the trees; for, if they are kept out of the ground a fortnight, they will not grow. This has constantly happened every where, for the berries sent from Holland to Paris did not grow, nor did those which were sent from Paris to England; so that wherever these trees are desired, the young plants must be sent, if it be at any distance from the place where they grow.

The berries should be planted in small pots filled with light kitchen-garden earth, and plunged into a hot-bed of tanners' bark; they must be watered gently once or twice a-week, but the earth must not be too moist, lest it rot the berries. If the bed be of a proper temperature of warmth, the plants will appear in a month or five weeks time, and in about two months more will be fit to transplant. For, as many of the berries will produce two plants, so the sooner they are parted, the better their roots will be formed; for, when they grow double till they have made large roots, they will be so intermixed and entangled, as to render it difficult to separate them without tearing off their fibres, which will greatly prejudice the plants. When these are transplanted, they must be each put into a separate small pot, filled with the same earth as before, and plunged into the tan-bed again, which should be stirred up to the bottom, and, if required, some new tan should be mixed with it, to renew the heat. Then the plants should be gently watered, and the glasses of the hot-bed must be shaded every day till they have taken new root; after which the plants should have free air admitted to them every day, in proportion to the warmth of the season: during the summer they will require frequently to be refreshed with water, but they must not have it in too great plenty; for, if their roots are kept too moist, they are very subject to rot, then the leaves will soon decay and drop off, and the plants become naked; when this happens, they are seldom recovered again. The first sign of these plants being disordered is, their leaves sweating out a clammy juice, which attracts the small insects that too frequently infest the plants in stoves; when they are not in health, these insects cannot be destroyed, till the plants are recovered to vigour; for, although the plants are ever so carefully washed and cleaned from them, yet they will be soon attacked by them again, if they are not recovered to health, for these insects are never seen upon any of the plants while they are in perfect vigour; but when they are disordered they soon spread over all the leaves and tender parts of the plants, and multiply exceedingly; therefore, upon the first attack, the plants should be shifted into fresh earth, and all possible care taken to recover them, without which all the washing and cleaning of the plants will be to little purpose. The disorders attending the coffee-trees, generally proceed from either being put into pots too large for them, nothing being of worse consequence than over potting them; or from the earth being too stiff, or from their being overhung by other plants, or being over watered. If these are properly taken care of, and the stove kept always in a proper temperature of heat, the plants will thrive, and produce plenty of fruit. After trial of several compositions of earth for these plants, none has been found equal to that of a kitchen garden, where the soil is naturally loose, and not subject to bind; and if it has constantly been well wrought and properly

properly dunged, this without any mixture is preferable to any other.

The plants ſhould not be too often tranſplanted, for that will greatly retard their growth. If they are new potted twice a-year at moſt, it will be ſufficient; though unleſs the plants make great progreſs, they will not require to be removed oftener than once in a-year, which ſhould be in ſummer, that they may have time to get good roots again before winter. During the warm weather in ſummer, theſe plants ſhould have a large ſhare of air, but they muſt not be wholly expoſed abroad at any ſeaſon; for although they may have the appearance of thriving in the open air during the heat of ſummer, yet when they are removed into the ſtove again, their leaves will fall off, and the plants will make but an indifferent appearance the following winter, if they ſhould ſurvive it; therefore it is the better method to keep them conſtantly in the ſtove, and admit a proportionable ſhare of air to them every day, according to the heat of the ſeaſon; they will require water two or three times a-week in warm weather, but in the winter they muſt have it more ſparingly; and the ſtove in which they are placed ſhould be kept to the heat aſſigned for the ananas upon the botanical thermometers.

This tree has been propagated by cuttings, and alſo from layers; but theſe are long before they make roots, and the plants ſo raiſed are never ſo ſtrong and thriving as thoſe which ariſe from berries; therefore where the berries can be procured, it is much the beſt method to propagate the plants by ſeeds. When they are tranſplanted, their roots ſhould not be too much cut or trimmed; the decayed or rotten fibres ſhould be pruned off, and thoſe which are cloſely matted to the ſide of the pots ſhould be trimmed, but not cut too near to the ſtem; for the old fibres do not put out new roots very kindly, eſpecially thoſe which are become tough, ſo that there ſhould always be a ſufficient number of young fibres left to ſupport the plants, till new ones are produced. The plants raiſed from the berries, produce fruit in two years from planting, and in hot climates ſooner; plantations of theſe trees may therefore be ſoon made in any of thoſe countries, where the temperature of the air is proper for their production, but the trees will not grow in the open air any where if there is a winter; ſo that in all countries without the tropics, they cannot be expected to grow abroad.

In Arabia Felix the coffee-tree is raiſed from ſeed, ſown in nurſeries, and planted out as there is occaſion. The plantations are in a moiſt ſhady ſituation, on a ſmall eminence, at the foot of the mountains, whence little rills of water are conducted in ſmall channels to the roots of the trees, to ſecure the production and ripening of the fruit. When they remove or tranſplant a tree, they make a trench three feet wide and five feet deep, which they line or cover with ſtones, that the water may the more readily ſink deep into the earth, and thus be kept from evaporating. When the fruit is nearly ripe the water is turned off, leſt the fruit ſhould be too ſucculent. In places much expoſed to the ſouth, the coffee-trees are planted in regular lines, ſheltered by a kind of poplar-tree, which affords a thick ſhade. Without this precaution they ſuppoſe that the bloſſoms would be ſo parched by the exceſſive heat of the ſun, as not to be ſucceeded by fruit.

Dr. Laborie, a royaliſt of St. Domingo, has lately publiſhed the French method of cultivating coffee in St. Domingo, in which are many judicious obſervations, the reſult of long experience, reſpecting the ſoil fit for a coffee-plantation; the various eſtabliſhments neceſſary; the ſeveral ſtages of its growth and duration; and the management and uſe of the negroes and cattle. With reſpect to ſoil, it is a fact, ſays he, beyond contradiction, that low lands, and even the mountains near the champaign country, are leſs proper for the production of coffee, than lands which are high and at a diſtance from the ſea. The coffee-tree delights in a comparatively cool climate, and in an open and permeable virgin ſoil; and is hurt by the parching deſtructive air of the ſea. The ſoil on the mountains of St. Domingo conſiſts generally of a bed of mould more or leſs deep; but which, for the production of coffee-trees, ought not to be leſs than four or five feet. If the declivity be gentle, the ſofteſt and moſt friable earth is preferable to all others; but in ſteep grounds a firm though not clayey ſoil, mixed with a proportion of gravel or ſmall ſtones, through which the water may find an eaſy way, is the moſt deſirable. The colour of the ground is of little conſequence, though ſuch as is ſomewhat reddiſh is generally to be preferred. With regard to expoſure, the north and weſt are the moſt eligible in low and hot ſituations, becauſe theſe expoſures are the cooleſt; and on the higheſt mountains the ſouth and eaſt are to be choſen, becauſe they are the hotteſt. On the whole, neither the higheſt nor the loweſt ſituations are the beſt, but thoſe which are conſiderably above the middle of the mountains. Between the coffee-trees, after they are planted, may be ſown beans, maize, and all kinds of eſculent plants, potherbs, and roots; but particular care muſt be taken to remove from theſe plantations all creeping plants, ſuch as melons, yams, potatoes, gourds, and, more eſpecially, tobacco, which multiplies to a vaſt extent, and exhauſts the ground.

In St. Domingo the moſt approved method of planting the coffee-tree is in ſtraight rows croſſing each other at right angles, and the diſtance between the plants is regulated by the quality and expoſure of the ground. The richer the ſoil, the expoſures being the ſame, and the cooler the expoſure, the quality of the ſoil being the ſame, the farther muſt the trees be planted aſunder. Though coffee, like all other vegetables, grows from the ſeed, Dr. Laborie adviſes, in the forming of large plantations, to make uſe of ſaplings reared in nurſeries; and the ſituation fitteſt for a nurſery is a plain, or at leaſt a ground of gentle aſcent, where the mould is crumbly. In forming a nurſery, ſome plant the whole cherry; but this author recommends the taking off the ſkin, and waſhing the ſeparated ſeeds; in which we ſuſpect that he is miſtaken, as his practice is certainly a deviation from nature. The nurſery muſt be kept very clear of weeds, and neither corn nor any thing elſe ſown in it. The beſt ſeaſon for tranſplanting the ſaplings is during the genial rains of April and May, when great attention is required, as the treaſures of future harveſt are at ſtake. Thoſe plants are the fitteſt for being removed which are ſaid to be crowned, or have each four little boughs; and, if the ſeeds were freſh and ſown in furrows about an inch from each other, this perfection is generally attained in the courſe of a year. The ſaplings muſt not be pulled up by force, but carefully raiſed by means of a flat, ſharp, iron, ſhovel, thruſt deeper under their roots; and the ſooner they are planted, after being taken up, the better. In hot ſituations plantain-trees are intermingled with the coffee trees for the purpoſe of ſhade and coolneſs. They are uſually placed in every fourth or ſixth row, as the trees are more or leſs diſtant, and the expoſure more or leſs hot.

The natural height of the coffee-tree is from fifteen to eighteen feet; and, if left to itſelf, it would have the form of moſt other trees, *i. e.* a naked trunk and a branchy head. This is prevented by what the planters call *ſtopping*; which is performed by cutting off the top of the tree when it has arrived at the proper height, which varies according to circumſtances. In the beſt ſoil and moſt genial expoſure, it is ſuffered to grow to the height of five feet, and in the worſt ſtopped at two; but, under the ſame aſpect, and on ground of the ſame quality, all the trees ought to be ſtopped at the ſame height. This operation of ſtopping is very apt to make the trees put forth ſuperfluous branches, which renders them inacceſſible to the genial warmth of the ſun, and, of courſe, deficient in the powers of fructification. Theſe muſt be plucked away while yet tender; for, if they be ſuffered to grow till it become neceſſary to cut them, a number of ſprouts ſucceed; whereas, when

they are plucked, the wound soon cicatrizes, and nothing follows. The fruit of the coffee in St. Domingo, when perfectly ripe, appears like a small oval cherry. Under a red and shining skin a whitish clammy luscious pulp presents itself, which generally incloses two seeds. When the seeds are opened, they are found covered with a white, ligneous, brittle, membrane, denominated *parchment*; on the inside of which is another silver-coloured membrane, exceedingly thin, and seeming to originate from the fissure of the seeds.

Dr. Mosely, physician to Chelsea hospital, who published a Treatise on the Culture and Properties of Coffee, in 1792, is a strong advocate for extending the growth of the coffee-tree in our West-India islands. He has satisfactorily shewn, that it is a practicable and advantageous speculation; the labour light; and many parts of it performed by children. The situations and soil where it is carried on must be dry, and, of course, healthy. Coffee plantations, in particular, may be considered as a nursery of useful inhabitants for the colonies. The soil best suited for coffee is happily such as can be spared from every other purpose. Large tracts of poor land, which now lie waste and useless, may be rendered as profitable as the best, without the mortality and casualties attendant on severe labour in hot climates. The numerous families which would live on coffee-plantations, dispersed in small settlements in the interior parts of the islands, would occasion the mountainous and woody lands to be cleared and opened; and to be intersected with roads and easy communications. Thus the residents would live in safety, and all sorts of property acquire a proportionate value and security. The retreats of fugitive negroes would be laid open, plunder and depredation prevented, and conspiracies for rebellion deprived of their hiding-places. And thus the credit of the planter, and security of the merchant, stand on a firm basis.

Dr. Titford, of Spanish-town, Jamaica, with a view also to encourage and improve the growth of coffee in our West-India islands, has lately communicated a paper on this subject, to the society for the encouragement of arts, manufactures, &c. in London; and of which the following is an extract: "Coffee being an article lately much encreased in demand in Europe and America, and in consequence commanding a high price, which has induced many planters lately to cultivate it; I beg leave to submit to the society a plan for sending it home in a better and more improved state than now done. The mode now used in general by the planter, when the coffee is ripe on the trees, is as follows: They bring the coffee to a machine called a peeling-mill, where it is divested of its outside skin and pulp; after which, it is put in heaps, and undergoes a slight fermentation; then spread out, and dried on platforms or terraces, until it is perfectly cured, when it is stored until all the crop is got in. The berries ripening so fast, it requires every exertion of the planter's strength to get in the fruit in due time. When the crop is over, they begin to prepare it for market, by again putting it in the sun, and carrying it to the peeling and winnowing mills, where it is totally divested of its coats and impurities, and the broken and bad coffee picked out, after which it is fit for market. It must be observed, that only the most considerable coffee-planters have the above mills; the small and needy planters beat out their coffee in large wooden mortars, or troughs, by which a waste is made by breaking the berry. When any coffee is kept for private use, or island consumption, it does not undergo the above processes; but the ripe fruit, as it is picked from the trees, is spread out in the sun, and simply well dried, and beat out as it is wanted for use or sale. Coffee is well known to improve, when so preserved, by drying it in the berry; but to daily impair and fall off, when it is divested of its coverings, as it is now sent to market; for which reason the planter does not beat out his coffee till ready to send it.

"Upon the above facts, I will endeavour to point out the advantages that will be derived by coffee being sent home in the whole berry, well dried, and also the objections and difficulties that will attend such mode. One advantage will be, the causing less trouble, and requiring less negro-labour, at a time of the year when the planter is the most employed. And this is an object to the planter, by saving the hire of negroes, which is very high during crop; and sometimes they cannot be procured, in which case the coffee drops off the trees, and is lost. The next is the prevention of the coffee imbibing the ill flavour of sugar, rum, pimento, &c. which may be shipped with it, and which, I understand, is the principal objection to this country coffee being used in England. It is presumed the natural coverings will effectually prevent any bad impregnations in its passage. The increase of freight will be of some importance, particularly if coffee is cultivated as it has been lately; but the translation of labour and trouble from the planter, by tedious negro-labour, to the superior mechanism of Great Britain; and above all, the improved condition, and superior quality, in which it is conceived the coffee will arrive at a foreign port; will make ample compensation for such additional charge. Also the still farther improvement, until the time it is wanted for sale or use. If wanted for the foreign market; in England, mills could be easily constructed, so as to do many thousand weight a-day; whereas the expence of mills and other machines in the West Indies, are a very heavy contingency to the planter. For home-consumption, a retailer might purchase a small quantity, and beat it out as he wants it, as he certainly would keep it in the state it was improving in; by which the consumer would get coffee of the finest quality, I should hope equal to the Mocha, at a very moderate price."—In consequence of the above representation, the society for the encouragement of arts, &c. now offer a high premium for the importation of coffee in pulp.

COF'FEE, *s.* [from קהוה *kofuah*, a mixing together. It is originally Arabic, pronounced *caheu* by the Turks, and *cahuah* by the Arabs.] A comforting aromatic drink, prepared from the berry of the coffee-tree. See COFFEA.

The chemical analysis of coffee evinces that it possesses a great portion of mildly bitter and lightly astringent gummous and resinous extract; a considerable quantity of oil; a fixed salt; and a volatile salt: these are its medicinal constituent principles. The intention of torrefaction is not only to make it deliver those principles, and make them soluble in water, but to give it a property it does not possess in the natural state of the berry. By the action of fire, its leguminous taste and the aqueous part of its mucilage are destroyed; its saline properties are created and disengaged, and its oil is rendered empyreumatic. From thence arises the pungent smell, and exhilarating flavour, not found in its natural state. The roasting of the berry to a proper degree requires great nicety: Du Four justly remarks, that the virtue and agreeableness of the drink depend on it, and that both are often injured in the ordinary method. Bernier says, when he was at Cairo, where it is so much used, he was assured by the best judges, that there were only two people in that great city, in the public way, who understood the preparing it in perfection. If it be under-done, its virtues will not be imparted, and in use it will load and oppress the stomach: if it be over-done, it will yield a flat, burnt, and bitter taste, its virtues will be destroyed, and in use it will heat the body, and act as an astringent.

Fourteen pounds weight of raw coffee is generally reduced, at the public roasting-houses in London, to eleven pounds by the roasting; for which the dealer pays sevenpence-halfpenny, at the rate of five shillings for every hundred weight. In Paris, the same quantity is reduced to ten pounds and an half. But the roasting ought to be regulated by the age and quality of the coffee, and by nicer rules than the appearance of the fumes, and such as are usually practised; therefore the reduction must consequently vary, and no exact standard can be ascertained.

tained. Beſides, by mixing different ſorts of coffee together, that require different degrees of heat and roaſting, coffee has ſeldom all the advantages it is capable of receiving to make it delicate, grateful, and pleaſant. This indeed can be effected no way ſo well as by people who have it roaſted in their own houſes, to their own taſte, and freſh as they want it for uſe. The cloſer it is confined at the time of roaſting, and till uſed, the better will its volatile pungency, flavour, and virtues, be preſerved.

The mode of preparing this beverage for common uſe differs in different countries, principally as to the additions made to it. But, though that is generally underſtood, and that taſte, conſtitution, the quality of the coffee, and the quantity intended to be drunk, muſt be conſulted, in regard to the proportion of coffee to the water in making it; yet there is one material point, the importance of which is not well underſtood, and which admits of no deviation. The preſervation of the virtues of coffee, particularly when it is of a fine quality, and exempt from rankneſs, as has been ſaid, depends on carefully confining it after it has been roaſted; and not powdering it until the time of uſing it, that the volatile and æthereal principles, generated by the fire, may not eſcape. But all this will ſignify nothing, and the beſt materials will be uſeleſs, unleſs the following important admonition is ſtrictly attended to: which is, that after the liquor is made, it ſhould be bright and clear, and entirely exempt from the leaſt cloudineſs or foul appearance, from a ſuſpenſion of any of the particles of the ſubſtance of the coffee.

There is ſcarcely any vegetable infuſion or decoction whoſe effects differ from its groſs origin more than that of which we are ſpeaking. Coffee taken in ſubſtance cauſes oppreſſion at the ſtomach, heat, nauſea, and indigeſtion; conſequently a continued uſe of a preparation of it, in which any quantity of its ſubſtance is contained, beſides being diſguſting to the palate, muſt tend to produce the ſame indiſpoſitions. The reſiduum of the roaſted berry, after its virtues are extracted from it, is little more than an earthy calx, and muſt therefore be injurious. The want of attention to this circumſtance has been the cauſe of many of the complaints againſt coffee, and of the averſion which ſome people have to it; and it is from this conſideration that coffee ſhould not be prepared with milk inſtead of water, nor ſhould the milk be added to it on the fire, as is ſometimes the caſe, for economical dietetic purpoſes, where only a ſmall quantity of coffee is uſed, as the tenacity of the milk impedes the precipitation of the grounds, which is neceſſary for the purity of the liquor, and therefore neither the milk nor the ſugar ſhould be added until after it is made with water in the uſual way, and the clarification of it is completed. The milk ſhould be hot when added to the liquor of the coffee, which ſhould alſo be hot, or both ſhould be heated together, in this mode of uſing coffee as an article of ſuſtenance.

If a knowledge of the principles of coffee, founded on examination and various experiments, added to obſervations made on the extenſive and indiſcriminate uſe of it, cannot authoriſe us to attribute to it any particular quality unfriendly to the human frame; if the unerring teſt of experience has confirmed its utility, in many countries, not excluſively productive of thoſe inconveniences, habits, and diſeaſes, for which its peculiar properties ſeem moſt applicable; let thoſe properties be duly conſidered, and let us reflect on the ſtate of our atmoſphere, the food and modes of life of the inhabitants, and the chronical infirmities which derive their origin from theſe ſources, and it will be evident what ſalutary effects might be expected from the general dietetic uſe of coffee in Great Britain. Coffee drunk warm within an hour after dinner, is of ſingular uſe to thoſe who have head-achs from a weakneſs in the ſtomach, contracted by attention, or from inebriation. It is uſeful when digeſtion is weak. The phlegmatic and corpulent are much benefited by its uſe. In ſome delicate habits it produces nervous ſymptoms. It is ſlightly aſtringent and antiſeptic, moderates alimentary fermentation, and is powerfully ſedative.

The duties on coffee, like thoſe of tea, chocolate, &c. form a branch of the public revenue, under the head of *cuſtoms* and *exciſe*; and, like all other ſubjects of thoſe juriſdictions, are liable to a variety of penal regulations by acts of parliament, neceſſary to prevent the numerous frauds and evaſions daily endeavoured to be practiſed, to the impoveriſhment of government, and the injury of the fair trader.

COF'FEE-HOUSE, *ſ.* A houſe of entertainment where coffee is ſold, and the gueſts are ſupplied with newſpapers:

At ten from *coffee-houſe* or play
Returning, finiſhes the day. *Prior.*

COF'FEE-MAN, *ſ.* One that keeps a coffee-houſe.—Conſider your enemies the Lacedemonians; did ever you hear that they preferred a *coffee-man* to Ageſilaus? *Addiſ.*

COF'FEE-POT, *ſ.* The covered pot in which coffee is boiled, or ſerved up.

COF'FER, *ſ.* [coƿne, Sax.] A cheſt generally for keeping money.—If you deſtroy your governor that is wealthy, you muſt chuſe another, who will fill his *coffers* out of what is left. *L'Eſtrange.*

Two iron *coffers* hung on either ſide,
With precious metal full as they could hold. *Spenſer.*

Treaſure.—He would diſcharge it without any burthen to the queen's *coffers*, for honour ſake. *Bacon.*

To COF'FER, *v. a.* To treaſure up in cheſts.—Treaſure, as a war might draw forth, ſo a peace ſucceeding might *coffer* up. *Bacon.*

COF'FER, *ſ.* In architecture, a ſquare depreſſure or ſinking, in each interval between the modillions of the Corinthian cornice; uſually filled up with a roſe; ſometimes with a pomegranate, or other enrichment.

COF'FER, *ſ.* in fortification, denotes a hollow lodgment, athwart a dry moat, ſix or ſeven feet deep, and ſixteen or eighteen broad. The upper part of it is made of pieces of timber, raiſed two feet above the level of the moat; the elevation having hurdles laden with earth for its covering, and ſerving as a parapet with embrazures. The coffer is nearly the ſame with the caponiere, excepting that this laſt is ſometimes made beyond the counterſcarp on the glacis, and the coffer always in the moat, taking up its whole breadth, which the caponiere does not. It differs from the traverſe and gallery, in that theſe are made by the beſiegers, and the coffer by the beſieged. The beſieged commonly make uſe of coffers to repulſe the beſiegers, when they endeavour to paſs the ditch. And, on the other hand, the beſiegers, to ſave themſelves from the fire of theſe coffers, throw up the earth on that ſide towards the coffer.

COF'FER-DAMS, or BATARDEAUX, in bridge-building, are incloſures formed for laying the foundation of piers, and for other works in water, to exclude the ſurrounding water, and ſo prevent it from interrupting the workmen. Theſe incloſures are ſometimes ſingle, and ſometimes double, with clay rammed between them; ſometimes they are made with piles driven cloſe by one another, and ſometimes the piles are notched or dovetailed into one another; but the moſt uſual method is to drive piles with grooves in them, at the diſtance of five or ſix feet from each other, and then boards are let down between them, after which the water is pumped out.

COF'FERER OF THE KING'S HOUSEHOLD, is a principal officer of the king's houſe, next under the controller, who, in the counting-houſe, and elſewhere, hath a ſpecial charge and overſight of other officers of the houſehold, to all which he pays their wages: this officer paſſes his accounts in the exchequer. 39 Eliz. c. 7.

COF'FIN, *ſ.* [*coffin*, Fr.] The box or cheſt in which dead bodies are put into the ground. It is uſed both of wood

wood and other materials.—He went as if he had been the *coffin* that carried himself to his sepulchre. *Sidney.*

One fate they have,
The ship their *coffin*, and the sea their grave. *Waller.*

A mould of paste for a pye:

Of the paste a *coffin* will I rear,
And make two pasties of your shameful heads. *Shakesp.*

A paper case, in form of a cone, used by grocers. In farriery, the *coffin* of a horse, is the whole hoof of the foot above the coronet, including the *coffin* bone. The *coffin* bone is a small spongy bone, inclosed in the midst of the hoof, and possessing the whole form of the foot. See the article FARRIERY.

To COF'FIN, *v. a.* To inclose in a coffin:

Let me lie
In prison, and here be *coffin'd*, when I die. *Donne.*

The sepulchral honours paid to the manes of departed friends in ancient times, are extremely curious. Their being *put into a coffin*, has been particularly considered as a mark of the highest distinction. With us the poorest people have their coffins. On the contrary, in the east, they are not at all made use of even in our times; Turks and Christians, as Thevenot assures us, agree in this. The ancient Jews seem to have buried their dead in the same manner; neither was the body of our Saviour put into a coffin; nor that of Elisha, 2 Kings, xiii. 21. whose bones were touched by the corpse that was let down *a little after* into his sepulchre. However, that coffins were anciently made use of in Egypt, all agree; and antique coffins of stone, and sycomore-wood, are still to be seen in that country. Maillet, however, informs us, that all were not inclosed in coffins who were laid in the Egyptian repositories of the dead. The greatest part were simply embalmed and swathed up, after which they laid them one by the side of another without any ceremony. Some were even laid in these tombs without any embalming at all. It is probable, that each considerable family had one of those burial-places to themselves; that the niches were designed for the bodies of the heads of families; and that those of their domestics or slaves had no other care taken of them than the laying them on the ground, after having been embalmed. That coffins were not universally used in Egypt, is undoubted from these accounts; and probably they were only persons of distinction who were buried in them. It is also reasonable to believe, that in an era so remote as that of Joseph, they might be much less common than afterwards; and consequently, that Joseph's being put in a coffin in Egypt might be mentioned with a design to express the great honours which the Egyptians did him at his death, as well as in life, being interred after the most sumptuous manner of the Egyptians, *embalmed*, and *put into a coffin*. Agreeably to this, the Septuagint version, which was made for Egyptians, seems to represent coffins as a mark of grandeur.

COF'FIN-MAKER, *s.* One whose trade is to make coffins.—Where will be your sextons, *coffin-makers*, and plummers? *Tatler.*

To the shame and disgrace of the police of London, it has long been a practice with a description of men, vulgarly called *resurrection-men*, to open the graves of persons recently interred, unscrew the coffins, and steal away the corpses, for the purpose of dissection. To the feelings of common humanity, but especially of relatives and friends, this species of theft must be highly distressing. The dead bodies are usually carried away in sacks, as well for the conveniency of being conveyed without suspicion in hackney-coaches, as to escape detection, which the name on the coffin would often occasion. But to stop the progress of these nightly depredations on the dead, Mr. Gabriel Aughtie, of Cheapside, London, has lately invented a coffin, which he contrives to fasten down by springs, and by screws that cannot be re-drawn, but which hold in so firm and secure a manner, that that the coffin-lid cannot be removed or taken off. And in order to prevent the possibility of opening the joints of the coffin in any part, thin plates of iron are disposed at all the joinings and corners in the inside, and a strip of iron is let in all round the edges of the top and bottom, so as to resist the teeth of any saw, or chissel, to cut it through. This useful invention has the sanction of the king's letters patent, granted on the 5th of July, 1796.

To COG, *v. a.* [A word of uncertain original, derived by Skinner from *coqueliner*, Fr.] To flatter; to wheedle; to sooth by adulatory speeches:

I'll mountebank their loves,
Cog their hearts from them, and come home belov'd
Of all the trades in Rome. *Shakespeare.*

To *cog* a die. To secure it, so as to direct its fall; to falsify:

But then my study was to *cog* the dice,
And dext'rously to throw the lucky sice. *Dryden.*

To obtrude by falsehood.—Fustian tragedies, or insipid comedies, have, by concerted applauses, been *cogged* upon the town for masterpieces. *Dennis.*

To COG, *v. n.* To lie; to wheedle:

Now stealeth he, now will he crave;
And now will he cosen and *cog*. *Tusser.*

COG, *s.* The tooth of a wheel, by which it acts upon another wheel. A small boat.

To COG, *v. a.* To fix cogs in a wheel.

CO'GA, an island of Abyssinia, in the lake of Dembea.

COGARE'TO, a town of Italy, in the state of Genoa: nine miles east-north-east of Savona.

CO'GEAD, a lake of North America, fifty miles long, and ten broad. Lat. 66. 0. N. lon. 109. 0. W. Greenwich.

CO'GENCY, *s.* Force; strength; power of compelling; conviction.—Maxims and axioms, principles of science, because they are self-evident, have been supposed innate; although nobody ever shewed the foundation of their clearness and *cogency*. *Locke.*

CO'GENT, *adj.* [*cogens*, Lat.] Forcible; resistless; convincing; powerful; having the power to compel conviction.—Such is the *cogent* force of nature. *Prior.*

CO'GENTLY, *adv.* With resistless force; forcibly; so as to force conviction.—They forbid us to hearken to those proofs, as weak or fallacious, which our own existence, and the sensible parts of the universe, offer so clearly and *cogently* to our thoughts. *Locke.*

COG'GER, *s.* A flatterer; a wheedler.

COG'GESHALL, a town in the county of Essex, forty-four miles from London, situate on the river Blackwater, where is a manufacture of baizes and says. Here is a market on Thursdays, and a fair on Whit-Tuesday and Wednesday. Near this town, on the road side, in a grotto under-ground, was found a vial with a lamp in it, covered with a Roman tile fourteen inches diameter, and also some urns with ashes and bones in them, of which one resembled coral, and had this inscription, *Cocilli M.* i. e. "to the manes, or ghost, of Cocillus." Little Coggeshall is south-east of the former, but on the other side the river. It was once a distinct parish, but now united to the former. Westfield is about three quarters of a mile from Coggeshall. A brazen pot was ploughed up here, covered with white hard clay, which contained two earthen pots, the inmost of which was covered with a stuff like velvet, tied with silk lace, and had in it some whole bones, and many small pieces of bones, which were wrapped up in fine silk.

COG'GESHALLE (Ralph), a learned English monk, who lived in the twelfth and thirteenth centuries. He was of the Cistercian order, and was esteemed a man of uncommon knowledge for his time. His surname was given him from the abbey over which he presided. The principal work of his which is come down to us, is a Chronicle

Chronicle of the Holy Land; and it is ſo much the more valuable, as he was an eye-witneſs of the facts he relates. He was at Jeruſalem, and was wounded there, during the ſiege of that city by Saladin. It is ſaid that he died in 1228. This Chronicle was publiſhed in 1729, by the fathers Martenne and Durand, in the fifth volume of the Ampliſſima collectio veterum Scriptorum et Monumentorum, &c. In this volume are likewiſe two other works of the ſame author, the firſt intituled Chronicon Anglicanum ab anno 1066 ad annum 1200; and the ſecond, Libellus de motibus Anglicanis ſub Johanne rege.

COG'GIA, or Cocia, a town of the iſland of Corſica: ſix miles ſouth of Vico.

COG'GLE, *ſ.* A ſmall fiſhing-boat, uſed upon the coaſts of Yorkſhire; and *cogs, (cogones,)* are a kind of little ſhips or veſſels uſed in the rivers Ouſe and Humber, mentioned in ſtat. 23 Henry VIII. c. 18.

COG'GLESTONE, *ſ.* [*cuogolo*, Ital.] A little ſtone; a ſmall pebble. *Skinner.*

CO'GITABLE, *adj.* [from *cogito*, Lat.] That which may be thought on; what may be the ſubject of thought.

To CO'GITATE, *v. n.* [*cogito*, Lat.] To think.

COGITA'TION, *ſ.* [*cogitatio*, Lat.] Thought; the act of thinking.—A picture puts me in mind of a friend: the intention of the mind, in ſeeing, is carried to the object repreſented; which is no more than ſimple *cogitation*, or apprehenſion of the perſon. *Stillingfleet.*—Purpoſe; reflection previous to action.—The king, perceiving that his deſires were intemperate, and his *cogitations* vaſt and irregular, began not to brook him. *Bacon.*—Meditation; contemplation; mental ſpeculation:

On ſome great charge employ'd
He ſeem'd, or fixt in *cogitation* deep. *Milton.*

CO'GITATIVE, *adj.* [from *cogito*, Lat.] Having the power of thought and reflection.—If theſe powers of cogitation and ſenſation are neither inherent in matter, nor acquirable to matter, they proceed from ſome *cogitative* ſubſtance, which we call ſpirit and ſoul. *Bentley.*—Given to thought and deep meditation.—The earl had the cloſer and more reſerved countenance, being by nature more *cogitative*. *Wotton.*

COGLIA'NO, a town of Italy, in the kingdom of Naples, and province of Principato Citra: thirteen miles north-north-weſt of Cangiano.

CO'GNAC, a town of France, and principal place of a diſtrict, in the department of the Charente, celebrated for its wine and brandy, which conſtitute its principal articles of commerce. The number of inhabitants is about 5000. It is ſeven leagues weſt of Angouleſme, and four and a half eaſt of Saintes. Lat. 45. 42. N. lon. 17. 18. E. Ferro.

CO'GNAC, a town of France, in the department of the Upper Vienne: twenty miles ſouth-eaſt of Confolent.

COG'NATE, or Cognative, *adj.* [*cognatus*, Lat.] Relative; relating to the ſame thing.

COGNA'TI, *ſ.* [Lat.] Relations by the mother.—The *agnati*, or relations by the father, were preferred to the *cognati*, or relations by the mother. *Blackſtone.*

COGNA'TION, *ſ.* [*cognatio*, Lat.] Kindred; deſcent from the ſame original.—Two vices I ſhall mention, as being of near *cognation* to ingratitude; pride, and hardheartedneſs, or want of compaſſion. *South.*—Relation; participation of the ſame nature.—He induceth us to aſcribe effects unto cauſes of no *cognation*. *Brown.*

COG'NE, a vale of Piedmont, to which the title of county is annexed, belonging to the biſhop of Aoſta; it takes its name from a ſmall river which waters it. The mountains which ſurround it are rich in mines of iron and copper; it contains thirteen villages, of which Cogne is the principal: ſituated ſix miles ſouth from Aoſta.

COG'NI, or Konich, a town of Aſiatic Turkey, the capital of Caramania, and the ordinary reſidence of a beglerbeg, ſituated in a beautiful and fertile country. It is very large, and the walls are ſupported by 108 ſquare towers, forty paces diſtant from each other: there are two large fauxbourgs, into one of which the caravans and ſtrangers retire. All the inhabitants are Turks; Armenians, Jews, and others, who come hither to trade, lodge in the kans, where they are ſupplied with every thing they want. It is the ſee of a Greek archbiſhop: 260 miles ſouth-eaſt of Conſtantinople. Lat. 38. 13. N. lon. 50. 45. E. Greenwich.

CO'GNISABLE, *adj.* [*connoiſſable*, Fr.] That falls under judicial notice. Liable to be tried, judged, or examined.—Some are merely of eccleſiaſtical cogniſance; others of a mixed nature, ſuch as are *cogniſable* both in the eccleſiaſtical and ſecular courts. *Ayliffe.*

CO'GNISANCE, *ſ.* [*connoiſſance*, Fr.] Judicial notice; trial; judicial authority.—It is worth while, however, to conſider how we may diſcountenance and prevent thoſe evils which the law can take no *cogniſance* of. *L'Eſtrange.*—A badge, by which watermen, ticket porters, or any ſuch perſons are known.—Theſe were the proper *cogniſances* and coat-arms of the tribes. *Brown.*

CO'GNISANCE, in law, is uſed diverſely, ſometimes for an acknowledgment of a fine. In replevin, *cogniſance* is the anſwer given by a defendant, who has acted as bailiff, &c. to another, in making a diſtreſs. But the moſt uſual ſenſe in which this term is now uſed, is relative to the claim of *cogniſance of pleas*. This is a privilege granted by the king to a city or town, to hold plea of all contracts, &c. within the liberty of the franchiſe; and when any man is impleaded for ſuch matters in the courts of Weſtminſter, the mayor, &c. of ſuch franchiſe may aſk cogniſance of the plea, and demand that it ſhall be determined before them: but if the courts at Weſtminſter are poſſeſſed of the plea before cogniſance be demanded, it is then too late. 9 Hen. IV. c. 5. 8 Hen. VI. c. 26. Cogniſance of pleas extends not to aſſizes; and when granted, the original ſhall not be removed: it lies not in a *quare impedit*, for they cannot write to the biſhop, nor of a plea out of the county-court, which cannot award a reſummons. *Jenk. Cent.* 31, 34. This cogniſance ſhall be demanded the firſt day; and if the demandant in a plea of land counterpleads the franchiſe, and the tenant joins with the claim of the franchiſe, and it is found againſt the franchiſe, the demandant ſhall recover the land; but if it be found againſt the demandant, the writ ſhall abate.

There are three ſorts of inferior juriſdictions, one whereof is *tenere placita*, and this is the loweſt ſort; for it is only a concurrent juriſdiction, and the party may ſue there, or in the king's courts, if he will. The ſecond is *conuſance of pleas*, and by this a right is veſted in the lord of the franchiſe to hold the plea, and he is the only perſon who can take advantage of it. The third ſort is an *exempt juriſdiction*, as where the king grants to a great city, that the inhabitants thereof ſhall be ſued within their city, and not elſewhere; this grant may be pleaded to the juriſdiction of the court of king's-bench, if there be a court within that city which can hold plea of the cauſe, and nobody can take advantage of this privilege but a defendant; for if he will bring *certiorari*, that will remove the cauſe, but he may wave it if he will, ſo that the privilege is only for his benefit. 3 *Salk.* 79, 80.

Henry VIII. by letters patent of the fourteenth of his reign, and confirmed by parliament, granted to the univerſity of Oxford conuſance of pleas, in which a ſcholar or ſervant of a college ſhould be party, *ita quod juſticiarii de utroque banco ſe non intromittant*. An attorney of the court of king's-bench ſued a ſcholar in that court for battery. By the court, this general grant does not extend to take away the ſpecial privilege of any court without ſpecial words. *Lit. Rep.* 304. If a ſcholar of Oxford or Cambridge be ſued in chancery for a ſpecial performance of a contract to leaſe lands in Middleſex, the univerſity ſhall not have conuſance, becauſe they cannot ſequeſter the lands. *Gilb. Hiſt. of C. P.* 194. Conuſance was granted

granted to the university of Oxford, (no cause being shewn to the contrary,) in Easter term, 9 Geo. II. in the case of Woodcocke and Brooke. *Hardw.* 241.

Conusance must be demanded before an imparlance, and the same term the writ is returnable, after the defendant appears; because, till he appears there is no cause in court, otherwise there would be a delay of justice; for if after imparlance, when the defendant has a day already allowed him, he would have two days, since when the conusance is allowed, the franchise prefixes a day to both parties to appear before them: and it is the lord's laches if he does not come soon enough not to delay the parties. *Gilb. Hist. of C. P.* 196.

COGNISE'E, *f.* in law, he to whom a fine in lands or tenements is acknowledged. *Cowell.*

COG'NISOR, *f.* in law, he that passeth or acknowledgeth a fine in lands or tenements to another. *Cowell.*

COGNI'TION, *f.* [*cognitio*, Lat.] Knowledge; complete conviction.—God, as he created all things, so is he beyond and in them all; not only in power, as under his subjection; or in his presence, as in his *cognition*; but in their very essence, as in the soul of their casualties. *Brown.*

COGNITIO'NIBUS MITTEN'DIS, *f.* A writ to one of the king's justices of the common pleas, or other that hath power to take a fine, who having taken the fine defers to certify it, commanding him to certify.

COG'NITIVE, *adj.* [from *cognitus*, Lat.] Having the power of knowing.—Unless the understanding employ and exercise its *cognitive* or apprehensive power about these terms, there can be no actual apprehension of them. *South.*

COGNO'MINAL, *adj.* [*cognomen*, Lat.] Having the same name.—Nor do those animals more resemble the creatures on earth, than they on earth the constellations which pass under animal names in heaven; nor the dog-fish at sea much more make out the dog of the land, than his *cognominal* or namesake in the heavens. *Brown.*

COGNOMINA'TION, *f.* [*cognomen*, Lat.] A surname; the name of a family. A name added from any accident or quality.—Pompey deserved the name Great: Alexander, of the same *cognomination*, was generalissimo of Greece. *Brown.*

COGNO'SCENCE, *f.* [*cognosco*, Lat.] Knowledge; the state or act of knowing.

COGNO'SCIBLE, *adj.* [*cognosco*, Lat.] That may be known; being the object of knowledge.—The same that is said for the redundance of matters intelligible and *cognoscible* in things natural, may be applied in things artificial. *Hale.*

COGNO'VIT ACTIO'NEM, *f.* is where a defendant acknowledges or confesses the plaintiff's cause against him to be just and true; and, before or after issue, suffers judgment to be entered against him without trial. And here the confession generally extends no further than to what is contained in the declaration; but if the defendant will confess more, he may. 1 *Rol.* 929.

COGOL'LA, a river of Spain, which runs into the Nagarella, in the country of Rioja.

COGOLLU'DO, a town of Spain, in New Castile: twenty miles west of Signença.

COGORE'TO, or COGURETO, a village of Italy, on the sea-coast of Genoa, remarkable for being the native place of Christopher Columbus, the celebrated discoverer of America.

COGUE, *f.* A small cup or dram of brandy. A small wooden vessel or cup.

To COGUE, *v. a.* To drink brandy.

COG'WARE, *f.* A sort of coarse cloth, made in divers parts of England, of which mention is made in the stat. 13 Rich. II. c. 10.

To COHA'BIT, *v. n.* [*cohabito*, Lat.] To dwell with another in the same place. To live together as husband and wife.—He knew her not to be his own wife, and yet had a design to *cohabit* with her as such. *Fiddes.*

COHA'BITANT, *f.* An inhabitant of the same place.—The oppressed Indians protest against that heaven, where the Spaniards are to be their *cohabitants*. *Decay of Piety.*

COHABITA'TION, *f.* The act or state of inhabiting the same place with another. The state of living together as married persons.—Monsieur Brumars, at one hundred and two years, died for love of his wife, who was ninety-two at her death, after seventy years *cohabitation*. *Tatler.*—By the common law of Scotland, cohabitation for a year and a day, or a complete twelvemonth, is deemed equivalent to matrimony.

COHAN'ZY, or CÆSARIA, a small river of North America, which rises in Salem county, New Jersey, and running through Cumberland county, empties into Delaware river opposite the upper end of Bombay Hook. It is about thirty miles in length, and is navigable for vessels of one hundred tons to Bridgetown, twenty miles from its mouth.

COHAS'SET, a township of the American States, in Norfolk county, Massachusetts, which was incorporated in 1770. Cohasset rocks, which have been so fatal to many vessels, lie off this town, about a league from the shore. It is twenty-five miles south-east of Boston; but in a straight line not above half the distance.

COHE'IR, *f.* [*cohæres*, Lat.] One of several among whom an inheritance is divided.—Married persons, and widows, and virgins, are all *coheirs* in the inheritance of Jesus, if they live within the laws of their estate. *Taylor.*

COHE'IRESS, *f.* A woman who has an equal share of an inheritance with other women.

To COHE'RE, *v. n.* [*cohæreo*, Lat.] To stick together; to hold fast one to another, as parts of the same mass.—We find that the force, whereby bodies *cohere*, is very much greater when they come to immediate contact, than when they are at ever so small a finite distance. *Cheyne.*

None want a place; for all, their centre found,
Hung to the goddess, and *coher'd* around;
Not closer, orb in orb conglob'd, are seen
The buzzing bees about their dusky queen. *Pope.*

To be well connected; to follow regularly in the order of discourse. To suit; to fit; to be fitted to. To agree.

COHE'RENCE, or COHERENCY, *f.* [*cohærentia*, Lat.] That state of bodies in which their parts are joined together, from what cause soever it proceeds, so that they resist divulsion and separation; nor can be separated by the same force by which they might be simply moved, or, being only laid upon one another, might be parted again. *Quincy.*—The pressure of the air will not explain, nor can be a cause of, the *coherence* of the particles of air themselves. *Locke.*—Matter is either fluid or solid; words that may comprehend the middle degrees between extreme fixedness and *coherency*, and the most rapid intestine motion. *Bentley.*—Connection; dependency; the relation of parts or things one to another.—Why between sermons and faith should there be ordinarily that *coherence*, which causes have with their usual effects? *Hooker.*—The texture of a discourse, by which one part follows another regularly and naturally. Consistency in reasoning, or relating, so that one part of the discourse does not destroy or contradict the rest.—*Coherence* of discourse, and a direct tendency of all the parts of it to the argument in hand, are most eminently to be found in St. Paul. *Locke.*

COHE'RENT, *adj.* [*cohærens*, Lat.] Sticking together, so as to resist separation:

Where all must fall, or not *coherent* be;
And all that rises, rise in due degree. *Pope.*

Connected; united.—The mind proceeds from the knowledge it stands possessed of already, to that which lies next, and is *coherent* to it, and so on to what it aims at. *Locke.*—Suitable to something else; regularly adapted:

Instruct my daughter,
That time and place, with this deceit so lawful,
May prove *coherent*. *Shakespeare.*

Consistent;

Consistent; not contradictory to itself.—A *coherent* thinker, and a strict reasoner, is not to be made at once by a set of rules. *Watts.*

COHE'SION, *f.* [from *cohere.*] The act of sticking together.—Solids and fluids differ in the degree of *cohesion*, which, being increased, turns a fluid into a solid. *Arbuthnot.*—The state of union or inseparability:

What cause of their *cohesion* can you find?
What props support, what chains the fabric bind? *Blackm.*

Connection; dependence.—In their tender years, ideas that have no natural *cohesion* come to be united in their heads. *Locke.*

Cohesion is one of the four species of attraction, denoting that force by which the parts of bodies adhere or stick together. This power was first considered by Newton as one of the properties essential to all matter, and the cause of all that variety observed in the texture of different terrestrial bodies. He did not, however, absolutely determine that the power of cohesion was an immaterial one; but that it might possibly arise, as well as that of gravitation, from the action of another. His doctrine of cohesion Newt n delivers in these words: The particles of all hard homogeneous bodies, which touch one another, cohere with a great force; to account for which, some philosophers have recourse to a kind of hooked atoms, which in effect is nothing else but to beg the thing in question. Others imagine that the particles of bodies are connected by rest, *i. e.* in effect by nothing at all; and others by conspiring motions, *i. e.* by a relative rest among themselves. But it rather appears to us, that the particles of bodies cohere by an attractive force, whereby they tend mutually towards each other: which force, in the point of contact, is very great; at little distances it is less; and at a little farther distance quite insensible. It is uncertain in what proportion this force decreases as the distance increases. Desaguliers conjectures, from some phenomena, that it decreases as the biquadratic or 4th power of the distance, so that at twice the distance it acts 16 times more weakly, &c. Now if compound bodies be so hard, as by experience we find some of them to be, and yet have a great many hidden pores within them, and consist of parts only laid together; no doubt those simple particles which have no pores within them, and which were never divided into parts, must be vastly harder. For such hard particles, gathered into a mass, cannot possibly touch in more than a few points; and therefore much less force is required to sever them, than to break a solid particle, whose parts touch throughout all their surfaces, without any intermediate pores or interstices. But how such hard particles, only laid together, and touching only in a few points, should come to cohere so firmly, as in fact we find they do, is inconceivable; unless there be some cause, whereby they are attracted and pressed together. Now the smallest particles of matter may cohere by the strongest attractions, and constitute larger, whose attracting force is feebler: and again, many of these larger particles cohering, may constitute others still larger, whose attractive force is still weaker, and so on for several successions, till the progression end in the biggest particle, on which the operations in chemistry, and the colours of natural bodies, do depend; and which by cohering compose bodies of a sensible magnitude.

The opinion maintained by many is that which is so strongly defended by J. Bernoulli, *De Gravitate Ætheris*; who attributes the cohesion of the parts of matter to the uniform pressure of the atmosphere; confirming this opinion by the known experiment of two polished marble planes, which cohere very strongly in the open air, but easily drop asunder in an exhausted receiver. However, if two plates of this kind be smeared with oil, to fill up the pores in their surfaces, and prevent the lodgment of air, and one of them be gently rubbed upon the other, they will adhere so strongly, even when suspended in an exhausted receiver, that the weight of the lower plate will not be able to separate it from the upper one. But, although this theory might serve tolerably well to xplain the cohesion of compositions, or greater collections of matter, yet it falls far short of accounting for that first cohesion of the atoms, or primitive corpuscles, of which the particles of hard bodies are composed.

Some philosophers have positively asserted, that the powers, or means, are immaterial, by which matter coheres; and, in consequence of this supposition, they have so refined upon attractions and repulsions, that their systems seem but little short of scepticism, or denying the existence of matter altogether. A system of this kind is adopted by Dr. Priestley, from Messrs. Boscovich and Michell, to solve some difficulties concerning the Newtonian doctrine of light. See his History of Vision, vol. i. p. 392. "The easiest method," says he, "of solving all difficulties, is to adopt the hypothesis of Mr. Boscovich, who supposes that matter is not impenetrable, as has been perhaps universally taken for granted; but that it consists of physical points only, endued with powers of attraction and repulsion in the same manner as solid matter is generally supposed to be: provided therefore that any body move with a sufficient degree of velocity, or have a sufficient momentum to overcome any powers of repulsion that it may meet with, it will find no difficulty in making its way through any body whatever; for nothing else will penetrate one another but powers, such as we know do in fact exist in the same place, and counterbalance or over-rule one another. The most obvious difficulty, and indeed almost the only one, that attends this hypothesis, as it supposes the mutual penetrability of matter, arises from the idea of the nature of matter, and the difficulty we meet with in attempting to force two bodies into the same place. But it is demonstrable, that the first obstruction arises from no actual contact of matter, but from mere powers of repulsion. This difficulty we can overcome; and having got within one sphere of repulsion, we fancy that we are now impeded by the solid matter itself. But the very same is the opinion of the generality of mankind with respect to the first obstruction. Why, therefore, may not the next be only another sphere of repulsion, which may only require a greater force than we can apply to overcome it, without disordering the arrangement of the constituent particles; but which may be overcome by a body moving with the amazing velocity of light?

Other philosophers have supposed that the powers both of gravitation and cohesion are material; and that they are only different actions of the etherial fluid, or elementary fire. In proof of this doctrine, they allege the experiment with the Magdeburg hemispheres, as they are called. The pressure of the atmosphere we see is, in this case, capable of producing a very strong cohesion; and if there be in nature any fluid more penetrating, as well as more powerful in its effects, than the air we breathe, it is possible that what is called the attraction of cohesion, may in some measure be an effect of the action of that fluid. Such a fluid as this is the element of fire. Its activity is such as to penetrate all bodies whatever; and in the state in which it is commonly called fire, it acts according to the quantity of solid matter contained in the body. In this state, it is capable of dissolving the strongest cohesions observed in nature. Fire, therefore, being able to dissolve cohesions, must also be capable of causing them, provided its power be exerted for that purpose, which possibly it may be, when we consider its various modes or appearances, viz. as fire or heat, in which state it consumes, destroys, and dissolves; or as light, when it seems deprived of that destructive power; and as the electric fluid, when it attracts, repels, and moves bodies, in a great variety of ways. In the Philos. Trans. for 1777, this hypothesis is noticed, and in some measure adopted, by Mr. Henly. "Some gentlemen," says he, "have supposed that the electric matter is the cause of the cohesion of the particles of bodies. If the electric matter

matter be, as I ſuſpect, a real elementary fire inherent in all bodies, that opinion may probably be well founded; and perhaps the ſoldering of metals, and the cementation of iron, by fire, may be conſidered as ſtrong proofs of the truth of their hypotheſis."

But whatever the cauſe of coheſion may be, its effects are evident and certain. The different degrees of it conſtitute bodies of different forms and properties. Thus, Newton obſerves, the particles of fluids, which do not cohere too ſtrongly, and are ſmall enough to render them ſuſceptible of thoſe agitations which keep liquors in a fluor, are moſt eaſily ſeparated and rarefied into vapour, and make what the chemiſts call *volatile bodies*; being rarefied with an eaſy heat, and again condenſed with a moderate cold. Thoſe that have groſſer particles, and ſo are leſs ſuſceptible of agitation, or cohere by a ſtronger attraction, are not ſeparable without a greater degree of heat, and ſome of them not without fermentation: and theſe make what the chemiſts call *fixed bodies*. Air, in its fixed ſtate, poſſeſſes the interſtices of ſolid ſubſtances, and probably ſerves as a bond of union to their conſtituent parts; for when theſe parts are ſeparated, the air is diſcharged, and recovers its elaſticity. And this kind of attraction is evinced by a variety of familiar experiments; as, by the union of two contiguous drops of mercury; by the mutual approach of two pieces of cork, floating near each other in a baſon of water; by the adheſion of two leaden balls, whoſe ſurfaces are ſcraped and joined together with a gentle twiſt, which is ſo conſiderable, that, if the ſurfaces are about a quarter of an inch in diameter, they will not be ſeparated by a weight of 100lb; by the aſcent of oil or water between two glaſs planes, ſo as to form the hyperbolic curve, when they are made to touch on one ſide, and kept ſeparate at a ſmall diſtance on the other; by the depreſſion of mercury, and by the riſe of water in capillary tubes, and on the ſides of glaſs veſſels; alſo in ſugar, ſponge, and all porous ſubſtances. And where this coheſive attraction ends, a power of repulſion begins.

To determine the force of coheſion, in a variety of different ſubſtances, many experiments have been made, and particularly by profeſſor Muſchenbroek. The adheſion of poliſhed planes, about two inches in diameter, heated in boiling water, and ſmeared with greaſe, required the following weights to ſeparate them:

	Cold greaſe.	Hot greaſe.
Planes of Glaſs	130 lb.	300 lb.
Braſs	150	800
Copper	200	850
Marble	225	600
Silver	150	250
Iron	300	950

But when the braſs planes were made to adhere by other ſorts of matter, the reſults were as in the following table:

With Water	12 oz.
Oil	18
Venice Turpentine	24
Tallow Candle	800
Roſin	850
Pitch	1400

In eſtimating the abſolute coheſion of ſolid pieces of bodies, he applied weights to ſeparate them according to their length: his pieces of wood were long ſquare parallelopipedons, each ſide of which was ·26 of an inch, and they were drawn aſunder by the following weights:

Fir	600 lb.
Elm	950
Alder	1000
Linden-tree	1000
Oak	1150
Beech	1250
Aſh	1250

He tried alſo wires of metal, 1-10th of a Rhinland inch in diameter; the metals and weights were as follow:

Of Lead	29¼ lb.
Tin	40¼
Copper	299¼
Yellow braſs	360
Silver	370
Iron	450
Gold	500

He then tried the *relative coheſion*, or the force with which bodies reſiſt an action applied to them in a direction perpendicular to their length. For this purpoſe he fixed pieces of wood by one end into a ſquare hole in a metal plate, and hung weights towards the other end, till they broke at the hole; the weights and diſtances from the hole are exhibited in the following table:

	Diſtance.	Weight.
Pine	9½ inch.	36¼ oz.
Fir	9	40
Beech	7	56⅓
Elm	9	44
Oak	8½	48
Alder	9¼	48

COHE'SIVE, *adj.* That has the power of ſticking to another, and of reſiſting ſeparation.

COHE'SIVENESS, *ſ.* The quality of being coheſive; the quality of reſiſting ſeparation.

To COHI'BIT, *v. a.* [*cohibeo*, Lat.] To reſtrain; to hinder.

To CO'HOBATE, *v. a.* To pour the diſtilled liquor upon the remaining matter, and diſtil it again.—The juices of an animal body are, as it were, *cohobated*, being excreted, and admitted again into the blood with the freſh aliment. *Arbuthnot.*

COHOBA'TION, *ſ.* A returning any diſtilled liquor again upon what it was drawn from, or upon freſh ingredients of the ſame kind, to have it the more impregnated with their virtues. *Quincy.*—*Cohobation* is the pouring the liquor diſtilled from any thing back upon the remaining matter, and diſtilling it again. *Locke.*

It is frequently required in chemical operations, that a ſubſtance ſhould be for a long time boiled, or digeſted in a volatile fluid conſiderably heated. This neceſſarily occaſions a great loſs of the fluid, if the operation be performed in an open veſſel. To prevent this, the ancient chemiſts employed a kind of ſtill, called a pelican. The head of this veſſel was provided with two beaks, which by a gradual incurvation returned into the body, and conveyed thither whatever volatile matter had riſen into the head, and there became condenſed. The views and practices of the modern chemiſts do not require theſe long digeſtions; but many valuable experiments of Prieſtley and others, of the nature of repeated diſtillation, have been made by a ſimpler apparatus. A glaſs tube, three or four feet in length, ſupplies the place of the pelican. A mineral acid water, or any other requiſite fluid, is put into the tube, in ſuch a quantity as to occupy an inch or more of its lower end; the upper end is then hermetically ſealed, and heat applied to the lower by a ſand-bath. The fluid partly riſes, and is partly changed, in other reſpects, by the heat. The vapours, as they arrive towards the upper part of the tube, become condenſed, and return again to the lower in a kind of circulation down the cooler ſide of the veſſel. See the various experiments in the article CHEMISTRY in this volume.

COHO'EZ, or the FALLS in Mohawk river, between two and three miles from its mouth, and ten miles northward of Albany, are a very great natural curioſity. The river above the falls is about three hundred yards wide, and approaches them from the north-weſt in a rapid current, between high banks on each ſide, and pours the whole body of its water over a perpendicular rock of about fifty feet in height, which extends quite acroſs like a mill-dam. The banks of the river, immediately below the

the falls, are about one hundred feet high. A bridge eleven hundred feet long, and twenty-four feet wide, resting on thirteen piers, was erected by the American States, at the expence of twelve thousand dollars, in 1794, a mile below the falls, from which a spectator commands a grand view of them; but they appear most romantically from Lansinburg-hill, five miles eastward.

CO'HOL, *s.* [from כחל, *cohol*, antimony.] A collyrium for the eyes; so called from the usage of the eastern ladies to paint their eye-lashes with antimony very finely powdered; from whence any thing reduced to a most subtle powder, or any dry application, was called *cohol*.

CO'HONG, a town of Asia, in Thibet: twenty miles south-west of Tien-tsang.

CO'HORN (Memnon), the Vauban of the Dutch, born in 1632. His genius for the arts of war, and for constructing fortifications, displayed itself early in life. Being engineer and lieutenant-general in the service of the states-general, he fortified and defended the greater part of their garrisons. It was a curious spectacle, says the president Hainault, to see, in 1692, at the siege of Namur, the fort Cohorn besieged by Vauban, and defended by Cohorn himself. He did not surrender till after he had received a wound judged to be mortal, but which, however, did not prove to be so. In 1703 the elector of Cologne, Joseph Clement, having espoused the part of France, and received a French garrison into Bonn, Cohorn kept up such a strong and terrible fire upon the place, that the commandant surrendered it three days afterwards. This great man died at the Hague in 1704, leaving the Hollanders several places fortified by his industry and skill. Bergen-op-zoom, which he called his master-piece, was taken, in 1747, by the marshal de Locwendahl, notwithstanding its fine fortifications, which caused it to be regarded as impregnable. We have a treatise by Cohorn, in the Flemish language, on the method of fortifying places.

CO'HORT, *s.* [*cohors*, Lat.] A troop of soldiers in the Roman armies, containing about six hundred foot.—The Romans levied as many *cohorts*, companies, and ensigns, from hence, as from any of their provinces. *Camden.*—In poetical language, a body of warriors:

Th' arch-angelic pow'r prepar'd
For swift descent; with him the *cohort* bright
Of watchful cherubim. *Milton.*

COHORTA'TION, *s.* [*cohortatio*, Lat.] Encouragement by words; incitement.

COHUA'GIUM, *s.* A tribute formerly paid by those who met promiscuously in the market or fair; *cohua* signifying a promiscuous multitude of men in a fair or market.

COHUIX'CAS, a country in New Spain, in which there is a considerable mountain of loadstone, between Tcoiltylan and Chilapan.

COI'BA, or QUIBO, a small island in the Pacific Ocean, near the coast of Veragua. Lat. 8. N. lon. 64. 40. W. Ferro.

COIF, *s.* [*coeffe*, Fr. from *cofea*, for *cucufa*, low Lat.] The head-dress; a lady's cap:

Instead of home-spun *coifs* were seen
Good pinners edg'd with colbertine. *Swift.*

A title given to serjeants at law, who are called *serjeants of the coif*, from the lawn coif they wear on their heads under their caps when they are created. The use of it was anciently to cover *tonsuram clericalem*, otherwise called *corona clericalis*; because the crown of the head was close shaved, and a border of hair left round the lower part, which made it look like a crown. *Blount.*—The judges of the four circuits in Wales; although they are not of the first magnitude, nor need be of the degree of the *coif*, yet are they considerable. *Bacon.*

COIF'ED, *adj.* Wearing a coif.

COIF'FURE, *s.* [*coeffure*, French.] Head-dress.—I am pleased with the *coiffure* now in fashion, and think it shews the good sense of the valuable part of the sex. *Addison.*

COIF'FY-LA-VILLE, a town of France, in the department of the Upper Marne, and chief place of a canton, in the district of Bourbonne-les-Baines: three miles south-west of Bourbonne.

COIGNE, *s.* [an Irish term.] Fitz Thomas of Desmond began that extortion of *coigne* and livery, and pay; that is, he and his army took horse meat and man's meat, and money at pleasure. *Davies.*

COIGNE, *s.* [French.] A corner:

No jutting frieze,
Buttrice, nor *coigne* of vantage, but this bird
Hath made his pendant bed. *Shakespeare.*

A wooden wedge used by printers.

To COIL, *v. a.* [*cueillir*, Fr.] To gather into a narrow compass; as, to coil a rope, to wind it in a ring.—The lurking particles of air, so expanding themselves, must necessarily plump out the sides of the bladder, and so keep them turgid, until the pressure of the air, that at first *coiled* them, be re-admitted to do the same thing again. *Boyle.*

COIL, *s.* [*kolleren*, Germ.] Tumult; turmoil; bustle; stir; hurry; confusion:

In that sleep of death, what dreams may come,
When we have shuffled off this mortal *coil*,
Must give us pause. *Shakespeare.*

A rope wound into a ring.

COILAN'THA, *s.* in botany. See GENTIANA.

COIL'IMA, *s.* [from κοιλια, the bowels.] A sudden swelling of the bowels from flatulency.

COILOPHIL'LUM, *s.* in botany. See SARRACENIA.

COILOS'TOMY, *s.* [*coilostomia*, Lat. from κοιλος, hollow, and στομα, the mouth.] The defect of speaking from the palate, or through the nose.

COILOTAPA'LUS, *s.* in botany. See CECROPIA.

COILPET'TA, a town of Hindoostan, in the Carnatic: forty-six miles south of Madura, and twenty-five north of Palamcotta.

COIMBETO'RE, a province of Hindoostan, in the Mysore, and southern part of the dominions of Tippoo Sultan. The country is separated from Travancore, Cochin, and the Nayrs, by lofty mountains, called the *Western Gauts*, a continuation of which also bounds it on the north; on the east it is bounded by the Carnatic, and on the south by the province of Dindigul. Towards the south-west is an opening of the mountains, through which the river Paniany passes to the sea, on the western coast. It is fertile, and well watered by several rivers: the principal towns are Coimbetore, Erroad, and Carroor.

COIMBETO'RE, a town of Hindoostan, and capital of the province to which it gives name, situated at the foot of the Western Gauts, on the river Noyel. This town was taken possession of by General Meadows, on the 22d of July, 1790, having been evacuated by Tippoo Sultan, who left behind him a quantity of grain and military stores. It was defended by a mud fort, but not capable of making a long resistance. It was retaken by Tippoo the year following, and confirmed to him by the peace which ensued. In the succeeding war with Tippoo, in which this prince was killed, and his capital, Seringapatam, taken by the English troops under general Harris, on the 4th of May, 1799, the city and province of Coimbetore fell, with the other dominions of Tippoo Sultan, into the hands of the English East-India company. It is 252 miles south-west of Madras, and ninety south of Seringapatam. Lat. 10. 58. N. lon. 77. 7. E. Greenwich.

COIM'BRA, a city of Portugal, in the province of Beira, situated on a mountain, near the river Mondego, built by the Romans about 300 years before Christ; the see of a bishop, suffragan of Lisbon, with a celebrated university. It contains eighteen colleges, in which are 4000 students, nine churches, eight convents, and about 12,000

 inhabitants.

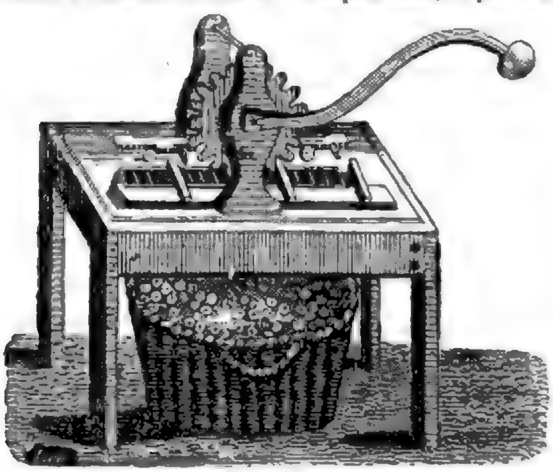
inhabitants. Ninety-six miles north-north-east of Lisbon. Lat. 40. 13. N. lon. 10. 15. E. Ferro.

COIN. *s.* [*coigne*, Fr.] A corner; any thing standing out angularly; a square brick cut diagonally: called often *quoin*, or *quine*.

COIN, *s.* [by some imagined to come from *cuneus*, a wedge, because metal is cut in wedges to be coined.] Money stamped with a legal impression.—I cannot tell how the poets will succeed in the explication of *coins*, to which they are generally very great strangers. *Addison.*—Payment of any kind.—The loss of present advantage to flesh and blood, is repaid in a nobler *coin*. *Hammond.*

Coin is a word collective, which contains in it all manner of the several stamps and species of money in any kingdom: and this is one of the royal prerogatives belonging to every sovereign prince, that he alone in his own dominions may order and dispose the quantity, value, and fashion, of his coin. But the coin of one king is not current in the kingdom of another, unless it be at great loss, though our king, by his prerogative, may make any foreign coin lawful money of England at his pleasure, by proclamation. If a man bind himself by bond to pay one hundred pounds of lawful money of Great Britain, and the person bound, the obligor, pays the obligee the money in French, Spanish, or other coin, made current either by act of parliament, or the king's proclamation, the obligation will be well performed. *Co. Lit.* 207. But it is said a payment in farthings is not a good payment. 2 *Inst.* 517. When a person has accepted of money in payment from another, and put the same into his purse, it is at his peril after his allowance; and he shall not then take exception to it as bad, notwithstanding he presently reviews it. *Terms de Ley.*

The art of coining money is a very simple and easy process; formerly the stamp was given by the stroke of a hammer; but it is now performed in a much more exact and elegant manner by an engine or mill, a figure of which is hereunto annexed. The planchets, or pieces of



metal intended to be coined, having been first cut out from the plate with a sharp hollow steel trapan of a round figure, are laid between the dyes, and the bar of the engine being pulled over, the impression is given with unerring exactness and astonishing facility; insomuch, that it is said one single person may stamp twenty thousand pieces of coin in one day. The milling, and stamp round the edge, are performed by a separate machine. In coining medals the process is the same, with this only difference: that money, having but a small relievo, receives its impression at a single stroke of the engine; whereas for medals, the height of their relievo makes it necessary that the stroke be repeated several times: to this end the piece is taken out from between the dies, heated, and returned again; which process, in medallions and large medals, is repeated fifteen or twenty times before the full impression can be given. For the names and values of coins in this and all other countries, see the article MONEY.

OFFENCES RELATING TO THE COIN.

Two offences respecting the coin, are made treason by the statute 25 Edw. III. c. 2. These are the actual counterfeiting the gold and silver coin of this kingdom; or the importing such counterfeit money with an intent to utter it, knowing it to be false. But these not being found sufficient to restrain the evil practices of coiners and false moneyers, other statutes have been since made for that purpose. By 1 Mary, c. 6, if any person shall falsely forge or counterfeit any such kind of coin of gold or silver, as is not the proper coin of this realm, but shall be current within this realm by consent of the crown, such offence shall be deemed high treason. And by 1 and 2 Phil. and Mary, c. 11, if any person do bring into this realm such false or counterfeit foreign money, being current here, knowing the same to be false, with intent to utter the same in payment, they shall be deemed offenders in high treason. The money, referred to in these statutes, must be such as is absolutely current here, in all payments, by the king's proclamation. Portugal money being only taken by consent, as approaching the nearest to our standard, and falling in tolerably well with our divisions of money into pounds and shillings: therefore to counterfeit that is not high treason, but another inferior offence.

Clipping or defacing the genuine coin was not hitherto included in these statutes; but by 5 Eliz. c. 11, clipping, washing, rounding, or filing, for wicked gains sake, any of the money of this realm, or other money suffered to be current here, shall be adjudged high treason; and by 18 Eliz. c. 1, the same species of offence is described in other more general words; viz. impairing, diminishing, falsifying, scaling, and lightening, are made liable to the same penalties.

By 8 and 9 Will. III. c. 26, (made perpetual by 7 Ann. c. 25,) whoever, without proper authority, shall knowingly, make or mend, or assist in so doing, or shall buy, sell, conceal, hide, or knowingly have in his possession any implements of coinage specified in the act, or other tools or instruments proper only for the coinage of money; or shall convey the same out of the king's mint; he, together with his councellors, procurers, aiders, and abettors, shall be guilty of high treason. The statute farther enacts, that to mark any coin on the edges with letters, or otherwise, in imitation of those used in the mint; or to colour, gild, or case over any coin resembling the current coin, or even round blanks of base metal; shall be construed high treason. But all prosecutions on this act are to be commenced within three months after the commission of the offence: except those for making or mending any coining tool or instrument, or for the making letters on money round the edges; which are directed to be commenced within six months after the offence committed. And, lastly, by 15 and 16 Geo. II. c. 28, if any person colours or alters any shilling or sixpence, either lawful or counterfeit, to make them respectively resemble a guinea or half guinea: or any halfpenny or farthing to make them respectively resemble a shilling or sixpence; this is also high treason; but the offender shall be pardoned, in case (being out of prison) he discovers and convicts two other offenders of the same kind.

Offences relating to the coin, not amounting to treason, and under which may be ranked some inferior misdemeanors not amounting to felony, are thus declared by the following series of statutes: 27 Edw. I. c. 3, none shall bring pollards, and crockards (which were foreign coins of base metal) into the realm, on pain of forfeiture of life and goods. By 9 Edw. III. no sterling money shall be melted down, upon pain of forfeiture thereof. By 17 Edw. III. none shall be so hardy to bring false and ill money into the realm, on pain of forfeiture of life and members of the persons importing, and the searchers permitting

permitting such importation. By 3 Hen. V. to make, coin, buy, or bring into the realm, any gally-halfpence, suskins, or dotkins, in order to utter them, is felony: and knowingly to receive or pay them or blanks (2 Hen. VI. c. 9.) incurs a forfeiture of an hundred shillings. By 14 Eliz. c. 3, such as forge any foreign coin, although it be not made current here by proclamation, shall (with their aiders and abettors) be guilty of misprison of treason. By 13 and 14 Car. II. c. 31, the offence of melting down any current silver money, shall be punished with forfeiture of the same, and also the double value: and the offender if a freeman of any town shall be disfranchised; if not, shall suffer six months imprisonment. By 6 and 7 Will. III. c. 17, if any person buys or sells, or knowingly has in his custody, any clippings or filings of the coin, he shall forfeit the same and 500l. one moiety to the king, and the other to the informer; and be branded in the cheek with the letter R. [But see benefit of CLERGY.] By 8 and 9 Will. III. c. 26, no person shall blanch, or whiten, copper for sale (which makes it resemble silver), nor buy or sell or offer for sale any malleable composition, which shall be heavier than silver, and look, touch, and wear, like gold, but beneath the standard: nor shall any person receive or pay at a less rate than it imports to be of (which demonstrates a consciousness of its baseness, and a fraudulent design) any counterfeit or diminished milled money of this kingdom, not being cut in pieces; an operation which is expressly directed to be performed when any such money shall be produced in evidence, and which any person, to whom any gold or silver money is tendered, is empowered (by 9 and 10 Will. III. c. 21. 13 Geo. III. c. 17. and 14 Geo. III. c. 70.) to perform at his own hazard; and the officers of the exchequer and the receivers general of the taxes are particularly required to perform: and all such persons so blanching, selling, &c. shall be guilty of felony, and may be prosecuted for the same at any time within three months after the offence committed.

But these precautions not being found sufficient to prevent the uttering of false or diminished coin, which was only a misdemeanor at common law, it is enacted by 15 and 16 Geo. II. c. 28, that if any person shall utter or tender in payment any counterfeit coin, knowing it to be so, he shall for the first offence be imprisoned six months, and find sureties for his good behaviour for six months more: for the second offence shall be imprisoned two years, and find sureties for two years longer: and that for the third offence, shall be guilty of felony without benefit of clergy. See CLERGY. Also if a person knowingly tenders in payment any counterfeit money, and at the same time has more in his custody; or shall, within ten days after, knowingly tender other false money; he shall be deemed a common utterer of counterfeit money; and shall for the first offence be imprisoned one year, and find sureties for his good behaviour two years longer: and for the second be guilty of felony without benefit of clergy. By the same statute it is also enacted that if any person counterfeits the copper coin, he should suffer two years imprisonment, and find sureties for two years more. By 11 Geo. III. c. 40, persons counterfeiting copper halfpence or farthings, with their abettors; or buying, selling, receiving or putting off any counterfeit copper money (not being cut in pieces or melted down) at a less value than it imports to be of; shall be guilty of single felony. And by a temporary stat. (14 Geo. III. c. 42,) if any quantity of money exceeding the sum of five pounds, being or purporting to be the silver coin of this realm, but below the standard of the mint in weight or fineness, shall be imported into Great Britain or Ireland, the same shall be forfeited, in equal moieties, to the crown and prosecutor.

The coining of money is in all states the act of the sovereign power: that its value may be known on inspection. And with regard to coinage in general, there are three things to be considered therein; the materials, the impression, and the denomination. With regard to the materials, Sir Edward Coke lays it down (2 *Inst.* 577.) that the money of England must either be of gold or silver: and none other was ever issued by the royal authority till 1672, when copper farthings and halfpence were coined by Charles II: and ordered by proclamation to be current in all payments, under the value of sixpence, and not otherwise. But this copper coin is not upon the same footing with the other in many respects, particularly with regard to the offence of counterfeiting it, as has been already noticed. And as to the silver coin, it was enacted by 14 Geo. III. c. 42, that no tender of payment in silver money, exceeding twenty-five pounds at one time, shall be a sufficient tender in law for more than its value by weight, at the rate of 5s. 2d. an ounce. This was a clause in a temporary act, which was continued till 1783, since which time it does not appear to have been revived. As to the impression, the stamping thereof is the unquestionable prerogative of the crown: for, though divers bishops and monasteries had formerly the privilege of coining money, yet, as sir Matthew Hale observes, 1 *Hist. P. C.* 191, this was usually done by special grant from the king, or by prescription which supposes one; and therefore was derived from, and not in derogation of, the royal prerogative. Besides that they had only the profit of the coinage, and not the power of instituting either the impression or denomination; but had usually the stamp sent them from the exchequer. The denomination, or the value for which the coin is to pass current, is likewise in the breast of the king; and, if any unusual pieces are coined, that value must be ascertained by proclamation. In order to fix the value, the weight and the fineness of the metal are to be taken into consideration together. When a given weight of gold or silver is of a given fineness, it is then of the true standard, and called esterling or sterling metal: a name for which there are various reasons given, but none of them entirely satisfactory. See *Spelm. Gloss.* 203. *Dufresne* 3, 165. The most plausible opinion seems to be that adopted by those two etymologists, that the name was derived from the Esterlings or Easterlings, as those Saxons were anciently called, who inhabited that district of Germany now occupied by the Hans-towns and their appendages: the earliest traders in modern Europe. Of this sterling or esterling metal all the coin of the kingdom must be made, by 25 Edw. III. c. 13. So that the king's prerogative seemeth not to extend to the debasing or inhancing the value of the coin, below or above the sterling value. 2 *Inst.* 577: though sir Matthew Hale, 1 *Hal. P. C.* 194, appears to be of another opinion. The king may also by his proclamation, legitimate foreign coin, and make it current here; declaring at what value it shall be taken in payments. 1 *H. P. C.* 197. But this it seems ought to be by comparison with the standard of our own coin, otherwise the consent of parliament will be necessary. The king may also at any time cry down any coin of the kingdom, and make it no longer current. 1 *Hal. P. C.* 197.

This standard hath been frequently varied in former times; but for many years past it has been thus invariably settled. The pound troy of gold, consisting of twenty-two carats (or 24th parts) fine, and two of alloy, is divided into forty-four guineas and an half of the present value of 21s. each. And the pound troy of silver, consisting of eleven ounces, and two penny weights fine, and eighteen penny-weights alloy, is divided into sixty two shillings. See Folkes on English Coins.

In the 7th year of William III. an act was made for calling in all the old coin of the kingdom, and to melt it down and re-coin it; the deficiencies whereof were to be made good at the public charge: and in every hundred pound coined, forty pound was to be shillings, and ten pound six-pences, under certain penalties. Persons bringing plate to the mint to be coined, were to have the same weight of money delivered out, as an encouragement: and receivers general of taxes, &c. were to receive money

money at a large rate per ounce. Our guineas have been raised and fallen, as money has been scarce or plenty, several times by statute: and anno 3 Geo. I. guineas were valued at twenty-one shillings, at which they have ever since continued to pass.

A duty of ten shillings per ton was imposed on wine, beer, and brandy imported, called the coinage duty, granted for the expence of the king's coinage, but not to exceed 3000l. per ann. 18 *Car.* II. *cap.* 5. This duty for coinage hath been continued and advanced, from time to time by divers statutes; and by 27 Geo. II. c. 11, (explained by 27 Geo. III. c. 13.) the treasury is to apply 15,000l. a-year to the expences of the mints in England and Scotland. 14 Geo. III. c. 92, regulates the stamping of money-weights, the fees for which are settled by 15 Geo. III. c. 30, at one penny for every twelve weights. See the article MINT.—The Irish coinage at present remains as it did prior to the union; for the value, &c. of which, see MONEY.

"Much COIN much care." The Latins say; *Crescentum sequitur cura pecuniam*. Horat. The French, *Plus on a d'argent, & plus on a de souci*. The Germans, *Viel geld, viel sorgen*. Though riches, and the obtaining of them, constitute almost every man's greatest care, yet they are not always the happiest men who attain them. They at best require a constant solicitude to employ and secure them, and often beget such an insatiable thirst after more, as prevents us from enjoying with pleasure and comfort those we have.

To COIN, *v. a.* To make or invent.—A term is *coined* to make the conveyance easy. *Atterbury.*—To mint or stamp metals for money.—They cannot touch me for *coining*: I am the king. *Shakespeare.*

COIN'AGE, *s.* The art or practice of coining money.—The care of the *coinage* was committed to the inferior magistrates; and I don't find that they had a public trial, as we solemnly practise in this country. *Arbuthnot.*—Coin; money; stamped and legitimated metal.—This is conceived to be a *coinage* of some Jews, in derision of Christians, who first began that portrait. *Brown.*—The charges of coining money. New production; invention.—Unnecessary *coinage*, as well as unnecessary revival of words, runs into affectation; a fault to be avoided on either hand. *Dryden.*—Forgery; invention.—This is the very *coinage* of your brain. *Shakespeare.*

To COINCI'DE, *v. n.* [*coincido*, Lat.] To fall upon the same point; to meet in the same point.—If the equator and ecliptic had *coincided*, it would have rendered the annual revolution of the earth useless. *Cheyne.*—To concur; to be consistent with.—The rules of right judgment, and of good ratiocination, often *coincide* with each other. *Watts.*

COIN'CIDENCE, *s.* The state of several bodies, or lines, falling upon the same point.—An universal equilibrium, arising from the *coincidence* of infinite centers, can never be naturally acquired. *Bentley.*—Concurrence; consistency; tendency of many things to the same end; occurrence of many things at the same time.—The very concurrence and *coincidence* of so many evidences that contribute to the proof, carries a great weight. *Hale.*—It is followed by *with*.—The *coincidence* of the planes of this rotation *with* one another, and with the plane of the ecliptic, is very near the truth. *Cheyne.*

COIN'CIDENT, *adj.* Falling upon the same point.—These circles I viewed through a prism; and, as I went from them, they came nearer and nearer together, and at length became *coincident*. *Newton.*—Concurrent; consistent; equivalent: followed by *with*.—Christianity teaches nothing but what is perfectly suitable to and *coincident with* the ruling principles of a virtuous and well-inclined man. *South.*

COIN'CY, a town of France, in the department of the Aisne: five miles north of Chateau Thierry.

COINDICA'TION, *s.* [from *con* and *indico*, Lat.] Many symptoms betokening the same cause.

COIN'ER, *s.* A maker of money; a minter; a stamper of coin:

My father was I know not where
When I was stampt: some *coiner* with his tools
Made me a counterfeit. *Shakespeare.*

A counterfeiter of the king's stamp; a maker of base money. An inventor.—Dionysius, a Greek *coiner* of etymologies, is commended by Athenæus. *Camden.*

COINTE (Charles le), born at Troyes the 4th of November 1611, entered very early into the congregation of the oratory, where he was received by the cardinal de Berulle. The pere Bourgoin, one of the cardinal's successors in the generalship, considered him for a long time as a useless man, because he applied himself to the study of history. Notwithstanding this, when Servien, plenipotentiary at Munster, asked him for a father of the oratory as chaplain to the embassy, he gave him pere le Cointe, who attended him, assisted him in making preliminaries of peace, and furnished the memorials necessary to the treaty. Colbert obtained for him the grant of a pension of one thousand livres in 1659; and, three years after, another of five hundred. It was then that he began to publish at Paris his grand work, intitled *Annales ecclesiastici Francorum*, in eight volumes folio, from the year 235 to 835. It is a compilation without ornament; but of immense labour, and full of curious particulars, executed with much discernment and sagacity. His chronology frequently differs from that of other historians; but, whenever he departs from them, he gives his reasons for it. The first volume appeared in 1665, and the last in 1679. He died at Paris Jan. 18, 1681, aged seventy.

To COJOIN, *v. n.* [*conjungo*, Lat.] To join with another in the same office:

Thou may'st *cojoin* with something, and thou dost,
And that beyond commission. *Shakespeare.*

COIRE, or CHUR, a bishopric and principality of Germany, which formerly included all the provinces of Rhetia, is now reduced to a narrow circle. The bishop is suffragan of Mentz, and a prince of the Roman empire, a dignity annexed to the see in 1170, by the emperor Frederic I. and is stiled lord of Furstenburg and Furstenaugh. His annual revenues, which amount to about two thousand pounds, arise chiefly from estates near Coire, and in the Tyrol. He receives also the annual sum of about seventy pounds from the customs of Chiavenna, in return for having ceded his right over the Valteline, Chiavenna, and Bormio, to the republic of the three leagues. The only prerogatives remaining are the right of coining money, and an absolute jurisdiction, both in civil and criminal affairs, within the small district in which his palace and the chapter are situated. Beyond this district he enjoys not the least power: so far from interfering in the affairs of the town, he could not even enter it if the inhabitants chose to exclude him; a right which they asserted in 1764.

COIRE, or CHUR, a town of Swisserland, in the country of the Grisons, and capital of the League of Grits, situated at the foot of the Alps, in a rich valley; founded, as is supposed, by the emperor Constantius. It was formerly a city of Germany, and governed by counts, who were princes of Germany, but became a bishopric in the ninth century; and, in 1526, soon after the reformation, a republic: the government is partly aristocratic and partly democratic; the supreme legislative authority resides in the citizens, whose number amounts to 294, divided into five tribes: thirty-two miles north of Chiavenna, and twenty-two east-south-east of Glarus. Lat. 46. 51. N. lon. 27. 13. E. Ferro.

COIS'TRIL, *s.* A coward; a runnaway; corrupted from *kestrel*, a mean or degenerate hawk.—He's a coward and a *coistril*, that will not drink to my niece. *Shakes.*

COIT, *s.* [*kote*, a die, Dutch.] Any thing thrown at a certain mark. See QUOIT.—The time they wear out at *coits*, kayles, or the like idle exercises. *Carew.*

COITION, *f.* [*coitio*, Lat.] Copulation; the act of generation.—I cannot but admire that philosophers should imagine frogs to fall from the clouds, considering how openly they act their *coition*, produce spawn, tadpoles, and frogs. *Ray*.—He is not made productive of his kind, but by *coition* with a female. *Grew*.—The act by which two bodies come together.—By Gilbertus this motion is termed *coition*, not made by any faculty attractive of one, but a syndrome and concourse of each. *Brown*.

COIX, *f.* [a name of Theophrastus for one of his reed-leaved plants, allied to the palms.] In botany, a genus of the class monoecia, order triandria, natural order grasses. The generic characters are—Male flowers disposed in a loose spike. Calyx: glume two-flowered, two-valved; valves oblong-ovate, obtuse, awnless, the outer thicker. Corolla: two-valved; valves ovate-lanceolate, length of the calyx, very thin, awnless. Stamina: filaments three, capillary; antheræ oblong, four-cornered. Female flowers fewer, at the base of the male spike, on the same plant. Calyx: glume two-flowered, two-valved; valves rounded, thick, shining, hard; the outer larger, shining. Corolla: glume two-valved, outer valve ovate, larger; inner narrower, smaller; both awnless. Pistillum; germ ovate, very small; style short, two-parted; stigmas two, horned, longer than the flower, pubescent on every side. Pericarpium: none; the outward calycine glume grows closely to the seed, increases, grows shining, falls, does not gape. Seed: solitary, roundish, covered by the ossified calyx.—*Essential Character*. Males in remote spikes; calyx, glume two-flowered, awnless; corolla, glume awnless. Females. Calyx, glume two-flowered; corolla, glume awnless; style two-parted; seed, covered by the calyx ossified.

Species. 1. Coix lacryma, or Job's tears: seeds ovate. Culm six feet high, perennial, subcylindric, solid, jointed, erect, branched; leaves lanceolate, quite entire, long, wrinkled underneath, reflex, clasping; flowers axillary, on a long, slender, sub-erect, common, peduncle; at the top many males in a subovate spikelet; and at the base a solitary female. The two styles are capillary and entirely distinct, with long villose stigmas. From the sheaths of the upper leaves come out one or two peduncles, compressed, sheathed at the base, ending at the top in a coriaceous ovate involucre, hollow within, perforated at the top, containing one or two covered sessile female flowers, surrounded on one side with an exterior glumaceous valve, and having on the other a single groove with two fistulose closed appendicles; a stipe is put forth from the bottom of the involucre between the appendicles, ending in a short few-flowered male spike; the involucre is permanent, hard, shining, smooth. There is only a single seed produced in each involucre, the other being constantly abortive; it is large, subglobular, gibbose on one side, with a broad deep groove on the other, beaked at the top with the permanent style, and having at the bottom a black umbilical hole; the female involucre, which covers it and does not quit it, is thick, stony, ovate-conical, perforated at the top and bottom, smooth, shining, of a livid or purplish colour. Gærtner objects to the name of *coix*, because that is a sort of palm, or a plant nearly allied to the palms, mentioned both by Theophrastus and Pliny; he therefore changes it to *lithagrostis*. Native of the East Indies; cultivated in 1596 by Gerarde.

2. Coix angulata, or large Job's tears: seeds angular. This will grow to the height of seven or height feet, whereas the foregoing is seldom so high as three feet in Europe; the stems become hard, like the reed or Indian corn, they branch out, and produce several spikes of flowers. Linnæus says this is perennial, and the foregoing species annual. Native of America.

3. Coix agrestis, or small Job's tears: culm entirely simple; leaves smooth and even; seeds roundish. Culms three feet high, round, solid, jointed, smooth, rising from a perennial creeping root. Native of Amboina, Ceylon, and Cochin-china.

Propagation and Culture. Those who are desirous to cultivate the first sort in England, may procure the seeds from Portugal; these should be sown on a moderate hot-bed in the spring, to bring the plants forward, and afterward transplant them on a warm border, allowing each two feet room at least, and when the plants have taken root, they will require no farther care, but to keep them clean from weeds. These will flower about midsummer, and in warm seasons; the seeds will ripen at Michaelmas. The second species will not bear the open air in England, but must be plunged into the bark-bed, where it will flourish, and produce ripe seeds the second year; it may be continued longer, if desired.

COKE (Sir Edward), lord chief justice of England, and one of the most eminent lawyers this kingdom has produced, was descended from an ancient family in Norfolk, and born at Mileham in that county in 1549. His father was Robert Coke, esq. of Mileham; his mother Winifred, daughter and coheiress of William Knightley, of Margrave Knightley in Norfolk. At ten years of age, he was sent to Norwich school; and from thence removed to Trinity-college in Cambridge. He remained in the university about four years, and went from thence to Clifford's-inn in London, and the year after was entered a student of the Inner Temple. The first proof he gave of the acuteness of his penetration and the solidity of his judgment, was his stating the cook's case of the Temple, (which had before puzzled the whole house,) so clearly and exactly, that it was noticed and admired by the bench. It is not at all improbable, that this might occasion his being so early called to the bar at the end of only six years, which in those times was considered very extraordinary. He himself has informed us, that the first cause he moved in the court of king's bench, was in Trinity term 1578; when he was counsel for the Rev. Edward Denny, vicar of Northingham in Norfolk, in an action of *scandalum magnatum* brought against him by Henry lord Cromwell. About this time he was appointed reader of Lyon's-inn, when his learned lectures were much attended; and so continued for three years. Soon after which he married Bridget, daughter and coheiress of John Preston, esq. with a fortune of 30,000l. By this marriage he became allied to some of the noblest families in the kingdom, and preferments flowed in upon him apace. The cities of Coventry and Norwich chose him their recorder; the county of Norfolk one of their representatives in parliament; and the house of commons their speaker, in the thirty-fifth year of queen Elizabeth. The queen also appointed him solicitor-general in 1592, and attorney-general the year following. Some time after he lost his wife, by whom he had ten children; and in 1598 he married Elizabeth, daughter of Thomas lord Burleigh, afterwards earl of Exeter, and relict of sir William Hatton. As this marriage was the source of perplexity to both parties, so the celebration of it was marked by an unfortunate and untoward circumstance. There had been the same year so much notice taken of irregular marriages, that archbishop Whitgift had signified to the bishops of his province, to prosecute strictly all that should either offend in point of time, place, or form. Now, whether Coke looked upon his own or the lady's quality, and their being married with the consent of the family, as setting them above such restrictions, or whether he did not consider at all about it, certain it is that they were married in a private house without either banns or licence: upon which he and his new-married lady, the minister who officiated, Thomas lord Burleigh, and several other persons, were prosecuted in the archbishop's court; but, upon their submission by their proxies, they were absolved from excommunication, and the penalties consequent upon it; because, says the record, they had offended, not out of contumacy, but through ignorance of the law in that point. The affair of greatest moment, in which as attorney-general he had a share in this reign, was the prosecution of the earls of Essex and Southampton,

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ton, who were brought to the bar in Westminster-hall, before the lords commissioned for their trial, February 19, 1600. After he had laid open the nature of the treason, and the many obligations the earl of Essex was under to queen Elizabeth, he is said to have closed with these words, that, "by the just judgment of God he of his earldom should be Robert the last, who of a kingdom thought to be Robert the first."

In May 1603 he was knighted by king James; and the same year managed the trial of sir Walter Raleigh at Winchester, whither the term was adjourned on account of the plague being in London. He lessened himself greatly in the opinion of the world, by his treatment of that unfortunate gentleman; for he exerted a fury and scurrility of language against him hardly to be paralleled. The resentment of the public was so conspicuous on this occasion, that Shakespeare, in his comedy of the "Twelfth Night," hints at this cruel behaviour of sir Edward Coke at Raleigh's trial; but which that great lawyer generally exercised towards the unfortunate. He was likewise reproached with this in a letter which sir Francis Bacon wrote to him after his own fall, wherein we have the following passage: "As your pleadings were wont to insult our misery, and inveigh literally against the person, so are you still careless in this point, to praise and disgrace upon slight grounds, and that suddenly; so that your reproofs or commendations are for the most part neglected and contemned, when the censure of a judge coming slow, but sure, should be a brand to the guilty, and a crown to the virtuous. You will jest at any man in public, without any respect to the person's dignity or your own. This disgraces your gravity more than it can advance the opinion of your wit; and so do all your actions, which we see you do directly with a touch of vain-glory. You make the laws too much lean to your opinion, whereby you shew yourself to be a legal tyrant, &c." January 27, 1606, at the trial of the gunpowder conspirators, and March 28 following, at the trial of the jesuit Garnet, he made two very elaborate speeches, which were soon after published in quarto, 1606. Cecil, earl of Salisbury, observed in his speech upon the latter trial, "that the evidence had been so well distributed and opened by the attorney-general, that he had never heard such a mass of matter better contracted, nor made more intelligible to the jury." This appears to have been really true; so true, that many to this day esteem this last speech, especially, his masterpiece.

It was probably in reward for this service, that he was appointed lord chief justice of the common-pleas. The motto he gave upon his rings, when he was called to the degree of serjeant, in order to qualify him for this promotion, was, *Lex est tutissima cassis*; "the law is the safest helmet." October 25, 1613, he was made lord chief justice of the king's bench; and in November was sworn of his majesty's privy council. In 1615, the king deliberating upon the choice of a lord chancellor, when that post should become vacant by the death or resignation of Egerton lord Ellesmere, sir Francis Bacon wrote to his majesty a letter upon that subject, wherein he has the following passage, relating to the lord chief justice: "If you take my lord Coke, this will follow; first, your majesty shall put an over-ruling nature into an over-ruling place, which may breed an extreme; next, you shall blunt his industries in matter of finances, which seemeth to aim at another place; and, lastly, popular men are no sure mounters for your majesty's saddle." The disputes and animosities between these two great men are well known. They seem, as a certain writer observes, to have been personal; and they lasted to the end of their lives. Coke was jealous of Bacon's reputation in many parts of knowledge; by whom again he was envied for the high reputation he had acquired in one: each aiming to be admired particularly in that, in which the other excelled. Coke was the greatest lawyer of his time, but could be nothing more. If Bacon was not so, we can ascribe it only to his aiming at too great an universality of learning.

Sir Thomas Overbury's murder in the Tower now broke out, at the distance of two years after; for Overbury died September 16, 1613, and the judicial proceedings against his murderers did not commence till September, 1615. In this affair sir Edward acted with great vigour, and, as some think, in a manner highly to be commended; yet his enemies, who were numerous, and had formed a design to humble his pride and insolence, took occasion, from certain circumstances, to represent him in a bad light both to the king and people. Many circumstances concurred at this time to hasten his fall. He was led to oppose the king in a dispute relating to his right of granting commendams; and James did not like to have his prerogative disputed, even in cases where it might well be questioned. He had a contest with the lord-chancellor Egerton, in which it is universally allowed that he was much to be blamed. Sir Edward, as a certain historian informs us, had heard and determined a case at common law; after which it was reported that there had been juggling. The defendant had prevailed with the plaintiff's principal witness not to attend, or give any evidence in the cause, provided he could be excused. One of the defendant's agents undertook to excuse him; and, carrying the man to a tavern, called for a gallon of sack, and bade him drink. As soon as he had put his lips to the liquor, the defendant's agent quitted the room. When this witness was called, the court was informed that he was unable to come; to prove which, this agent was produced, who deposed, "that he left him drinking in such a condition, that if he continued in it but a quarter of an hour, he was a dead man." For want of that person's testimony the cause was lost, and a verdict given for the defendant. The plaintiffs, finding themselves injured, carried the business into chancery; but the defendants, having had judgment at common law, refused to obey the orders of that court. Upon this, the lord chancellor committed them to prison for contempt of the court: they petitioned against him in the star-chamber; the lord chief justice Coke joined with them, fomented the difference, and threatened the lord chancellor with a premunire. The chancellor then made the king acquainted with the business; who, after consulting sir Francis Bacon, then his attorney-general, and some other lawyers upon the affair, justified the lord chancellor, and gave a proper rebuke to Coke.

Roger Coke gives a different account of the occasion of the chief justice's disgrace; and informs us, that he was one of the first who felt the effects of the power of the rising favourite, Villiers, afterwards duke of Buckingham. The author of the notes on Wilson's Life of James, published in the second volume of Kennet's Complete History of England, tells us, "that Sir Edward lost the king's favour, and some time after his place, for letting fall some words upon one of the trials, importing his suspicion that Overbury had been poisoned to prevent the discovery of another crime of the same nature, committed upon one of the highest rank, whom he termed a sweet prince; which was taken to be meant of prince Henry." Whatever were the causes of his disgrace, which it is probable were many, he was brought upon his knees before the council at Whitehall, June, 1616; and offences were charged upon him by Yelverton, the solicitor-general, implying, amongst other things, speeches of high contempt uttered in the seat of justice, and uncomely and undutiful carriage in the presence of the king, the privy council, and judges. Soon after, he presented himself again at the council-table upon his knees, when secretary Winwood informed him, that report had been made to his majesty of what had passed there before, together with the answer that he had given, and that too in the most favourable manner; that his majesty was no ways satisfied with respect to any of the heads; but that notwithstanding, as well out of his own clemency, as in regard

regard to the former services of his lordship, the king was pleased not to deal heavily with him: and therefore had decreed, 1. That he be sequestered from the council-table, until his majesty's pleasure be further known. 2. That he forbear to ride his summer circuit as justice of assize. 3. That during this vacation, while he had time to live privately and dispose himself at home, he take into consideration his books of reports; wherein, as his majesty is informed, be many extravagant and exorbitant opinions set down and published for positive and good law: and if, in reviewing and reading thereof, he find any thing fit to be altered or amended, the correction is left to his discretion. Among other things, the king was not well pleased with the title of those books, wherein he styled himself "lord chief justice of England;" whereas he could challenge no more, but lord chief justice of the king's-bench. And having corrected what in his discretion he found meet in these reports, his majesty's pleasure was, he should bring the same privately to himself, that he might consider thereof, as in his princely judgment should be found expedient. Hereunto Mr. secretary advised him to conform himself in all duty and obedience, as he ought; whereby he might hope that his majesty in time would receive him again to his gracious and princely favour. To this the lord chief justice made answer, that he did in all humility prostrate himself to his majesty's good pleasure; that he acknowledged that decree to be just, and proceeded rather from his majesty's exceeding mercy than his justice; gave humble thanks to their lordships for their goodness towards him; and hoped that his behaviour for the future would be such as would deserve their lordships favour. From which answer of sir Edward's we may learn that he was as dejected in adversity, as he was overbearing in prosperity.

In October he was called before the chancellor, and forbid Westminster-hall; and also ordered to answer several exceptions against his reports. In November the king removed him from the office of lord chief justice. Upon his disgrace, sir Francis Bacon wrote him an admonitary letter, in which he remonstrates to him several errors in his former behaviour and conduct. We have made a citation from this letter already; we will here give the remainder of it: for though perhaps it was not very generous in Bacon to write such a letter at such a season, even to a professed adversary, yet it serves to illustrate the character and manners of Coke. In this letter he advised sir Edward to be humbled for this visitation; and observes, "that affliction only levels the molehills of pride in us, ploughs up the heart, and makes it fit for wisdom to sow her seed, and grace to bring forth her increase." He afterwards points out to him some errors in his conduct. "In discourse, says he, you delight to speak too much, not to hear other men; this some say becomes a pleader, not a judge. For by this sometimes your affections are entangled with a love of your own arguments, though they be the weaker; and with rejecting of those which, when your affections were settled, your own judgment would allow for strongest. Thus, while you speak in your element, the law, no man ordinarily equals you; but when you wander, as you often delight to do, you then wander indeed, and never give such satisfaction as the curious time requires. This is not caused by any natural defect, but first for want of election; when you, having a large and fruitful mind, should not so much labour what to speak, as to find what to leave unspoken. Rich soils are often to be weeded. Secondly, you cloy your auditory. When you would be observed, speech must be either sweet or short. Thirdly, you converse with books, not men, and books specially humane; and have no excellent choice with men, who are the best books. For a man of action and employment you seldom converse with, and then but with underlings; not freely, but as a schoolmaster, ever to teach, never to learn. But if sometimes you would in your familiar discourse hear others, and make election of such as knew what they speak, you should know many of those tales, which you tell, to be but ordinary; and many other things, which you delight to repeat and serve in for novelties, to be but stale. As in your pleadings you were wont to insult even misery, and inveigh bitterly against the person; so are you still careless in this point. Your too much love of the world is too much seen, when, having the living of 10,000l. you relieve few or none. The hand that hath taken so much, can it give so little? Herein you shew no bowels of compassion, as if you thought all too little for yourself, or that God had given you all that you have, only to that end you should still gather more, and never be satisfied, but try how much you could gather, to account for all at the great and general audit day. We desire you to amend this, and let your poor tenants in Norfolk find some comfort, where nothing of your estate is spent towards their relief, but all brought up hither to the impoverishing your country." He then tells him, "that in case of Overbury he used too many delays, till the delinquent's hands were loose, and his own bound; and that he was too open in his proceedings, and so taught them how to defend themselves. But that," continues he, "which we commend you for, are those excellent parts of nature and knowledge in the law, which you are endued withal. But these are only good in their good use. Wherefore we thank you heartily for standing stoutly in the commonwealth's behalf; hoping, it proceedeth not from a disposition to oppose greatness, as your enemies say, but to do justice, and deliver truth indifferently without respect of persons."

Low as sir Edward Coke was fallen, he was afterwards restored to credit and favour; the first step to which was, his proposing a match between the earl of Buckingham's elder brother, sir John Villiers, and his younger daughter by the lady Hatton: for he knew no other way of gaining that favourite. This however occasioned a serious quarrel between sir Edward and his wife; who, resenting her husband's attempt to dispose of her daughter without asking her leave, carried away the young lady, and lodged her at sir Edmund Withipole's house near Oatlands. Upon this sir Edward wrote immediately to the earl of Buckingham, to procure a warrant from the privy-council to restore his daughter to him; but before he received an answer, discovering where she was, he went with his sons, and took her by force, which occasioned lady Hatton to complain in her turn to the privy council. Much confusion followed; and this private match became at length an affair of state. The differences were at length made up, in appearance at least, Sep 1617; sir Edward was restored to favour, and reinstated in his place as privy-councillor; and sir John Villiers was married to Mrs. Frances Coke, with great splendour, at Hampton-court. This wedding however cost sir Edward dear. For besides 10,000l. paid in money at two payments, he and his son sir Robert did, pursuant to articles and directions of the lords of the council, assure to sir John Villiers a rentcharge of 2000 marks per annum during sir Edward's life, and of 900l. a year during lady Hatton's life, if she survived her husband; and after both their deaths, the manor of Stoke in Buckinghamshire, of the value of 900l. per annum, to sir John Villiers and his lady, and to the heirs of her body. All this time the quarrel subsisted between him and his wife: and many letters are still extant, which shew a great deal of violence and resentment in both parties. At the time of the marriage, lady Hatton was confined at the complaint of her husband: for, since her marriage, she had purchased the island and castle of Purbeck, and several other estates in different counties; which made her greatly independent of her husband. However, their reconciliation was afterwards effected, but not till July 1621, and then by no less a mediator than the king.

A parliament was summoned, and met January 1621; and in February there was a great debate in the house of commons upon several points of importance, such as liberty of speech, the increase of popery, and other grievances.

ances. Sir Edward Coke was a member, and his age, experience, and dignity, gave him great weight; but it soon appeared, that he resolved to act a different part from what the court, and more especially the great favourite Buckingham, expected. He spoke very warmly; and also took occasion to shew, that proclamations against the tenor of acts of parliament were void: for which he is highly commended by Camden. The houses being adjourned by the king's command in June, met again in November; and fell into great ferments about the commitment of sir Edwin Sands, soon after their adjournment, which had such unfortunate consequences, that the commons protested, December 18, against the invasion of their privileges. The king prorogued the parliament upon the 21st; and, on the 27th, sir Edward Coke was committed to the Tower, his chambers in the Temple broke open, and his papers delivered to sir Robert Cotton and Mr. Wilson to examine. January 6, 1622, the parliament was dissolved; and the same day sir Edward was charged before the council with having concealed some true examinations in the great cause of the earl of Somerset, and obtruding false ones; nevertheless he was soon after released, but not without receiving high marks of the king's resentment; for he was a second time turned out of the privy-council, the king giving him this character, that "he was the fittest instrument for a tyrant that ever was in England." And yet, says Wilson, in the house he called the king's prerogative an overgrown monster. Towards the close of 1623 he was nominated, with several others, to whom large powers were given, to go over to Ireland; which nomination, though accompanied with high expressions of kindness and confidence, was made with no other view but to get him out of the way; but he would not go. He remained firm in his opinions, nor does it appear that he ever sought to be reconciled to the court; so that he was absolutely out of favour at the death of king James.

In the beginning of the next reign, when it was found necessary to call a second parliament, he was pricked for sheriff of Bucks in 1625, to prevent his being chosen. He laboured to avoid it, but in vain; so that he was obliged to serve the office, and to attend the judges at the assizes, where he had often presided as lord chief justice. This, however, did not prevent his being elected knight of the shire for Bucks in the parliament of 1628, in which he distinguished himself more than any man in the house of commons, spoke warmly for the redress of grievances, argued boldly in defence of the liberty of the subject, and strenuously supported the privilege of the house. It was he that proposed and framed the petition of rights; and, June 1628, he made a speech, in which he named the duke of Buckingham as the cause of all our miseries, though, lord Clarendon tells us, he had before blasphemously styled him the saviour of the nation; but this was perfectly consistent with the character of the man, who could flatter or abuse just as interest or passion directed. Nor is there any reason to conclude, that all this opposition to the arbitrary measures of the court flowed from any principles of patriotism, for he was too great a tyrant in his nature to be capable of any such, but from a disposition to oppose greatness, and a desire to distress those who had done so much to humble him. After the dissolution of this parliament, which happened the March following, he retired to his house at Stoke Pogeys in Buckinghamshire, where he spent the remainder of his days; and there, September 3, 1634, breathed his last in his eighty-sixth year, expiring with these words, as his monument informs us, "Thy kingdom come! thy will be done!" While he lay upon his death-bed, sir Francis Windebank, by an order of council, came to search for seditious and dangerous papers; by virtue whereof he took his Commentary upon Littleton, and the History of his Life before it, written with his own hand; his Commentary upon Magna Charta, &c. the Pleas of the Crown and the Jurisdiction of Courts, his eleventh and twelfth Reports in manuscript, and fifty-one other manuscripts, with the last will of sir Edward, wherein he had been making provision for his younger grand-children. The books and papers were kept till seven years after, when one of his sons, in 1641, moved the house of commons, that the books and papers taken by sir Francis Windebank might be delivered to sir Robert Coke, heir of sir Edward; which the king was pleased to grant. Such of them as could be found were accordingly delivered up; but the will was never heard of more.

Sir Edward Coke was in his person well proportioned, and his features regular. He was neat, but not nice, in his dress; and is reported to have said, "that the cleanness of a man's clothes ought to put him in mind of keeping all clean within." He possessed great quickness of parts, deep penetration, a faithful memory, and a solid judgment. He was wont to say, that "matter lay in a little room;" and in his pleadings he was concise, though in set speeches and in his writings too diffuse. He was certainly a great master of his profession, as even his enemies allow; had studied it regularly, and was perfectly acquainted with the deepest parts of it. Hence he gained so high an esteem in Westminster-hall, and came to enjoy so large a share in the favour of the great lord Burleigh. He valued himself, and, indeed, not without reason, upon this, that he obtained all his preferments without employing either prayers or pence; and that he became queen Elizabeth's solicitor, speaker of the house of commons, attorney-general, chief justice of both benches, high-steward of Cambridge, and a member of the privy-council, without either begging or bribing. As he derived his fortune, his credit, and his greatness, from the law, so he loved it to a degree of enthusiasm. He committed every thing to writing with an industry beyond example, and published a great deal. He met with many changes of fortune; sometimes in power, sometimes in disgrace. He was, however, so excellent at making the best of a bad market, that king James used to compare him to a cat, who always fell upon her legs. He was, upon occasion, a friend to the church and clergy; and thus, when he had lost his public employments, and a great peer was inclined to question the rights of the church of Norwich, he prevented it by telling him, that, "if he proceeded, he would put on his cap and gown again, and follow the cause through Westminster-hall." He had many benefices in his own patronage, which he is said to have given freely to men of merit; declaring, in his law language, that he would have law livings pass by livery and seisin, and not by bargain and sale.

The character left us by Fuller, of this eminent lawyer, is as follows: "Five sorts of persons this great man used to foredesign to misery and poverty; chemists, monopolizers, concealers, and rythming poets. For three things he said he would give God solemn thanks: that he never gave his body to physic, nor his heart to cruelty, nor his hand to corruption. In three things he much applauded his own success: in his fair fortune with his wife, in his happy study of the law, and in his free coming by all his preferment, *nec prece, nec pretio*; neither begging nor bribing for preferment. He constantly had prayers said in his own house, and charitably relieved the poor with his constant alms. The foundation of Sutton's hospital, (the Charter-house, when indeed but a foundation,) had been ruined before it was raised, and crushed by some courtiers in the hatching thereof, had not his great care preserved the same."

"His learned and laborious works on the law (says a great author) will be admired by judicious posterity, while fame has a trumpet left her, or any breath to blow therein." This is indisputably a just character of his writings in general; the particulars of which are as follow: About the year 1600 were published, in folio, the first part of the "Reports of sir Edward Coke, knight, her majesty's attorney-general, of divers resolutions and judgments given with great deliberation by the reverend judges and sages of the law, of cases and matters in law, which were never resolved

resolved or adjudged before; and the reasons and causes of the said resolutions and judgments during the most happy reign of the most illustrious and renowned queen Elizabeth, the fountain of all justice, and the life of the law." The second, third, and so on to the eleventh part of the Reports, were all published by himself in the reign of James I. The twelfth part of his Reports has a certificate printed before it, dated February 2, 1655, and subscribed E. Bulstrod; signifying, that he conceives it to be the genuine work of sir Edward Coke. The title of the 13th part is, Select Cases in Law, reported by sir Edw. Coke; and these are asserted to be his, in a preface signed with the initials J. G. In 1614 there was published, A Speech and Charge at Norwich Assizes, intended to pass for sir Edw. Coke's; but he clearly disclaims it, in the preface to the seventh part of his Reports. He did, indeed, make a speech at that time, and in some measure to this purpose; but these notes of it were gathered without his knowledge in a very incorrect manner, and published with a design to prejudice and expose him. In 1614 was published, in folio, A Book of Entries, containing perfect and approved precedents of courts, declarations, informations, plaints, indictments, bars, duplications, rejoinders, pleadings, processes, continuances, essoigns, issues, defaults, departure in despight of the court, demurrers, trials, judgments, executions, and all other matters and proceedings, in effect, concerning the practic part of the laws of England, in actions real, personal, mixed, and in appeals; being very necessary to be known, and of excellent use for the modern practice of the law, many of them containing matters in law, and points of great learning; collected and published for the common good and benefit of all the studious and learned professors of the laws of England. His Institutes are divided into four parts. The first is the translation and comment upon the Tenures of sir Thomas Littleton, one of the judges of the common-pleas in the reign of Edward IV. It was published in his life-time, in 1628; but that edition was very incorrect. There was a second published in 1629, said to be revised by the author, and in which this work is much amended; yet several mistakes remained even in that. The second part of the Institutes gives us magna charta and other select statutes, in the languages in which they were first enacted, and much more correct than they were to be had any where else. He adds to these a commentary full of excellent learning, wherein he shews how the common law stood before those statutes were made, how far they are introductory of new laws, and how far declaratory of the old; what were the causes of making them, to what ends they were made, and in what degree, at the time of his writing, they were either altered or repealed. The third part of the Institutes contains the criminal law or pleas of the crown; where, among other things, he shews, in regard to pardons and restitutions, how far the king may proceed by his prerogative, and where the assistance of parliament is necessary. The fourth part of the Institutes comprehends the jurisdiction of all the courts in this kingdom, from the high court of parliament down to the court-baron. This part not being published till after his decease, there are many inaccuracies and some greater faults in it, which were animadverted upon and amended in a book written by William Prynne, esquire, and published in 1669. There are besides, of his, 1. A Treatise of Bail and Mainprize, 1637, 4to. 2. Reading on the State of Fines, 27 Edw. I. 1662, 4to. 3. Complete Copyholder, 1640, 4to. There was added in another edition of this book in 1650, 4to, Calthorpe's Reading between a Lord of the Manor and a Copyholder his Tenant, &c. And in the editions in 12mo, 1668 and 1673, there is a supplement.

COKE, *s.* [perhaps from *coquo*, Skinner.] Fewel made by burning pit-coal under earth, and quenching the cinders; in a similar manner as charcoal is made with wood. It is frequently used in drying malt.

COKE-OVEN, a very useful invention of the right honourable Henry Seymour Conway, for which he received his majesty's letters patent in June 1789. It is adapted to the purposes of conveying the heat arising from the fire of coal, while making into coke, in a manner sufficient for working steam-engines; baking bread, biscuit, &c. calcining and fusing ores and metals; also for warming rooms, heating water-baths, and other similar uses; whereby the expence of the coal heretofore necessary for such operations is entirely saved, as the coal is converted into coke. The modes of applying it are as follow: 1st. In working steam-engines, the coal being spread on a flat hearth, as usual in coke-ovens, and being surrounded and covered over with a crown of brick-work, formed so as to contain and reverberate the heat, the proper openings must be made in the crown, or the search, through which to convey the flame and heat of the coal, while it is burning to be charred or made into coke, so as to give heat to the boiler employed, sufficient to raise the steam necessary for working the engine to which it is to be adapted, according to the size of its cylinder, and force required; and to this the size of the oven, as well as the flues or openings, must be adapted. These openings may be of different forms, having the necessary number of square inches as a vent for the flame and heat; and may be variously placed, according to the position and form of the boiler; but, by different experiences and trials, are thought generally best when made in the backward part of the oven, the draught being apparently brisker, and the flame, being conveyed under the bottom of the boiler, in such a stream or body as may give the necessary heat, should be drawn round the boiler in one or more flues, according to the shape of the boiler, and height of water. Where the latter is not considerable, it may be sufficient to fill the space under the boiler with flame, and then carry it off to the chimney, or direct it to any other purpose, taking care that the flues or openings from under the boiler be so framed as not to carry off the flame by too quick a draught; which, besides a due size given to such flues, should be farther governed by registers placed therein, so as to check the draught at pleasure; by that means, either keeping a full body of flame under the boiler, or increasing its activity by a brisker draught, which may be varied according to the different states of of the fire. When the heat is to be given to ovens, for the purpose of baking bread or biscuit, or for pies or meat, or any other kind of thing to be dressed or baked in ovens, the flame or heat must then be conducted so as to heat all parts of the baking-ovens, whether placed over the coke-ovens, or in the back, or in any other direction sufficiently contiguous. For this purpose, flues are to be formed under the bottom of the baking-ovens, in such manner as to disperse the heat, as near as may be, equally to the different parts; carrying it from the bottom, by a circular flue each way, round the search or sides, whence it rises to give heat in the same way over the top; making the brick-work, in each part, of a thickness calculated to give the requisite warmth without burning; for which end it should be made somewhat thickest under the bottom, where it comes first from the coke-oven, and thinnest over the crown, where it may have lost something of its force. An oven or machine for baking biscuit on this plan has been erected and worked, by which three baking-ovens are heated from the fire of the same coke-oven; one of them being placed immediately over, and the two others behind, the same coke-oven, on a level with it, and as near as they could stand to each other, at equal distance from it. The flame for heating the two last issuing from the back of the coke-oven, and that for the first rising by flues or openings through the crown; all the said openings from the coke-oven being governed by registers between the coke and baking ovens, so as that the flame may be shut off from any or all of them at pleasure; to which are also added other

other registers in the chimney-flues, to damp or check the heat, and detain it more or less in its circulation round the several baking-ovens respectively. The baking-ovens may also be heated by the admission of the flame from the coke-oven into them, through a large opening, for as long time as may be necessary to give the proper heat. The mouth may, at the same time, be closed, and only a smaller opening or flue left, sufficient to carry off the flame, and to keep the body of the oven full, as in reverberating furnaces. Those small openings may also be governed by registers; it should, however, be observed, not to admit the flame till the fire in the coke-oven is become clear; the said opening from the coke-oven being afterwards closed by a register, the heat will then remain equal, or diminish gradually, as in the common way of heating ovens by faggots; and in this manner two, or more, baking-ovens may be heated alternately from the same coke-oven, and the process continually repeated. When metals are to be calcined, or melted, a furnace adapted to those purposes is placed contiguous to the coke-oven, whence the flame should be conveyed immediately through large openings, and in as full a body as may be, with this caution, that, in melting, the fire should not be suffered to pass into the furnace (being shut off by registers) till the sulphur and smoke of the coals is passed off, and the flame appears bright and clear; in all cases the chimney should be raised to a considerable height, as of thirty or forty feet, or more, as is common for furnaces, in order to command a quick draught, which may be constantly restrained by the registers, as above described. This invention has the peculiar property and advantage, that the same oven may, at the same time, be applied to several different purposes; or that two, or more, coke-ovens may be so placed as to be applicable to one and the same purpose, as in the case of steam-engines, or of some metallic processes, where a great force of fire is required: and, in steam-engines, the steam may be acquired either from two, or more, different boilers, or the heat from the different coke-ovens applied to single boilers of an extraordinary dimension; and at all such forges where the price of coal is any way considerable, and the demand of coke great, this method seems to offer the highest advantages. Another particular in these constructions, of singular advantage in many cases, is the readiness with which they may be made to turn off the fire, and to cool; for, in those, not only double registers may be used immediately to shut off the flame, but also air-holes placed between those registers, to be opened like them at pleasure, as well as other air-holes also, to open between the crown of the coke-oven and bottom of the boiler, or into the circular flues, if desired; which will prodigiously quicken the cooling, and which, being afterwards stopt with bricks or plugs, well adapted and luted where necessary, will render the alternate admission and exclusion of the air complete; and will have the farther advantage of making openings to clear the different flues occasionally. When the purpose to be served is that of warming houses, or staircases, the oven may either be placed in some convenient spot joining to the wall of the house, and the flame or heat drawn from it into flues within, properly disposed to receive and conduct it; or the body of the oven may be placed within the house, covered as stoves often are, in such manner for convenience or appearance as may be thought best; which may be the more easily done, as coke-ovens of a moderate, or even small, size are found to give heat so as to produce very considerable effects. The heat or flame, being conducted through the flues, as before mentioned, to the places to be warmed or heated, may be used for different domestic or other purposes. An oven of this kind, of no more than three feet diameter, and one foot and a half in the height, or little more, having been experienced to keep a boiler, containing seventy-two gallons of water, constantly boiling, so as to evaporate nine gallons per hour, and to work, at the same time, a small still; and sometimes to calcine, or melt, both copper and iron. It may be useful to mention, that registers much exposed to the immediate heat of the fire should be made of the best Stourbridge, or other strong loam, or brick-earth, or of a composition of such loam and old burnt ware from glass-houses, &c. pounded, or other like composition; in other parts they may be conveniently made of iron, of different thickness, according to the different distances from the fire. It has also been found useful, where the heat is very great, to have the iron handles, used for drawing the loam or composition registers, so fixed, by hold-fasts in holes made in the registers for that purpose, that no part may be exposed to the great impulse of the fire, but defended by the brick-work. It may also be found useful, where the registers are of extraordinary size, to make them a little of a wedge form, narrowing towards the end, in order to their drawing or lifting with ease; the grooves in which they run being made in the same form, so as to shut well when closed.

CO'KENHAUSEN, a strong town of Livonia in Sweden, on the river Divina.

CO'KER, a river of England, in the county of Lancaster, which runs into the Irish sea: five miles north-west of Garstang.

CO-KIANG, a town of China, of the third rank, in the province of Se-tchuen: twenty miles east-south-east of Tche-li-leou.

CO-KING, a city of China, of the first rank, in the province of Yun-nan: 1160 miles south-south-west of Pekin. Lat. 26. 35. N. lon. 117. 42. E. Ferro.

COK'ZIM, see CHOCZIM.

COL, one of the western islands of Scotland, about thirteen miles long, and three broad. Col, in the language of Dr. Johnson, is not properly rocky, but rather one continued rock, of a surface much diversified with protuberances, and covered with a thin layer of earth, which is often broken, and discovers the stone. Such a soil is not for plants that strike deep roots; and, perhaps, in the whole island nothing has ever yet grown to the height of a table. The uncultivated parts are clothed with heath, among which industry has interspersed spots of grass and corn; but no attempt has yet been made to raise a tree. The lord has lately introduced the culture of turnips, to provide food for his cattle in the winter. Col has many lochs, some of which have trouts and eels. Their quadrupeds are horses, cows, sheep, and goats. They have neither deer, hares, nor rabbits. They have no vermin, except rats, which have been lately brought thither by sea; and are free from serpents, frogs, and toads. The number of inhabitants rather more than 800: eleven miles north-west from the island of Mull. Lat. 56. 38. N. lon. 5. 30. W. Edinburgh.

COL OF AREZ, a passage of the Pyrenees, in the road from Prats de Molo in France, to Campredon in Spain.

COL OF ARGENTIERE, a passage of the Alps, between Nice and Saluzzo.

COL OF LIMON, a passage of the Alps, between Sospella and Coni.

COL OF PARACOLS, a passage of the Pyrenees, between Ceret in France, and Ampurdan in Spain.

COL OF PERTUS, a passage of the Pyrenees, between Boulou and Junquere.

COL OF TENDA, a passage of the Alps, between Piedmont and Nice, over the mountains of Tenda.

COLAIRCOTTA, a town of Hindoostan, in the circar of Ellore: ten miles east of Ellore.

CO'LAN, a town of South America, in Peru, and jurisdiction of Piura. The inhabitants raise a great deal of grain, and feed a number of cattle, which they dispose of to Payta and other towns: three leagues north of Payta.

CO'LANDER, *s.* [from *colo*, Lat. to strain.] A sieve, either of hair, twigs, or metal, through which a mixture to be separated is poured, and which retains the thicker parts; a strainer.—All the viscera of the body are but as so

so many *colanders* to separate several juices from the blood. *Ray*.

The brains from nose and mouth, and either ear,
Came issuing forth, as through a *colander*
The curdled milk. *Dryden*.

CO'LAPIS, or COLOPS, in ancient geography, a river of Liburnia, which, after a winding north-east coast, falls into the Savus, at the Insula Segestica: now the Culpe, the boundary of the Alps, running through Croatia into the Save; Colapiani, the people living on it. *Pliny*.

CO'LAR, a town of Hindoostan, in the Mysore country: thirty-five miles east-north-east of Bangalore, and 135 west of Madras. It is famous for the magnificent and extensive mausoleum of Nadim Saeb, father of Hyder Ali. Lat. 13. 9. N. lon. 78. 19. E. Greenwich.

COLARBA'SIANS, or COLORBASIANS, *s.* A sect of Christians in the second century, so called from their leader Colarbasus, a disciple of Valentinus, who, with Marcus, another disciple of the same master, maintained the whole plenitude and perfection of truth and religion, to be contained in the Greek alphabet; and that it was upon this account that Christ was called the *alpha* and *omega*. This sect was a branch of the Valentinians.

COLARDEAU' (Charles Pierre), born at Janville, in France, in 1735. He made his first appearance in the literary world, in 1758, by a poetical translation of Pope's Eloisa to Abelard; in which he has retained the warmth of the original, with the richness of its images. His tragedies of Astarbè and Calisto, the one performed in 1758, and the other in 1760, were not so successful. The complexion of them is indeed sorrowful and even gloomy, but never tragical. The Temple of Gnidos, and two of the Nights of Young, put into French verse, the Epistle to M. Duhamel, the Poem of Prometheus, which appeared afterwards, afford many agreeable particulars, and are in general versified in a soft and harmonious style. These several performances excited the attention of the French academy, who elected him a member at the beginning of 1776; but he was denied the power of pronouncing his inaugural discourse: he was snatched away by death, in the flower of his age, the 7th of April in the same year. His works were collected in two vols. 8vo. Paris, 1779.

COLA'RUS, a town of Hindoostan, in the circar of Gohud: thirty miles south-south-west of Narwa, and 125 south of Agra.

COLA'TION, *s.* [from *colo*, Lat.] The art of filtering or straining.

COLAT'TO, a town of Italy, belonging to the state of Venice, in the Trevisan: six miles south-south-west of Ceneda.

COLA'TURE, *s.* [from *colo*, Lat.] The art of straining; filtration. The matter strained.

COL'BA, a town of Germany, in the circle of Upper Saxony, and territory of Neustadt: three miles west-south-west of Newstadt.

COL'BERG, a town of Germany, in the circle of Upper Saxony and Farther Pomerania, situated at the mouth of the Persante, near the Baltic; remarkable for its salt-works, belonging to Prussia. It was besieged by the Russians, in 1758, without success; but taken by them in 1761: ninety-eight miles north-north-east of Kustrin, and 124 north-east of Berlin. Lat. 54. 8. N. lon. 33. 13. E. Ferro.

COL'BERT (John Baptist), marquis of Segnelai, a celebrated statesman of France, born at Paris in 1619. His grandfather is said to have been a wine-merchant, and his father at first followed the same occupation; but afterwards traded in cloth and silk. Colbert was early instructed in the arts of merchandize, and afterwards became clerk to a notary. In 1648, his relation John Baptist Colbert, lord of St. Pouange, preferred him to the service of Michael le Tellier, secretary of state, whose sister he had married; and here he discovered such diligence and exactness in executing all the commissions that were entrusted to his care, that he quickly grew distinguished. One day his master sent him to cardinal Mazarine, who was then at Sedan, with a letter written by the queen-mother; and ordered him to bring it back after that minister had seen it. Colbert carried the letter, and would not return without it, though the cardinal treated him roughly, used several arts to deceive him, and obliged him to wait for it several days. Some time after, the cardinal, returning to court, and wanting one to write his agenda or memoranda, desired le Tellier to furnish him with a fit person for that employment; and Colbert being presented to him, the cardinal had some remembrance of him, and desired to know where he had seen him. Colbert was afraid of putting him in mind of Sedan, lest the remembrance of his importunacy in demanding the queen's letter, should renew the cardinal's anger. But his eminency was so far from disliking him for his faithfulness to his late master, that he received him on condition that he should serve him with the like zeal and fidelity.

Colbert applied himself wholly to the advancement of the cardinal's interests, and gave him so many marks of his diligence and skill, that he made him his intendant. He accommodated himself so dextrously to the inclinations of that minister, by retrenching his superfluous expences, that he was entrusted with the management of that gainful trade of selling benefices and governments. It was by Colbert's counsel that the cardinal obliged the governors of frontier places to maintain their garrisons with the contributions they exacted. He was sent to Rome to negociate the reconciliation of cardinal de Retz, for which the pope had shewed some concern; and to persuade his holiness to consent to the disincamerating of Castro, according to the treaty concluded with his predecessor Urban VIII. Upon the whole, Mazarine had so high an opinion of Colbert's abilities, and withal such a regard for his faithful services, that at his death, which happened in 1661, he earnestly recommended him to Louis XIV. as the most proper person to regulate the finances, which at that time stood in much need of reformation. Louis accepted the recommendation, and made Colbert intendant of the finances. He applied himself to their regulation, and succeeded; though it procured him many enemies, and some affronts. France is also obliged to this minister for establishing at that time her trade with the East and West Indies; a great design, and from which she reaped innumerable advantages.

In 1664, he became superintendant of the buildings; and from that time applied himself so earnestly to the enlarging and adorning of the royal edifices, that they are at present so many monuments of his taste for architecture; witness the palace of the Thuilleries, the Louvre, St. Germain, Fontainbleau, and Chambord. Versailles, it may be said, he raised from the ground. It was a kennel, where Louis XIII. kept his hunting equipage; now a palace fit for the greatest monarch. But royal palaces were not Colbert's only care; he formed several designs for increasing the beauty and convenience of the capital; and he did it with great magnificence and grandeur. The public are obliged to this minister for the establishment of the academy for painting and sculpture, in 1664. To Colbert, also, the lovers of naval knowledge are obliged for the erection of the academy of sciences, and for the royal observatory at Paris, which was first inhabited by Cassini. But these are not the only obligations that France has to this minister: she owes to him all the advantages she receives by the union of the two seas; a prodigious work, begun in 1666, and finished in 1680. Colbert was also very intent upon regulating the police, and establishing the order, decency, and well-being of society. He undertook to reform the courts of justice, and to put a stop to the usurpation of noble titles, which was then very common in France.

In 1669, he was made secretary of state, and entrusted with the management of affairs relating to the sea; and his performances in this new province were answerable to the

the confidence the king had reposed in him. He suppressed several offices, which were chargeable, but useless; and, in the mean time, perceiving the king's zeal for the extirpation of heresy, he shut up the chamber instituted by the edicts of Paris and Rouen. He proposed several new regulations concerning criminal courts; and was extremely severe with the parliament of Thoulouse, for obstructing the measures he took to carry the same into execution. His main design in reforming the tedious method of proceedings at law, was to give the people more leisure to apply themselves to commerce; for the advancement of which he procured an edict, to erect a general insurance-office at Paris, for the safety and benefit of merchants. In 1672, he was made minister of state; for, how busied soever he might be in the regulation of public affairs, yet he never neglected his own or his family's interest and grandeur, or missed any opportunity of advancing either. He had been married many years, had sons and daughters grown up; all of which, as opportunity offered, he took care to marry to great persons: for, though he had no reason to doubt of his master's favour, yet he wisely secured his fortune by powerful alliances. Business was certainly Colbert's natural delight; and he not only loved it, but was very impatient of interruption in it, as the following anecdote may serve to shew: A lady of quality was one day urging him, when he was in the plenitude of power, to do her some favour; and, perceiving him inattentive and inflexible, threw herself at his feet, in the presence of above one hundred persons, crying, "I beg your greatness, in the name of God, to grant my request!" Upon which, Colbert, kneeling down over against her, replied, in the same mournful tone, "I conjure you, madam, in the name of God, not to disturb me!"

This great minister died of the stone, Sept. 6, 1683, in his sixty-fifth year; leaving behind him six sons and three daughters. He was of a middle stature, rather lean than fat. His mien was low and dejected, his air gloomy, and his aspect stern. He slept little, and was very sober. Though naturally sour and morose, he knew how to act the lover, and had mistresses. He was of a slow conception, but spoke judiciously of every thing after he had once comprehended it. He understood business well, and pursued it with unwearied application. Thus he filled the most important places with reputation, and his influence diffused itself through every part of the government. He restored the finances, the navy, the commerce of France; and he erected those various works of art, which have ever since been monuments of his taste and magnificence. He was a lover of learning, though he never applied to it himself; and therefore conferred donations and pensions upon scholars in other countries, while he established and protected seminaries of learning in his own. He invited into France, painters, statuaries, mathematicians, and artists, of all kinds who were eminent; thus giving new life to the sciences, and making them flourish. Upon the whole, he was a wise, active, generous, and impartial, minister; ever attentive to the prerogatives of the king, the happiness of the people, the progress of arts and manufactures, and, in short, to every thing that could advance the credit, and promote the welfare of his country.

COL'BERT (John Baptist), marquis of Torcy, son of the preceding, born September 19, 1665. Being sent early in life to several foreign courts, he was deservedly appointed secretary of state for the foreign department in 1686, director-general of the posts in 1699, and counsellor to the regency during the minority of Louis XV. all which offices he filled with great distinction. His embassies to Portugal, to Denmark, and to England, put him upon a level with the most able negociators. He died at Paris the 2d of September 1746, at the age of eighty-one, an honorary member of the academy of sciences. He had married a daughter of the minister of state Arnauld de Pomponne, by whom he had several children. Ten years after his death, in 1756, were published his Memoirs of the Negociations from the Treaty of Ryswic to the Peace of Utrecht, 3 vols. 12mo. divided into four parts. The first is assigned to the negociations for the Spanish succession; the second to the negociations with Holland; the third to those carried on with England; and the fourth to the affairs concerning the treaty of Utrecht.

COLCHAGU'A, or COLLAGUA, a town of South America, and capital of a jurisdiction, in the country of Chili.

COL'CHESTER, the principal town of the county of Essex, pleasantly situated upon an eminence, gradually rising on the south side of the river Colne. It is the ancient *Colonia Camulodunum*, from which word Colonia, both the town and the river Colne, received their names. The Saxons called it *Colneceaster*. That it flourished under the Romans, several pavements of their bricks, and varieties of their coin dug up in and about it, fully evince. In 1763, a curious tessellated Roman pavement was found in the garden of Mr. Barnard, about three feet under the surface of the earth. The emperor Constantine the Great was born at Colchester, his mother Helen being daughter of Cool, governor of this district under the Romans. She is said to have discovered the cross of Christ at Jerusalem; whence the arms of this town are a cross regulee between three ducal coronets, two in chief and one in base, the coronet in base passing through the cross.

The walls wherewith the town was encompassed are still tolerably entire on the south, east, and west sides, but much decayed on the north; they are generally about nine feet thick. By a statute of Henry VIII. this town was made the see of a suffragan bishop. In the conclusion of the civil war in 1648, it sustained a severe siege of ten weeks; and in consequence of a very resolute defence, the siege was turned into a blockade, wherein the garrison and inhabitants suffered the utmost extremity of hunger, and were at last obliged to surrender at discretion, when their two valiant chief officers, sir Charles Lucas and sir George Lisle, were shot under the castle walls in cold blood. Colchester is a borough by prescription, and under that right sends two members to parliament, all their charters being silent upon that head. The charter was renewed in 1763.

The famous abbey gate of St. John is still standing, and allowed to be a curious and beautiful piece of Gothic architecture. It was built, together with the abbey, in 1097, and Gudo, steward to king William Rufus, laid the first stone. St. Ann's chapel, standing at the east end of the town, is valuable in the esteem of antiquarians as a building of great note in the early days of Christianity: it is still pretty entire. St. Botolph's priory was founded by Ernulphus in the reign of Henry I. in the year 1110. It was demolished in the wars of Charles I. by the parliament army under sir Thomas Fairfax. The ruins still exhibit a beautiful sketch of ancient masonry, much admired by the lovers of antiquities. The castle is still entire, and is a magnificent structure, in which great improvements have of late been made.

The river Colne, which passes through the town, encompasses it on the north and east. There are three bridges over it, and it is navigable within three miles for ships of large burthen; a little lower it may even receive a royal navy; and up to the town, and close to the houses, it is navigable for hoys and small craft. Colchester chiefly subsists by the trade of making baize; and the whole country round it may be said to be employed, and in part maintained, by the spinning of wool for the baize-manufactory carried on here. Colchester has long been famous for good oysters; the best of which are distinguished by the name of Pyefleet. Here is also a mineral spring, formerly in high repute. Its water is of the bitter purging kind, similar to that at Epsom, but not so strong.

This town has been supposed to contain about 40,000 people, including the out-villages within its liberty, of which there are many, the liberty being of a large extent.

The

The markets are held on Wednesdays and Saturdays; and here are four fairs yearly, viz. on the 2d of April for wholesale tailors; 5th of July for horses; 23d of July for cattle; and 20th of October for cheese, butter, and toys. Besides its twelve churches, here are five meeting-houses; also one Dutch and one French church. Its other public edifices are, 1. Bay-hall, where the goodness of the manufacture of baize made in this town is ascertained by a corporation established for this purpose, called governors of the Dutch Bay-hall. 2. The guildhall of the town, called by them the Moot-hall. 3. A capital work-house for the poor. 4. A free grammar-school for the instruction of the sons of free-burgesses; which has good allowance for the master. Here are also several charity-schools, and well-endowed alms-houses. This town is governed by a mayor, recorder, town-clerk, twelve aldermen, eighteen assistants, eighteen common-council, two coroners, four serjeants, and two claviers. The mayor and aldermen for the time being, with forty-eight guardians, are also a corporation for the benefit of the poor. It is a liberty of itself, containing four wards and sixteen parishes, within and without the walls.

From Colchester the land projects a great way into the sea, south and south-east, and makes that promontory of land, called the Nase, well known to seamen who use the northern trade. Here is seen a sea open as an ocean, without any opposite shore, though it is no more than the mouth of the Thames. This point called the Nase, and the north-east point of Kent near Margate, called the North-Foreland, make the mouth of the river, and the port of London, and is above sixty-miles over. At Walton, under the Nase, they find on the shore copperas-stones in great quantities; and there are several large works, called *copperas-houses*, where it is manufactured.

COL'CHESTER, a township of the American States, in Ulster county, New York, on the Popachton branch of Delaware river, south-west of Middletown; and about fifty miles south-west by south of Cooperstown. By the state census of 1796, one hundred and ninety-three of its inhabitants are electors.

COL'CHESTER, a large township of the American States, in New London county, Connecticut, settled in 1701; about fifteen miles westward of Norwich, twenty-five south-east of Hartford, and twenty north-west of New London city.

COL'CHESTER, a town of the American States, in Chittenden county, Vermont, on the east bank of lake Champlain, at the mouth of Onion river, and north of Burlington, on Colchester bay, which spreads north of the town.

COL'CHESTER, a post-town of the American States, in Fairfax county, Virginia, situated on the north-east bank of Ocquoquam creek, four miles from its confluence with the Potowmack; and is here about 100 yards wide, and navigable for boats: sixteen miles south-west of Alexandria, 106 north by east of Richmond, and 172 from Philadelphia.

COL'CHESTER RIVER, a river in Nova-Scotia.

COL'CHI, in ancient geography, a town of the Hither India; thought to be Cochin, on the coast of Malabar.

COL'CHICUM, *s.* [from *Colchis*, a city of Armenia, where this plant is supposed to have been very common.] In botany, a genus of the class hexandria, order trigynia, natural order spathaceæ. The generic characters are—Calyx: none, except scattered spathes. Corolla: six-parted; tube angulated, rooted; divisions of the border lanceovate, concave, erect. Stamina: filaments six, subulate, shorter than the corolla; antheræ oblong, four-valved, incumbent. Pistillum: germ buried within the root; styles three, thread-form, length of the stamens; stigmas reflex, channelled. Pericarpium: capsule three-lobed, connected internally by a suture, obtuse, three-celled, sutures gaping inwardly. Seeds: many, nearly globular, wrinkled.—*Essential Character.* Spathe; corolla six-parted, with a rooted tube; capsule three, connected, inflated.

Species. 1. Colchicum autumnale, or common meadow saffron: leaves flat, lanceolate, erect. This has a bulbous root, about the size and shape of the tulip, but not so sharp-pointed at the top, the skin or cover is also of a darker colour. These bulbs are renewed every year, for those which produce the flowers decay, and new roots are formed above. The flowers come out in autumn; these arise with long slender tubes from the root, about four inches high, shaped like those of saffron, but larger; the number of flowers is generally in proportion to the size of the roots, from two to seven or eight; in March the green leaves appear, these are commonly four to a full-grown root; they are folded over each other below, but spread open above ground, standing cross ways; they are of a deep green, and when fully grown, are five or six inches long, and one and a half broad. The seed-vessel comes out from between the leaves in April, and the seeds ripen in May, soon after which the leaves decay. With the other leaves one or two generally arise, of the same length, but only one-fourth of the width, which are a kind of bracteal leaves to the seed-bud. The seed-vessel, which arises with the leaves, is sessile at their base, large, somewhat ovate, but with three very blunt angles. The seeds lie buried all winter within the bulb, in spring they grow up on a fruit-stalk, and are ripe about the time of hay harvest. May not the very great length of the styles account in some measure for the delay in the ripening of the seeds? As this plant blossoms late in the year, and probably would not have time to ripen its seeds before winter, providence has contrived its structure such, that it may be performed at a depth within the earth, out of the reach of the usual effects of frost; and, as seeds buried at such a depth are known not to vegetate, a no less admirable provision is made to raise them above the surface when they are perfected, and to sow them at a proper season.

Monf. de Jussieu entertains a singular opinion, that colchicum, although it have the habit of crocus, yet bears a nearer affinity to veratrum. His accurate account, however, of its propagation by the root, may serve to explain that of bulbous plants in general, and also of the orchidæ. From the permanent striated dilated tuber of the old root, situated on one side, and clothed with the coats of the preceding root-leaves, a new plant springs from the side from the same coats, which is tuberous at the base, throws out fibres at the bottom like other bulbs, and is received into the bosom of the former tuber which embraces it half round. This has an outer radical spathe, which is cylindric and tubular, cloven at the top on one side, and half under ground; from two to six flowers half emerge from this spathe without leaves. In the mean time the fruits, much later than the flowers, sit on the stem rising out of the space. As the plant advances, the new tuber increases; the old one, deprived of its nutriment, perishes, and, at the same time, the former pushes forth from its base the gem of a succeeding plant. There are commonly two lateral gems from the same tuber; one lower just described bearing the flower and seed; the other superior, caulescent like the former, but more slender and scarcely floriferous.

It is a native of most parts of Europe. Miller observed it in England, in great plenty, in the meadows near Castle-Bromwich, in Warwickshire, the beginning of September; and says, that the country people call the flowers *naked ladies*, because they come up without any leaves. They give the same name to the hepatica, and indifferently to any plant which has flowers on naked scapes, appearing at a different time from the leaves. It is found also with us in many other places; as, near Derby and Northampton; Bury in Suffolk; orchards on the borders of Malvern chace, and meadows under Malvern-hills in Worcestershire; meadows bordering the Severn, Worcestershire; Wallington and Hales Owen, Shropshire; about Bath, Bristol, Warminster, Shepton-Mallet; Southgate; near Comb in Oxfordshire, with a double flower, and some varieties of colour; in Scotland, but not common.

The

The varieties most commonly propagated by the florists are the following: The meadow-saffron with white flowers; meadow-saffron with striped flowers; broad-leaved meadow-saffron; striped-leaved meadow-saffron; many-flowered meadow-saffron; meadow-saffron with double purplish flowers; meadow-saffron with double white flowers; and meadow-saffron with many white flowers: no cattle eat it. In a pasture where there were several horses, and which was eaten down pretty bare, the grass was closely cropped even under the leaves, but not a leaf of the meadow-saffron was bitten. This is one of those plants which, upon the concurrent testimony of ages, has been condemned as poisonous; but Dr. Störck of Vienna has taught us that it is an useful medicine. The roots have much acrimony. An infusion of them in vinegar, formed into a syrup, by the addition of sugar or honey, is found to be a very useful pectoral and diuretic. It seems, in its virtues, very much to resemble squill; but it is less nauseous and acrimonious, though more sedative. Allioni relates, that he has experienced the squill to be more safe and efficacious than the meadow-saffron.

2. Colchicum montanum: leaves linear, spreading very much. This has a smaller root, with a darker coat; the leaves come up soon after the flowers decay, and continue green all the winter, like the saffron; they are long, narrow, and spread on the ground; they decay in June; the flowers are of a reddish purple colour, and appear in August and September. The whole plant is little more than a finger's height; native of Spain and Portugal, Italy, the south of France, and Swisserland; cultivated here in 1629.

3. Colchicum variegatum, or variegated meadow-saffron: leaves waved, spreading. Leaves smaller than those of the common sort, for the most part three in number, and of a paler and fresher green colour, lying close upon the ground, broad at the bottom, a little pointed at the end, waved about the edges; root not so large as that of the common sort; flowers smaller, but very beautiful, whitish, with deep blue or purple spots. It flowers late, frequently not till October or November, and is somewhat tender. Native of the Greek islands; cultivated in 1629 by Parkinson, Tuggie, &c. also among queen Henrietta Maria's flowers at Edgecombe in Surry, in the garden of sir John Tunstall, gentleman usher to her majesty.

Propagation and Culture. These are all very pretty plants for a garden, producing their flowers in autumn, when few other plants are in beauty. The leaves begin to decay in May; soon after which time, is the proper season to transplant their roots; for, if they are suffered to remain in the ground till August, they will send forth fresh fibres, and after that it will be too late to remove them. The roots may be kept above ground until the beginning of August; at which time, if they are not planted, they will produce their flowers as they lie out of the ground; but this will greatly weaken their roots. For the manner of planting their roots, see TULIPA; and, for sowing the seeds, see XIPHIUM. Those who are desirous of obtaining varieties in the flowers, must propagate them from seeds. See BULBOCODIUM.

COL'CHIS, or COLCHOS, a country of Asia, at the south of Asiatic Sarmatia, east of the Euxine sea, north of Armenia, and west of Iberia, now called Mingrelia. It is famous for the expedition of the Argonauts, and the birth-place of Medea. It was fruitful in poisonous herbs, and produced excellent flax. The inhabitants were originally Egyptians, who settled there when Sesostris king of Egypt extended his conquests in the north.

COL'COTHAR, *s.* The brown red calx of iron, which remains after the distillation of the acid from martial vitriol: it is used for polishing glass and other substances by artists, who call it crocus, or crocus martis. The term given it by modern chemists is, red oxyd of iron by the sulphuric acid.

COLD, *adj.* [colo, Sax. *kalt*, German.] Not hot; not warm; gelid; wanting warmth; being without heat.—The diet in the state of manhood ought to be solid; and their chief drink water *cold*, because in such a state it has its own natural spirit. *Arbuthnot.*

The aggregated soil
Death, with his mace petrific, *cold*, and dry,
As with a trident, smote. *Milton.*

Causing sense of cold:

Some better shroud, some better warmth, to cherish
Our limbs benumb'd, ere this diurnal star
Leave *cold* the night, how we his gather'd beams
Reflected may with matter sere foment. *Milton.*

Chill; shivering; having sense of cold:

O noble English, that could entertain,
With half their forces, the full power of France;
And let another half stand laughing by,
All out of work, and *cold* for action. *Shakespeare.*

Having cold qualities; not volatile; not acrid.—*Cold* plants have a quicker perception of the heat of the sun than the hot herbs; as a *cold* hand will sooner find a little warmth than an hot. *Bacon.*—Indifferent; frigid; wanting passion; wanting zeal; without concern; unactive; unconcerned; wanting ardour.—To see a world in flames, and an host of angels in the clouds, one must be much of a stoic to be a *cold* and unconcerned spectator. *Burnet.*

O, thou hast touch'd me with thy sacred theme,
And my *cold* heart is kindled at thy flame. *Rowe.*

Unaffecting; unable to move the passions.—What a deal of *cold* business doth a man mispend the better part of life in? In scattering compliments, tendering visits, following feasts and plays. *Ben Jonson.*—Reserved; coy; not affectionate; not cordial; not friendly. The commissioners grew more reserved, and *colder* towards each other. *Clarendon.*—Chaste; not heated by vitious appetite:

Convey your pleasures in a spacious plenty,
And yet seem *cold*. *Shakespeare.*

Not welcome; not received with kindness or warmth of affection:

My master's suit will be but *cold*,
Since she respects my mistress' love. *Shakespeare.*

Not hasty; not violent. Not affecting the scent strongly:

She made it good
At the hedge corner, in the *coldest* fault. *Shakespeare.*

Not having the sense strongly affected:

Smell this business with a sense as *cold*
As is a dead man's nose. *Shakespeare.*

COLD, *s.* The cause of the sensation of cold; the privation of heat; the frigorific power.—Heat and *cold* are nature's two hands, whereby she chiefly worketh: and heat we have in readiness, in respect of the fire: but for *cold*, we must stay till it cometh, or seek it in deep caves, or high mountains: and, when all is done, we cannot obtain it in any great degree. *Bacon.*

The sun
Had first his precept so to move, so shine
As might affect the earth with *cold* and heat
Scarce tolerable, and from the north to call
Decrepit winter, from the south to bring
Solstitial summers heat. *Milton.*

The sensation of cold; coldness; chillness:

When she saw her lord prepar'd to part,
A deadly *cold* ran shiv'ring to her heart. *Dryden.*

A disease caused by cold; the obstruction of perspiration.

What disease hast thou?——
A whoreson *cold*, sir; a cough. *Shakespeare.*

The effects produced on most bodies by the agency of cold, are extremely curious and interesting. In general, cold contracts most bodies, and heat expands them: though there are some instances to the contrary, especially in the extreme states of these qualities of bodies. Thus, though iron, in common with other bodies, expands with heat, yet, when melted, it is always found to expand in cooling again. So also, though water always is found to expand gradually as it is heated, and to contract as it cools, yet in the act of freezing it suddenly expands again, and that with a most enormous force, capable of rending rocks, or bursting the very thick shells of metal, &c. A computation of the force of freezing water has been made by the Florentine Academicians, from the bursting of a very strong brass globe or shell, by freezing water in it; when, from the known thickness and tenacity of the metal, it was found that the expansive power of a spherule of water only one inch in diameter, was sufficient to overcome a resistance of more than 27,000 pounds, or thirteen tons and a half. Experiments have also been made on bursting thick iron bomb-shells by freezing water in them, by Mr. Edward Williams of the royal artillery, and published in the Edin. Phil. Tran. vol. i.

Such a prodigious power of expansion, almost double that of the most powerful steam engines, and exerted in so small a mass, seemingly by the force of cold, was thought a very powerful argument in favour of those who supposed that cold, like heat, is a positive substance. The late Dr. Black's discovery of latent heat, however, has now afforded a very easy and natural explication of this phenomenon. He has shewn, that, in the act of congelation, water is not cooled more than it was before, but rather grows warmer: that as much heat is discharged, and passes from a latent to a sensible state, as, had it been applied to water in its fluid state, would have heated it to 135°. In this process, the expansion is occasioned by a great number of minute bubbles suddenly produced. Formerly these were supposed to be cold in the abstract: and to be so subtle, that, insinuating themselves into the substances of the fluid, they augmented its bulk, at the same time that, by impeding the motion of its particles upon each other, they changed it from a fluid to a solid. But Dr. Black shews that these are only air extricated during the congelation; and to the extrication of this air he ascribes the prodigious expansive force exerted by freezing water. The only question therefore now remaining, is, By what means this air comes to be extricated, and to take up more room than it naturally does in the fluid. To this it may be answered, that perhaps part of the heat which is discharged from the freezing water, combines with the air in its unelastic state, and, by restoring its elasticity, gives it that extraordinary force, as is seen also in the case of air suddenly extricated in the explosion of gunpowder. See the article CHEMISTRY, p. 205, of this volume.

Cold also usually tends to make bodies electric, which are not so naturally, and to increase the electric properties of such as are so. And it is farther found that all substances do not transmit cold equally well; but that the best conductors of electricity, viz. metals, are likewise the best conductors of cold. It may farther be added, that when the cold has been carried to such an extremity as to render any body an electric, it then ceases to conduct the cold so well as before. This is exemplified in the practice of the Laplanders and Siberians; where, to exclude the extreme cold of the winter from their habitations the more effectually, and yet to admit a little light, they cut pieces of ice, which in the winter time must always be electric in those countries, and put them into their windows; which they find to be much more effectual in keeping out the cold than any other substance.

Cold is the destroyer of all vegetable life, when increased to an excessive degree. It is found that many garden plants and flowers, which seem to be very stout and hardy, go off at a little increase of cold beyond the ordinary standard. And in severe winters, nature has provided the best natural defence for the corn fields and gardens, namely, a covering of snow, which preserves such parts green and healthy as are under it, while such as are uncovered by it are either killed or greatly injured.

Dr. Clarke is of opinion, that cold is owing to certain nitrous and other saline particles, endued with particular figures proper to produce such effects. Hence, sal-ammoniac, saltpetre, or salt of urine, and many other volatile and alkalizate salts, mixed with water, very much increase its degree of cold. In the Philos. Trans. No. 274, M. Geoffroy relates some remarkable experiments with regard to the production of cold. Four ounces of sal-ammoniac dissolved in a pint of water, made his thermometer descend two inches and three-quarters in less than fifteen minutes. An ounce of the same salt put into four or five ounces of distilled water, made the thermometer descend two inches and a quarter. Half an ounce of sal-ammoniac mixed with three ounces of spirit of nitre, made the thermometer descend two inches and $\frac{5}{12}$; but, on using spirit of vitriol instead of nitre, it sunk two inches and a half. In this last experiment it was remarked, that the vapours raised from the mixture had a considerable degree of heat, though the liquid itself was so extremely cold. Four ounces of saltpetre mixed with a pint of water, sunk the thermometer an inch and a quarter; but a like quantity of sea-salt sunk it only one-sixth of an inch. Acids always produced heat, even common salt with its own spirit. Volatile alkaline salts produced cold in proportion to their purity, but fixed alkalies heat.

But the greatest degree of cold produced by the mixture of salts and aqueous fluids, was that shewn by Homberg; who gives the following receipt for making the experiment: Take a pound of corrosive sublimate, and as much sal-ammoniac; powder them separately, and mix the powders well; put the mixture into a vial, pouring upon it a pint and a half of distilled vinegar, shaking all well together. This composition grows so cold, that it can scarcely be held in the hand in summer; and it happened, as M. Homberg was making the experiment, that the matter froze. The same thing once happened to M. Geoffroy, in making an experiment with sal-ammoniac and water, but it never was in his power to make it succeed a second time. If, instead of making these experiments with fluid water, it be taken in its congealed state of ice, or rather snow, degrees of cold will be produced greatly superior to any that have yet been mentioned. A mixture of snow and common salt sinks Fahrenheit's thermometer to 0; pot ashes and pounded ice sunk it 8 degrees farther; two affusions of spirit of salt on pounded ice sunk it $14\frac{1}{2}$ below 0; and by repeated affusions of spirit of nitre M. Fahrenheit sunk it to 40° bebelow 0. This is the ultimate degree of cold which the mercurial theorometer will measure; for the mercury itself begins then to congeal; and therefore recourse must afterwards be had to spirit of wine, naptha, or some other fluid that will not congeal. The greatest degree of cold hitherto produced by artificial means, has been 80° below 0: which was done at Hudson's Bay by means of snow and vitriolic acid, the thermometer standing naturally at 20° below 0. Indeed greater degrees of cold than this have been supposed: Mr. Martin, in his Treatise on Heat, relates, that at Kirenga in Siberia, the mercurial thermometer sunk to 118° below 0; and professor Brown at Petersburg, when he made the first experiment of congealing quicksilver, fixed the point of congelation at 350° below 0; but from later experiments it has been more accurately determined, that 40° below 0 is the freezing point of quicksilver.

The most remarkable experiment however was made by Mr. Walker of Oxford, with spirit of nitre poured on Glauber's salt, the effect of which was found to be similar to that of the same spirit poured on ice or snow; and the addition of sal-ammoniac rendered the cold still more intense. The proportions of these ingredients recommended by

by Mr. Walker, are concentrated nitrous acid two parts by weight, water one part; of this mixture, cooled to the temperature of the atmosphere, eighteen ounces; of Glauber's salt, a pound and a half avoirdupois; and of sal-ammoniac, twelve ounces. On adding the Glauber's salt to the nitrous acid, the thermometer fell 52°, viz. from 50 to —2; and on the addition of the sal-ammoniac, it fell to —9°. Thus Mr. Walker was able to freeze quicksilver without either ice or snow, when the thermometer stood at 45°; viz. by putting the ingredients in four different pans, and inclosing these within each other. See CHEMISTRY, p. 384, 385.

Excessive degrees of cold occur naturally in many parts of the globe in the winter season. Even in the East Indies, cold is sometimes excessive. It is mentioned in Mr. Pennant's View of Hindoostan, published in 1798, that a frost has been experienced at Delhi, which lasted three nights. All the tanks were completely frozen over, and vessels of brass and copper, filled with water, burst or split asunder.

Although the thermometer in this country hardly ever descends so low as 0, yet in the winter of 1780, Mr. Wilson of Glasgow observed, that a thermometer laid on the snow sunk to 25° below 0; and Mr. Derham, in the year 1708, observed in England, that the mercury stood within one-tenth of an inch of its station when plunged into a mixture of snow and salt. At Petersburg, in 1732, the thermometer stood at 28° below 0; and when the French academicians wintered near the polar circle, the thermometer sunk to 33° below 0: and in the Asiatic and American continents, still greater degrees of cold are often observed.

The effects of these extreme degrees of cold are very surprising. Trees are burst, rocks rent, and rivers and lakes frozen several feet deep: metallic substances blister the skin like red-hot iron: the air, when drawn in by breathing, hurts the lungs, and excites a cough: even the effects of fire in a great measure seem to cease; and it is observed, that though metals are kept for a considerable time before a strong fire, they will still freeze water when thrown upon them. When the French mathematicians wintered at Tornea in Lapland, the external air, when suddenly admitted into their rooms, converted the moisture of the air into whirls of snow; their breasts seemed to be rent when they breathed it, and the contact of it was intolerable to their bodies; and the spirit of wine, which had not been highly rectified, burst some of their thermometers by the congelation of the aqueous part.

Extreme cold too often proves fatal to animals in those countries where the winters are very severe; thus 7000 Swedes perished at once in attempting to pass the mountains which divide Norway from Sweden. But it is not necessary that the cold, in order to prove fatal to human life, should be so very intense as has just been mentioned; it is only requisite to be a little below 32° of Fahrenheit, or the freezing point, accompanied with snow or hail, from which shelter cannot be obtained. The snow which falls upon the clothes, or the uncovered parts of the body, then melts, and by a continual evaporation carries off the animal heat to such a degree, that a sufficient quantity is not left for the support of life. In such cases, the person first feels himself extremely chill and uneasy; he turns listless, unwilling to walk or use exercise to keep himself warm, and at last turns drowsy, sits down to refresh himself with sleep, but wakes no more.

On the cold felt at the top of high mountains, and at certain depths under ground, the celebrated Euler, in his Letters to a German Princess, has suggested the following explication: "It appears very surprising, that we should feel the same degree of cold in all regions, after we have risen to a certain height, say 24,000 feet; considering that the variations with respect to heat, on the earth, not only in different climates, but in the same country, at different seasons of the year, are so perceptible. This variety, which takes place at the surface of the globe, is undoubtedly occasioned by the sun. It appears, at first sight, that his influence must be the same above and below, especially when we reflect, that a height of 24,000 feet, or a German mile, which is 4000 fathoms, or somewhat under $4\frac{1}{2}$ths miles English, though very great with respect to us, and even far beyond the height of the loftiest mountains, is a mere nothing compared to the distance of the sun, which is about thirty millions of German miles. This is, therefore, a very important difficulty, which we must endeavour to solve. For this purpose I begin with remarking, that the rays of the sun do not communicate heat to any bodies, but such as do not grant them a free passage. Bodies, through which we can discern objects, are denominated *transparent*, *pellucid*, and *diaphanous*. These bodies are glass, crystal, diamond, water, and several other liquids, though some are more or less transparent than others. One of these transparent bodies being exposed to the sun, is not heated to such a degree as a body not transparent, as wood, iron, &c. Bodies not transparent are denominated *opaque*. A burning-glass, for example, by transmitting the rays of the sun, sets on fire opaque bodies, while the glass itself is not sensibly heated. Water exposed to the sun becomes somewhat warm, only because it is not perfectly transparent; when we see it considerably heated by the sun at the brink of rivers, it is because the bottom, being an opaque body, is heated by the rays which the water transmits. Now, every heated body communicates that heat to all adjoining bodies; the water accordingly derives heat from the bottom. If the water be very deep, so that the rays cannot penetrate to the bottom, it has no perceptible heat, though the sun bears upon it.

"As air is a very transparent body, to a much higher degree than glass or water, it follows, that it cannot be heated by the sun, because the rays are freely transmitted through it. The heat which we frequently feel in the air, is communicated to it by opaque bodies, which the rays of the sun have heated; and, were it possible to annihilate all these bodies, the air would scarcely undergo any change in its temperature by the rays of the sun: exposed to it or not, it would be equally cold. But the atmosphere is not perfectly transparent; it is even sometimes so loaded with vapours, that it loses almost entirely its transparency, and presents only a thick fog. When the air is in this state, the rays of the sun have a more powerful influence upon it, and heat it immediately. But these vapours rise to no great height; at the height of 24,000 feet, and beyond, the air is so subtile and so pure, that it is perfectly transparent; and, for this reason, the rays of the sun cannot immediately produce any effect upon it. This air is likewise too remote from terrestrial bodies, to receive a communication of heat from them; they act only upon such as are adjacent. Hence we easily perceive, that the rays of the sun cannot produce any effect in regions of the air very much elevated above the surface of the earth; and that the same degree of cold must always, and universally, prevail in such regions, as the sun has no influence there, and as the heat of terrestrial bodies cannot be communicated so far. This is nearly the case on the summit of very high mountains, where it is always much colder than on plains and in vallies. There are clouds, however, above these mountains, and in almost as great a quantity as above the plains, which is demonstrated by the snows which cover the highest summits. There are few naturalists who have not been surprised by clouds in their excursions upon the mountains. The heat that is felt when such clouds are formed, must be attributed almost entirely to the transmission of the water which found itself dissolved in the air, under the form of elastic fluid, to a liquid state. The heat of the solar rays, intercepted by the cloud, can produce no change in the inferior temperature, as it would have been transmitted from the ground.

"The city of Quito, in Peru, is almost under the equator,

tor, and, were we to form our judgment from its situation on the globe, we should suppose it oppressed with intolerable heat; the air, however, is abundantly temperate, and differs very little from that of Paris. Quito is situated at a great height above the real surface of the earth. In going to it from the sea shore, we have to ascend for several days; it is accordingly built in an elevation equal to that of our highest mountains, though surrounded by others still much higher, called the Cordeliers. This last circumstance would afford a reason for thinking, that the air there must be as hot as at the surface of the earth, as it is contiguous, on all sides, to opaque bodies, on which the rays of the sun fall. The objection is solid; and no solution can be given but this: that the air at Quito, being very elevated, must be much more subtile, and of less gravity, than with us; and the barometer, which always stands considerably lower, incontestably proves it. Air of such a quality is not so susceptible of heat as common air, as it must contain less vapour and other particles which usually float in the atmosphere; and we know by experience, that air, very much loaded, is proportionably susceptible of heat. I must here subjoin another phenomenon, no less surprising: in very deep pits, and lower still, if it were still possible to descend, the same degree of heat always, and universally, prevails, and nearly for the same reason. As the rays of the sun exert their influence only on the surface of the earth, and as the heat which they there excite communicates itself up and down, this effect, at very great depths, is almost imperceptible. The same thing holds respecting considerable heights."

The reason which Professor Euler assigns above for the cold that prevails in the higher regions of the atmosphere seems plausible, but will not stand an accurate examination. Light is much impaired in its passage through the atmosphere, and the heat communicated is in every case proportional to the quantity of absorption. It appears, from some ingenious experiments of M. Bouguer, that we receive only four-fifths of the rays of a vertical sun; and when that luminary approaches the horizon, the portion of his light, which reaches the surface of the earth, is much smaller. Thus, at an elevation of twenty degrees, it is one-half; at that of ten degrees, one-third; and at that of five degrees, one-eighth. Hence, the sun-beams are most powerful on the summits of lofty mountains, for they suffer the greatest diminution in passing through the dense air of the lower regions. If the air derived its heat from the surface of the earth, those countries would be warmest which enjoyed the greatest quantity of sunshine. The British islands are shrouded in clouds nine months of the year; yet our climate is milder than that of the same parallel on the continent, where the sky is generally serene. The elevated town of Quito, exposed to a brilliant sun, enjoys a temperate air; while the Peruvian plains, shaded with fleecy clouds, are parched with heat. Were the reasoning above to be implicitly admitted, we should conclude, that the tops of mountains are warmer than their bases. To say that air, much rarefied, is not susceptible of heat, is a very extraordinary assertion, since we are acquainted with no substance whatever that may not be heated. Besides, a more intense cold may be artificially produced than what prevails in the lofty regions of the atmosphere. We must recur to other principles for the true solution of the fact. It is indifferent what portion of the air first receives the heat; the effect depends entirely on the nature of its distribution. If the atmosphere were of an uniform density throughout, the heat would, at all heights, be likewise the same. But as the density varies according to the altitude, the distribution of heat is affected by that circumstance, and follows a certain corresponding law. We would gladly develope the principles from which this theory is deduced, but the popular nature of the present treatise forbids all abstract discussion. It will here be sufficient to give a table of the diminuition of heat at different altitudes.

Altitude in feet.	Diminution of heat, in degrees of Farenheit.
3,000	12°
6,000	24½
9,000	38
12,000	53
15,000	61½
18,000	86½
21,000	94½

The diminution of heat, on the ascent, is not quite so great in extensive continents; for the intercourse between the rare and the dense portions of the atmosphere is, in this case, necessarily slow, and the heat, which is principally formed at the surface, will only be partially dispersed. It is a common mistake to suppose, that the same heat obtains, at a certain depth, in every part of the globe. The fact is, that heat, originally derived from the sun, is communicated very slowly to the matter below the surface, which, therefore, does not feel the vicissitude of seasons, but retains the average temperature of the climate for many ages. Hence the utility of examining the heat of springs, which is the same with that of the substances through which they flow. The following table exhibits the average heat of places on the level of the sea, computed by the celebrated astronomer, Professor Meyer, for every five degrees of latitude.

Lat.	Average Temperat.	Lat.	Average Temperat.
0	84°	50	53½°
5	83½	55	49
10	82½	60	45
15	80½	65	41½
20	78	70	38
25	74½	75	35½
30	71	80	33½
35	67	85	32½
40	62½	90	32
45	58		

By comparing this table with the preceding, it will be easy to discover, for any latitude, the altitude of the curve of congelation, or where the average temperature is 32°. With respect to the influence of cold upon the health of man, a very interesting enquiry has been lately made by Dr. W. Heberden, with a view to ascertain its effects upon the inhabitants of the city of London. The winter of 1795 and that of 1796, were extraordinarily contrasted; the first being one of the coldest, the last one of the warmest, on record. During January 1796, nothing was more common than to hear expressions of the unseasonableness of the weather; and fears lest the want of the usual degree of *cold* should be productive of putrid diseases, and other causes of mortality. On the other hand, "a bracing cold," and "a clear frost," are familiar in the mouth of every Englishman; and what he is taught to wish for, as among the greatest promoters of health and vigour. Whatever deference be due to received opinions, it appears, however, from the strongest evidence, that the prejudices of the world are upon this point at least unfounded. The average degrees of heat upon Farenheit's thermometer kept in London during the month of January 1795, was 23° in the morning, and 29·4 degrees in the afternoon. The average in January 1796, was 43·5 degrees in the morning, and 50·1 degrees in the afternoon. A difference of above twenty degrees! And if we turn our attention from the comparative coldness of these months, to the corresponding healthiness of each, collected from the weekly bills of mortality, we shall find the result no less remarkable. For in five weeks, between the 31st of December 1794, and the 3d of February 1795, the whole number of burials amounted to 2823; and in an equal period of five weeks between the 30th of December 1795, and the 2d of February 1796, to 1471: so that the excess of the mortality in January 1795 above that of January 1796,

1796, was not less than 1352 persons. A number sufficient surely to awaken the attention of the most prejudiced admirers of a cold winter. And though the evidence of two years only are stated here, yet the same conclusion may universally be drawn from a careful examination of the weekly bills of mortality for many years. These two seasons were chosen as being each of them very remarkable, and in immediate succession one to the other, and in every body's recollection. One of the first things that must strike every mind engaged in this investigation, is its effect on old people. It is curious to observe, among those who are said in the bills to die above sixty years of age, how regularly the tide of mortality follows the influence of severe cold: so that a person used to such enquiries, may form no contemptible judgment of the severity of any of our winter months, merely by attending to this circumstance. Thus their number in January 1796 was not above one-fiftieth of what it had been in the same month the year before. The article of asthma, as might be expected, is prodigiously increased, and seems to include the most considerable part of the mortality of the aged. After these come apoplexies and palsies, fevers, consumptions, and dropsies. Under the two last of which are contained a large proportion of the chronical diseases of this country: all which seem to be hurried on to a premature termination. See, for the prevention and cure of all these maladies, the article MEDICINE.

COLD'DITZ, a town of Germany, in the circle of Upper Saxony, and circle of Leipsic: twenty-one miles south-east of Leipsic, and thirty-six west of Dresden.

COLDE'NIA, *s.* [so named by Linnæus, in honour of *C. Colden*, of North America, a very curious botanist who discovered several new plants.] In botany, a genus of the class tetrandria, order tetragynia, natural order asperifoliæ. The generic characters are—Calyx: perianthium four-leaved; leaflets lanceolate, erect, length of the corolla. Corolla: one-petalled, funnel-form, with the opening pervious; border patulous, obtuse. Stamina: filaments four, inserted into the tube; antheræ roundish. Pistillum: germs four, ovate; styles as many, capillary, length of the stamens; stigmas simple, permanent. Pericarpium: none; fruit ovate, compressed, scabrous, acuminate, terminated by four beaks. Seeds: two, muricate, two-celled.—*Essential Character.* Calyx, four-leaved; corolla, funnel-form; styles four; seeds, two, two-celled.

There is but one species, called by Linnæus coldenia procumbens. It is an annual plant, whose branches trail on the ground; they extend near a foot from the root, and divide into many smaller branches; leaves short and sessile, deeply crenate, have several longitudinal nerves, and are of a glaucous colour; corolla cut into four segments at the top, of a pale blue colour, and very small; the stigmas are hairy; fruit composed of four cells, and wrapped up in the calyx, with a single seed in each cell; branches alternate; leaves alternate, subpetioled, obovate, sublunate on the upper side, plaited along the deep serratures, tomentose, except in the plaits; flowers axillary, few, sessile; seeds flat on the inner side, muricate, and angular on the outer: according to Gærtner, they consist of four nuts, united into a rounded-four-cornered mucronate fruit; the rind fungous, very thick on the back, but becoming gradually thinner and almost membranaceous on the sides; shells bony, hard, convex on one side, rounded; on the other side compressed into an acute angle, one-celled. Native of the East Indies; cultivated in 1759 by Mr. Miller.

Propagation and Culture. This plant is propagated by seeds, which must be sown upon a hot-bed in the spring; and, when the plants are fit to remove, they should be each put into a separate small pot, plunged into a hot-bed of tanners' bark, observing to shade them till they have taken fresh root; after which they should have air admitted to them every day in proportion to the warmth of the season, and gently watered two or three times a-week in warm weather; but they must not have too much moisture. These plants must remain in the hot-bed, where they will flower in June, and the seeds will ripen in September.

COL'DING, or KOLDING, a town of Denmark, in the diocese of Ripen, situated between mountains, on the river Thueths, which runs into the Little Belt, about a league below. It is ancient, and was formerly the residence of many Danish kings, who adorned it with several edifices. At present the harbour is filled up, and its commerce nearly annihilated: twenty-four miles north-east of Ripen. Lat. 55. 30. N. lon. 9. 23. E. Greenwich.

COL'DINGHAM, a town in Scotland, supposed to be the *Colonia* of Ptolemy, and called by Bede the city *Coldana* and of Colud *(Coludum)*, situated about two miles from Eymouth, a place famous many ages ago for its convent. This was the oldest nunnery in Scotland, and here the virgin-wife Etheldreda took the veil in 670; but, by the ancient name *Coludum* it should seem, that it had before been inhabited by the religious called *Culdees.* In 870 it was destroyed by the Danes; but its name was rendered immortal by the heroism of its nuns; who, to preserve themselves inviolate from those invaders, cut off their lips and noses; and thus rendering themselves objects of horror, were, with their abbess Ebba, burnt in the monastery by the disappointed invaders. After this it lay deserted till the year 1098, when king Edgar founded on its site a priory of benedictines in honour of St. Cuthbert, and bestowed it on the monks of Durham. Mr. Pennant's description of the black, joyless, heathy, moor, where it was situated, might be sufficient to guard the fair inhabitants of the nunnery were it still subsisting. That description, however, is now altogether inapplicable: the whole tract, five miles over, has been since improved, and converted into corn fields; and the passage of the steep glen called the *Pease*, which terminates the moor on the road towards Edinburgh, and was formerly the terror of travellers, is now rendered safe and easy by means of a bridge extending from one side of the chasm to the other.

COL'DINGUEN, a town of Denmark, in North Jutland, and diocese of Ripen. It is remarkable for its bridge, over which pass all the oxen and other cattle that go from Jutland into Germany, which brings in a considerable revenue to the king. It is seated on an eminence, in a pleasant country abounding with game.

COL'DITZ, a town of Germany, in the circle of Upper Saxony, and margraviate of Meissen, situated on the Mulda. This town suffered severely in the civil wars of Germany in the last century. It was several times pillaged by the Swedes and Hussites: ten miles south-east of Leipsic.

COLD'LY, *adv.* Without heat. Without concern; indifferently; negligently; without warmth of temper or expression:

What England says, say briefly, gentle lord;
We *coldly* pause for thee. *Shakespeare.*

COLD'NESS, *s.* Want of heat; power of causing the sensation of cold:

Such was the discord, which did first disperse
Form, order, beauty, through the universe;
While dryness moisture, *coldness* heat resists,
All that we have, and that we are, subsists. *Denham.*

Unconcern; frigidity of temper; want of zeal; negligence; disregard.—If, upon reading admired passages in authors, he finds a *coldness* and indifference in his thoughts, he ought to conclude, that he himself wants the faculty of discovering them. *Addison.*—Coyness; want of kindness; want of passion:

Let ev'ry tongue its various censures chuse,
Absolve with *coldness*, or with spite accuse. *Prior.*

Chastity; exemption from vehement desire:

The silver stream her virgin *coldness* keeps,
For ever murmurs, and for ever weeps. *Pope.*

COLD'STREAM, a town of Scotland, in the county of Berwick, on the north side of the Tweed, with a fine bridge over that river: eleven miles south-west of Berwick, and 332 and a half north of London.

COLD'WATER, a lake of North America. Lat. 54. 56. N. lon. 111. W. Greenwich.

COLE, *s.* [capl, Sax.] A general name for all sorts of cabbage.

COLE (William), the son of a clergyman, born at Adderbury in Oxfordshire, about 1626. After he had been well instructed in the classics, he was entered, in 1642, of Merton college in Oxford. In 1650 he took a degree in arts; after which he left the university, and retired to Putney near London, where he lived several years, and became the most famous botanist of his time. In 1656 he published the Art of Simpling; or, an Introduction to the Knowledge of gathering Plants; with which was also printed Perspicillum Microcosmologicum; or, a Prospective for the Discovery of the lesser World, wherein Man is a Compendium, &c. And, in 1657, he published Adam in Eden; or, Nature's Paradise; wherein is contained the history of plants, herbs, and flowers, with their several original names. Upon the restoration of Charles II. he was made secretary to Duppa, bishop of Winchester, in whose service he died, in 1662.

COLE-FISH, or COAL-FISH, *s.* See GADUS *carbonarius*.

CO'LEBROOK, a town of the American States, in the northern part of New Hampshire, in Grafton county, on the east bank of Connecticut river, opposite the Great Monadnock: 126 miles north-west by north from Portsmouth.

CO'LEBROOK, a township of the American States, on the north line of Connecticut, in Litchfield county, thirty miles north-west of Hartford city. It was settled in 1756. Here are considerable iron works, and several mills, on Still river. In digging a cellar in this town, at the close of the year 1796, belonging to Mr. John Hulburt, the workmen, at the depth of about ten feet, found three large tusks and two thigh bones of an animal, the latter of which measured each about four feet four inches in length, and twelve inches and a half in circumference. When first discovered they were entire; but as soon as they were exposed to the air they mouldered to dust. This adds another to the many facts, which prove that a race of enormous animals, now extinct, once inhabited the American continent.

CO'LEBROOK DALE, a valley of England, situated on the banks of the river Severn, in the eastern part of Shropshire, celebrated for its extensive iron works. In forming a canal to the river Severn, for the purpose of conveying the manufactured goods, a spring of native tar was discovered, which at first yielded a large quantity, some say seventy or eighty gallons a day; but the quantity is now very much diminished. In 1779, a bridge of cast-iron was thrown over the Severn in this place; a description of which may be seen under BRIDGE, vol. iii. p. 393.

CO'LEFORD, a small town in Gloucestershire, on the borders of Monmouthshire. It has a market on Fridays, and two annual fairs, viz. June 20, for wool; and December 5, for cheese. In its neighbourhood are very extensive iron works. It is distant from London 127 miles, Monmouth six, and Ross ten.

COLENE'TO, a river of Italy, in the kingdom of Naples, which runs into the gulf of Tarento, four miles east of Rossano.

COLEOP'TERA, or BEETLE, *s.* The name of Linnæus's first order of insects. See ENTOMOLOGY.

CO'LERAINE, a town of Ireland, in the county of Londonderry, situated on the river Bann, about three miles from the sea, with a valuable salmon fishery: this town, before the building of Londonderry, gave name to the county called the county of Coleraine: twenty-five miles east-north-east of Londonderry, and twenty-nine north-north-west of Antrim. Lat. 55. 8. N. lon. 6. 29. W. Greenwich.

CO'LERAINE, a town of the American States, on the north bank of St. Mary's river, Camden county, Georgia, about fifty miles from its mouth. On the 29th of June, 1796, a treaty of peace was made at this place between the president of the United States, on the one part, and the king's chiefs and warriors of the Creek nation of Indians, on the other. By this treaty, the line between the white people and the Indians, was established to run "from the Currahee mountain to the head or source of the main south branch of the Oconee river, called, by the white people, Appalatohee, and by the Indians, Tulapocka, and down the middle of the same." Liberty was also given by the Indians to the president of the United States, to "establish a trading or military post on the south side of Alatamaha, about one mile from Beard's bluff, or any where from thence down the river, on the lands of the Indians;" and the Indians agreed to "annex to said post a tract of land of five miles square;" and, in return for this and other tokens of friendship on the part of the Indians, the United States stipulated to give them goods to the value of 6000 dollars, and to furnish them with two blacksmiths with tools.

CO'LERAINE, a township of the American States, in Hampshire county, Massachusetts, which contains 1417 inhabitants.

COLEROO'N, a river of Hindoostan, forming the largest and most northern branch of the Delta.

COLES (Elisha), author of a well-known and long-valued Dictionary, was born in Northamptonshire about 1640; and, in 1658, was entered of Magdalen college in Oxford. He left it without taking a degree; and, going to London, taught Latin to young people, and English to foreigners, about 1663. Afterwards he became one of the ushers of merchant-taylors' school; but, being there guilty of a very great fault, which is not any where expressly mentioned, he was forced to withdraw into Ireland, whence he never returned. He was a critical proficient in the English and Latin tongues, did much good in his profession, and wrote several useful and necessary books for the instruction of youth.

CO'LESEED, *s.* Cabbage seed.—Where land is rank, it is not good to sow wheat after a fallow; but *coleseed* or barley, and then wheat. *Mortimer*. See BRASSICA.

CO'LESHILL, a small market-town in Warwickshire, beautifully situated on an eminence, at the bottom of which, on the north side, runs the river Cole, whence it takes its name. It consists of one long street, running north and south, with a small one branching out eastward about the middle of the town, and leading to the church-yard, which is the summit of the eminence, and commands a pleasing view of the country around. The church, which is an old structure, dedicated to St. Peter, and to which there is a handsome tower and a beautiful spire, forms a conspicuous object to the neighbourhood. On the north side of the church-yard is a free grammar-school of ancient foundation, with salary and privileges, worth about fifty pounds a-year. This town is a great thoroughfare, distant from Coventry twelve miles, fifteen from Lichfield, ten from Tamworth, the same from Birmingham and Atherstone, and thirteen from Nuneaton; and lies on the great road from London (from whence it is distant 104 miles) to Liverpool and Ireland, and also on the road to Chester. The market is on Wednesdays; and here are three fairs annually, on Shrove-Monday, the 6th of May, and on the Wednesday following Old Michaelmas-day.

CO'LET (John), a learned English divine, born in London in 1466, was the eldest son of sir Henry Colet, twice

twice lord mayor, who had, besides him, twenty-one children. His mother, whose family name is unknown, had the singular ill fortune to survive the whole of her numerous progeny. His education for the holy profession in which he afterwards distinguished himself, was begun in London, matured at Magdalen-college in Oxford, and perfected in France and Italy, where his profound knowledge of divinity is said to have stood unrivalled. After his return from his travels, he settled again at Oxford, where he contracted a strict intimacy with the admirable Erasmus, who was then studying there, and whose subsequent correspondence with him contains an history of his character, and in some measure of his life. We gather from thence, that he was a man of sanguine temperament; high-spirited and hasty; inclined to the luxuries of the table, and gay conversation, and by no means insensible to impressions still softer. These faults, however, he corrected by temperance, and by a severe application to his studies; and, says Erasmus expressly, "*Virginitatis florem ad mortem usque servavit.*" (Sir Isaac Newton did the same.) In 1493 he was admitted a prebendary of York, and in 1502 of Salisbury; and three years after, was promoted, without interest or application, to the deanery of St. Paul's. Here he became remarkable for a most correct observance of his pastoral duties; and, in addition to his own personal services, drew together the most eminent scholars and divines of the time, to read lectures in his cathedral, of which number Erasmus himself was one. Amidst these pious labours for the living, he formed a noble plan for the benefit of thousands yet unborn, and had the happiness to carry it into execution, the foundation of St. Paul's school. This lasting monument to his fame he erected at the expence of four thousand five hundred pounds; entrusted the government of the school to the mercers' company, of which his father had been a member, and gave the charge of education to the famous grammarian William Lilly. His health now soon declined, and, from three repeated attacks of the sweating sickness, he fell into a consumption. Incapacitated by this infirmity from performing the offices of his function, he retired to the monastery of the Carthusians at Shene; and, having languished for some months, died there on the 16th of September 1519, and was buried in his cathedral church of St. Paul. He wrote several things, as follow: 1. Oratio habita à doctore Johanne Colet, decano sancti Pauli, ad clerum in convocatione, anno 1511. This being hardly to be met with, except in the Bodleian library at Oxford, among archbishop Laud's manuscripts, is reprinted by Knight in his appendix to the life of Colet; where also is reprinted an old English translation of it, supposed to have been done by the author himself. 2. Rudimenta Grammatices à Joanne Coleto, decano ecclesiæ sancti Pauli Londin. in usum scholæ ab ipso institutæ; commonly called "Paul's Accidence, 1539," 8vo. 3. The Construction of the Eight Parts of Speech, Antwerp, 1530, 8vo. 4. Daily Devotions; or, the Christian's morning and evening sacrifice. 5. Monition to a godly life. 1534, 1563, &c. 6. Epistolæ ad Erasmum. There are still remaining in manuscript others of his pieces, of which the curious and inquisitive may see an account in his life by Knight. With regard to sermons, he wrote but few; for he generally preached without notes.

COLET'TA-VEET'LA. See Barleria.

CO'LEWORT, *s.* [caplpyꞃꞇ, Sax.] A species of cabbage. See Brassica.

How turnips hide their swelling heads below,
And how the closing *coleworts* upwards grow. *Gay.*

CO'LIBERTS, *s.* [*coliberti*, Lat.] in law, were tenants in ancient soccage, and particularly such villeins as were manumitted or made freemen. But they had not an absolute freedom; for, though they were better than servants, yet they had superior lords to whom they paid certain duties, and in that respect might be called servants, though they were of middle condition between freemen and servants.

CO'LIBRI, *s.* in ornithology, that beautiful division of the humming-birds, which have a curved bill. See the article Trochilus.

CO'LIC, *s.* [*colicus*, Lat.] It strictly is a disorder of the colon; but loosely, any disorder of the stomach or bowels that is attended with pain.—*Colics* of infants proceed from acidity, and the air in the aliment expanding itself, while the aliment ferments. *Arbuthnot.* See the article Medicine.

CO'LIC, *adj.* Affecting the bowels.—Intestine stone and ulcer, *colic* pangs. *Milton.*

CO'LIGNY (Gaspard de), admiral of France, born the 16th of February 1516, at Chatillon-sur-Loing. He signalized himself under Francis I. at the battle of Ceritoles, and under Henry II. who made him colonel-general of the French infantry, and afterwards admiral of France, in 1552; favours which he obtained by the brilliant actions he performed at the battle of Renti, by his zeal for military discipline, by his victories over the Spaniards, and especially by the defence of St. Quintin. The admiral threw himself into that place, and exhibited prodigies of valour; but the town being forced, he was made prisoner of war. After the death of Henry II. he put himself at the head of the Calvinists against the Guises, and formed so powerful a party as to threaten ruin to the Romish religion in France. On trying occasions he seemed to set no value on his life. Being wounded, and his friends lamenting around him, he said to them with incredible constancy, "The business we follow should make us as familiar with death as with life." The first pitched battle that happened between the huguenots and the catholics was that of Dreux, in 1562. The admiral fought bravely, lost it, but saved the army. The duke of Guise having been murdered by treachery, a short time afterwards, at the siege of Orleans, he was accused of having connived at this base assassination; but he cleared himself of the charge by oath. The civil wars ceased for some time, but only to re-commence with greater fury in 1567. Coligni and Condé fought the battle of St. Denys against the constable Montmorenci. This indecisive day was followed by that of Jarnac, in 1569, fatal to the Calvinists. Condé having been killed in a shocking manner, Coligni had to sustain the whole weight of the party. He alone supported that unhappy cause, and was again defeated at the affair of Moncontour, without suffering his courage to be shaken for a moment. An advantageous peace seemed shortly after to terminate these bloody conflicts in 1571. Coligni appeared at court, where he was loaded with caresses, in common with all the rest of his party. Charles IX. ordered him to be paid a hundred thousand francs as a reparation of the losses he had sustained, and restored to him his place in the council. On all hands he was exhorted to distrust these perfidious caresses. A captain of the Calvinists, who was retiring into the country, came to take leave of him: Coligni asked him the reason of so sudden a retreat: "It is (said the soldier) because they shew us too many kindnesses: I had rather escape with the fools, than perish with the over-wise." A conspiracy soon broke out; the admiral was fired at from a window, and wounded in the arm. Maurevert had been employed to assassinate Coligni, at the instance of the duke de Guise, who had proposed the scheme to Charles IX. it was this wretch who shot at him from a house belonging to the convent of St. Germain-l'Auxerrois. The king of Navarre, and the prince of Condé, complained of this villainous act. Charles IX. trained to the arts of dissimulation, pretended to be extremely afflicted at the event, ordered strict enquiry to be made after the author of it, and called Coligni by the tender name of father. This was at the very time when he was meditating the massacre of the protestants. The carnage began on the 24th of August, 1572, for the shocking particulars of which see the article Bartholomew's Day, vol. ii. p. 764. The duke

duke of Guiſe, under a ſtrong eſcort, marched to the houſe of the admiral. A crew of aſſaſſins, headed by a domeſtic of the houſe of Guiſe, entered ſword in hand, and found him ſitting in an elbow-chair. "Young man," ſaid Coligni, in a calm and tranquil manner, "thou ſhouldeſt have reſpected my grey hairs: but, do what thou wilt; thou canſt only ſhorten my life by a few days." The miſcreant, after ſtabbing him in ſeveral places, threw him out at the window into the court-yard of the houſe, where the duke of Guiſe ſtood waiting. Coligni fell at the feet of his baſe and implacable enemy, and ſaid, according to ſome writers, as he was juſt expiring: "Oh! that I had died by the hand of a gentleman, and not by that of a turnſpit!" His body was expoſed for three days to the fury of the populace, and then hung up by the feet on the gibbet of Montfaucon. Montmorenci, his couſin, had it taken down, in order to bury it ſecretly in the chapel of the chateau de Chantilli. An Italian, having cut off the head of the admiral, carried it to Catherine de Medicis; and this princeſs cauſed it to be embalmed, and ſent it to Rome. The perſonal courage of this great man, was the leaſt of the numerous qualities which adorned him. He, of all the chiefs, perhaps alone, from conviction, had renounced the errors of the church of Rome, and embraced the doctrines of Calvin. Brave, generous, and ſincere, he was actuated by no ſelfiſh views, he was impelled by no baſe or private paſſions. To obtain liberty of conſcience for himſelf, and for thoſe who profeſſed the ſame tenets, was all that he required; and it was with the reluctance of a patriot, that he found himſelf compelled to ſeek it amidſt the horrors of civil war.

CO'LIGNI, a town of France, in the department of the Ain, and chief place of a canton, in the diſtrict of Bourg-en-Breſſe: twelve miles north of Bourg.

CO'LIHAUT, a town on the weſtern ſide of the iſland of Dominica.

COLI'MA, a large and rich town of Mechoacan, in New Spain, on the South-Sea, near the borders of Xaliſca, and in the moſt pleaſant and fruitful valley in all Mexico, producing cocoa, caſſia, and other things of value, beſides gold. Dampier takes notice of a volcano near it, with two ſharp peaks, from which ſmoke and flame iſſue continually. The famous plant oleacazan grows in the neighbourhood, which is reckoned a catholicon for reſtoring decayed ſtrength, and a ſpecific againſt all ſorts of poiſon. The natives apply the leaves to the parts affected, and judge of the ſucceſs of the operation by their ſticking or falling off. Lat. 19. 50. N. lon. 87. W. Ferro.

CO'LIMER, a town of France, in the department of the Orne, and chief place of a canton, in the diſtrict of Mortagne: four miles weſt of Mortagne.

CO'LIN, a mountain of Ireland, in the county of Antrim: fifteen miles north of Antrim.

CO'LIN, a town of Bohemia, in the circle of Caurzim, with a ſtrong caſtle: twenty-eight miles eaſt of Prague.

COLIN'DA, a town of Hindooſtan, in the country of Bengal: twenty-eight miles ſouth of Comillah.

COLI'PHIUM, *ſ.* [from κωλον, a limb, and ιφι, ſtrongly.] A kind of bread formerly given to wreſtlers. It was made of the flour and bran all together, was thought to make men athletic, and was uſed by the Greeks. Bread made of fine flour neither nouriſhes nor ſtrengthens ſo much as the coarſer made with the addition of the bran. Indeed bread made of bran alone is more ſtrengthening than that of fine flour, when made for labouring men. The Romans, for three hundred years, only made bread of bran. In Norfolk, that ſort of bread is ſaid to be now in uſe, and alſo in Weſtphalia. Some of the moſt ancient nations called the bread thus made *panis furfuraceus*; Aulius Gellius, *panis impurus*; Hippocrates, *ſyncomiſton*, bread prepared of unſifted meal; Cœlius Rhodiginus, *panis cibarius*, and *panis gregarius*; and Terence, *panis ater*.

COLISE'UM, *ſ.* An amphitheatre, built at Rome by Veſpaſian, in the place where ſtood the baſon of Nero's gilded houſe. The word is formed from *coloſſæum*, on account of the coloſſus of Nero that ſtood near it; or, according to Nardini, from the Italian *coliſeo*. In this were placed ſtatues, repreſenting all the provinces of the empire; in the middle whereof ſtood that of Rome, holding a golden apple in her hand. The ſame term, *coliſeum*, is alſo given to another amphitheatre of the emperor Severus. In theſe *coliſea* were repreſented games, and combats of men and wild beaſts; but there are now little remaining of either, time and war having reduced them to ruins.

CO'LIUS, *ſ.* in ornithology, the COLY; a genus of birds belonging to the order of paſſeres, the generic characters of which are as follow: Bill ſhort, thick, convex above, plane below; upper mandible curved apart; noſtrils ſmall, generally covered with feathers at the baſe of the bill; tongue fringed at the tip; tail wedge-ſhaped, and long. Of this bird there are five ſpecies now known, all natives of Africa. Linnæus knew but two; one of which he placed with the *ſhrikes*, the other with the *groſbeaks*, contrary to the ſentiments of Briſſon, who had put them in a genus by themſelves. Dr. Gmelin has judiciouſly united them again into one, and added the other ſpecies more recently diſcovered.

1. Colius Capenſis, or coly from the Cape of Good Hope; about the ſize of a chaffinch. The body is entirely cinereous, pure on the back and rump, and mixed with vinaceous on the head; the throat and neck have a light lilac tint, which deepens on the breaſt; the belly is a dull white; the quills of the tail are cinereous, but the two lateral ones on each ſide are edged exteriorly with white; the two intermediate quills meaſure ſix inches and nine lines; thoſe on the ſides diminiſh gradually in length; the legs are grey, and the nails blackiſh; the bill is grey at its baſe, and blackiſh at its extremity. The length of the bird, including the long quills of the tail, is ten inches and three lines; ſo that the real ſize of the body exceeds not three inches and a half. It inhabits the country round the Cape of Good Hope.

2. Colius Senegalenſis, or creſted coly of Senegal, much reſembling the preceding, though it differs in point of ſize, being two inches longer. It has a creſt formed by projecting feathers on the head, approaching to a ſea-green colour, with a well-defined bar of fine ſky-blue behind the head, at the origin of the neck; the general colour of the plumage is cinereous grey, with a vinaceous tint on the head, neck, and breaſt; the tail tapers from its baſe to its extremity; the bill is not entirely black; the upper mandible is white from its baſe to two-thirds of its length, and its tip is bluiſh-black; the feathers of the tail are of unequal length, the middle ones being near eight inches long, and ſhorten by degrees to the outer ones, which are leſs than one inch. Found in the country of Senegal.

3. Colius erythropus, the white-backed coly; length twelve inches. The upper mandible is white at the baſe, and black the reſt of its length; the under white; general colour of the plumage bluiſh aſh-colour; the head is abundantly creſted, ſome of the feathers longer than the head itſelf, and when erected ſtand quite upright, and are pointed in ſhape; the under parts, from the breaſt, are dull white; near the vent quite white; the lower part of the back, the rump, and upper tail coverts, are purple, with a ſtripe of pure white the whole way down the middle; the tail is very long, and cuneiform, as in the two preceding, and the ſhafts cheſnut; the two outer feathers have the outer webs white, and are only an inch and a half in length; the legs are very ſtout, of a fine red colour, and all the four toes placed forward, as in the ſwift; the claws large, hooked, and duſky. This inhabits the neighbourhood of the Cape of Good Hope, and the ſingularity of all the toes being placed forwards, is ſtriking.

4. Colius ſtriatus, the rayed coly; length thirteen inches; bill black above, whitiſh beneath; the plumage above is of a dull grey, with a light tinge of lilac, which inclines

COLIUS.

1. The Senegal Coly. 2. The White backed Coly.

inclines to red on the rump and tail; the breast is rufous grey, and the belly rufous, both transversely striped with brown; the tail is green, and greatly cuneiform, like that of the others; the two middle feathers are eight inches and a half in length. This is likewise found in the neighbourhood of the Cape of Good Hope.

5. Colius Panayensis, the Panayan coly: it has a black bill; the head is crested; the neck, and upper parts of the body, are cinereous grey, with a yellowish tinge; breast the same, crossed with transverse lines of black; the lower part of the belly, and upper part of the tail, are rufous; the wings reach very little beyond the base of the tail, which is greatly cuneiform, like the others; the legs are of a pale flesh-colour. It is a native of Panay, one of the Philippine Islands.

To COLL, *v. a.* [*accoler*, Fr.] To embrace round the neck:

So having said, her 'twixt her armes twain
She straightly strain'd, and *colled* tenderly. *Spenser.*

COLLABAU'G, a town of Hindoostan, in the Malwa country: forty-four miles west of Chandaree.

COLLA'ERT (Adrian), an eminent engraver, who flourished about the year 1550, was born at Antwerp. After having learned the first principles of engraving, he went into Italy to perfect himself in drawing. He worked entirely with the graver, in a firm style, but rather stiff and dry. The vast number of plates executed by his hand sufficiently evince the facility with which he engraved; and though exceedingly neat, they are seldom highly finished.

COLLA'ERT (Hans, or John), son to the foregoing, and also an excellent artist. He drew and engraved in the style of his father, and was equal to him in merit. He must have been very old when he died, for his prints are dated from 1555 to 1622. He assisted his father in all his great works, and engraved besides a prodigious number of plates of various subjects. One of his best prints is Moses striking the rock, from Lambert Lombard. A great number of small figures are introduced into this print, and they are admirably well executed; the heads are fine, and the drawing correct.

COLLAL'TO, a county or district of Maritime Austria, containing the three important castles, Collalto, St. Salvatore, and St. Lucia, together with their appurtenances. Collalto is an old castle on a delightful eminence, on the east bank of the Soligo, which, at no great distance, discharges itself into the Piave; it is provided with drawbridges, and is in a flourishing condition. The church of St. Prosdocimo, was built in the fourteenth century; and there is a monastery without the walls of the castle. The villages are Falze di Piave, Barbisano, and Sarnaglia. St. Salvatore, another castle, built on a high mountain, with thick walls, has a fine steeple, and an old chapel, containing fine paintings and pendulous gardens, kept in order at a very considerable expence. Its principal town is Susegani, the church of which possesses an altar-piece by Titian. St. Lucia, a castle and large village, with fine buildings, of which the villages Castosco and Refrantolo are destitute. Ray is an old castle, destroyed by the Austrians in 1415. The monastery of the Carmelites, now suppressed, was built on the ruins of this castle.

To COLLAP'SE, *v. n.* [*collabor, collapsus*, Lat.] To fall together; to close so as that one side touches the other.—In consumptions and atrophy the liquids are exhausted, and the sides of the canals *collapse*; therefore the attrition is increased, and consequently the heat. *Arbuthnot.*

COLLAP'SION, *s.* The act of closing or collapsing. The state of vessels closed.

COL'LAR, *s.* [*collare*, Lat.] A ring of metal put round the neck:

Ten brace and more of greyhounds;
With golden muzzles all their mouths were bound,
And *collars* of the same their necks surround. *Dryden.*

The part of the harness that is fastened about the horse's neck:

Her waggon spokes made of long spinners legs,
The traces of the smallest spider's web,
The *collars* of the moonshine's watry beams. *Shakespeare.*

The part of the dress that surrounds the neck. An ensign of dignity. The COLLAR of the order of the garter consists of S.S. with roses enamelled red, within a garter enamelled blue, and the George at the bottom. The lord-mayor's COLLAR is more usually called *a chain.*

To slip the COLLAR. To get free; to escape; to disentangle himself from any engagement or difficulty:

When, as the ape him heard so much to talk
Of labour, that did from his liking baulk,
He would have *slipt the collar* handsomely. *Hubberd.*

A COLLAR *of Brawn*, is the quantity bound up in one collar or bandage.

Knights of the COLLAR, a military order in the republic of Venice, called also the order of St. Mark, or the medal.

To COL'LAR, *v. a.* To seize by the collar; to take by the throat.

To COLLAR *Beef*, or other meat; to roll it up, and bind it hard and close with a collar or bandage.

COL'LAR-BONE, *s.* The clavicle; the bones on each side of the neck.—A page riding behind the coach fell down, bruised his face, and broke his right *collar-bone*. *Wiseman.*

COLLARE'DO, a town of Italy, in the duchy of Tuscany: four miles west of Parana.

COLLA'RES, a town of Portugal, in the province of Estramadura: six miles north of Cascaes.

To COLLA'TE, *v. a.* [*confero, collatum*, Lat.] To compare one thing of the same kind with another.—They could not relinquish their Judaism, and embrace Christianity, without considering, weighing, and *collating*, both religions. *South.*—To collate books; to examine if nothing be wanting. To bestow; to confer.—The significance of the sacrament disposes the spirit of the receiver to admit the grace of the spirit of God, there consigned, exhibited, and *collated*. *Taylor.*—With *to*. To place in an ecclesiastical benefice.—If a patron shall neglect to present unto a benefice, void above six months, the bishop may *collate* thereunto. *Ayliffe.*

COLLA'TERAL, *adj.* [*con* and *latus*, Lat.] Side to side:

Thus saying, from his radiant seat he rose
Of high *collateral* glory. *Milton.*

Running parallel. Diffused on either side:

But man by number is to manifest
His single imperfection; and beget
Like of his like, his image multiply'd
In unity defective, which requires
Collateral love and dearest amity. *Milton.*

Not direct; not immediate:

They shall hear and judge 'twixt you and me;
If by direct or by *collateral* hand
They find us touch'd, we will our kingdom give
To you in satisfaction. *Shakespeare.*

Concurrent.—All the force of the motive lies within itself: it receives no *collateral* strength from external considerations. *Atterbury.*

COLLA'TERAL, [*collateralis*, from *laterali*, Latin.] In law, that which cometh sideways, not direct: as *collateral* assurance is that which is made over and above the deed itself: *collateral* security, is where a deed is made of other land, besides those granted by the deed of mortgage; and if a man covenants with another, and enters into bond for the performance of his covenant, the bond is a *collateral* assurance; because it is external, and

and without the nature and essence of the covenant. If a man hath liberty to pitch booths or standings, for a fair or market, in another person's ground, it is *collateral* to the ground. The private woods of a common person, within a forest, may not be cut down without the king's licence; it being a prerogative *collateral* to the soil. And to be subject to the feeding of the king's deer, is *collateral* to the soil of a forest. *Cromp. Jurisd.* 185. *Manwood*, p. 66.

COLLATERAL CONSANGUINITY, or KINDRED. *Collateral* relations agree with the lineal in this, that they descend from the same stock or ancestor; but differ in this, that they do not descend from each other. *Collateral kinsmen*, therefore, are such as lineally spring from one and the same ancestor, who is the *stirps*, or root, the *stipes*, trunk, or common stock, from whence these relations are branched out. 2 *Comm.* 204.

COLLATERAL ISSUE, is where a criminal convict pleads any matter, allowed by law, in bar of execution, as pregnancy, the king's pardon, an act of grace, or diversity of person, viz. that he or she is not the same that was attainted, &c. whereon issue is taken, which issue is to be tried, by a jury, *instanter*.

COLLA'TERALLY, *adv.* Side by side.—These pullies may be multiplied according to sundry different situations, not only when they are subordinate, but also when they are placed *collaterally*. *Wilkins.*—Indirectly.—By asserting the scripture to be the canon of our faith, I have created two enemies: the papists more directly, because they have kept the scripture from us; and the fanatics more *collaterally*, because they have assumed what amounts to an infallibility in the private spirit. *Dryden.*—In collateral relation.

COLLA'TIA, a town on the Anio, built by the people of Alba. It was there that Sextus Tarquin offered violence to Lucretia. *Livy*.

COLLATI'NUS (Lucius Tarquinius), a nephew of Tarquin the Proud, who married Lucretia, to whom Sextus Tarquin offered violence. He, with Brutus, drove the Tarquins from Rome, and were made first consuls. As he was one of the Tarquins, so much abominated by all the Roman people, he laid down his office of consul, and retired to Alba in voluntary banishment. *Livy*.

COLLA'TIO BONO'RUM, *s.* is in law where a portion or money advanced by the father to a son or daughter, is brought into *hotchpot*, in order to have an equal distributory share of his personal estate, at his death, according to the intent of the stat. 22 and 23 Car. II. c. 10.

COLLA'TION, *s.* [*collatio*, Lat.] The act of conferring or bestowing; gift.—Neither are we to give thanks alone for the first *collation* of these benefits, but also for their preservation. *Ray.*—Comparison of one copy, or one thing of the same kind, with another.—In the disquisition of truth, a ready fancy is of great use; provided that *collation* doth its office. *Grew.*—In law, *Collation* is the bestowing of a benefice, by the bishop that hath it in his own gift or patronage; and differs from institution in this, that institution into a benefice is performed by the bishop at the presentation of another who is patron, or hath the patron's right for the time. *Cowel.*—Bishops should be placed by *collation* of the king under his letters patent, without any precedent election, or confirmation ensuing. *Hayward.*—A repast; a treat less than a feast.

COLLATION OF SEALS, is when upon the same label one seal is set on the back or reverse of the other.

COLLATIONE FACTA UNI POST MORTEM ALTERIUS, is in law a writ directed to the justices of the common pleas, commanding them to issue their writ to the bishop, for the admission of a clerk in the place of another presented by the king, who died during the suit between the king and the bishop's clerk; for judgment once passed for the king's clerk, and he dying before admittance, the king may bestow his presentation on another. *Reg. Orig.* 31.

COLLATIONE HEREMITAGII, in law, a writ whereby the king conferred the keeping of an hermitage upon a clerk. *Reg. Orig.* 303.

COLLATI'TIOUS, *adj.* [*collatitius*, Lat.] Done by the contribution of many.

COLLATI'TIUM, *s.* [from κολλα, glue.] A food prepared from the flesh of a capon; or other nutritious food boiled to a jelly.

COLLA'TIVE, *adj.* A law term.—An advowson *collative* is where the bishop and the patron are one and the same person. *Blackstone*.

COLLA'TOR, *s.* One that compares copies or manuscripts.—To read the titles they give an editor or *collator* of a manuscript, you would take him for the glory of letters. *Addison.*—One who presents to an ecclesiastical benefice.—A mandatory cannot interrupt an ordinary *collator*, till a month is expired from the day of presentation. *Ayliffe*.

To COLLAU'D, *v. a.* [*collaudo*, Lat.] To join in praising.

COL'LE (Charles), secretary to the duke of Orleans, born at Paris in 1709, and died in the same city Nov. 2, 1783, at the age of seventy-five. In his character were united a singular disposition to gaiety and an uncommon degree of sensibility; the death of a beloved wife accelerated his own. Without affecting the qualities of beneficence and humanity, he was both humane and beneficent. Having a propensity to the drama from his infancy, he cultivated it with success. His Partie-de-Chasse de Henri IV. (from which our Miller of Mansfield is taken) excites the most lively emotions, from the truth of his characters, and especially from the justness of the picture he has drawn of that good king. His comedy of Dupuis and Desronais, in the manner of Terence, may perhaps be destitute of what is called the *vis comica*; but it interests every beholder by the justness of its sentiments, by its well-supported characters, by its natural dialogue, in short by scenes that melt the audience into tears. The works of this amiable writer are collected in 3 vols. 12mo. under the title of Theatre de Societé.

COL'LE, a town of Italy, in the duchy of Tuscany, the see of a bishop, suffragan of Florence: twenty-five miles south of Florence.

COL'LE DUNENZO, a town of Italy, in the kingdom of Naples, and province of Abruzzo Citra: seven miles north of Civita Borella.

COL'LE DUO, a town of Italy, in the kingdom of Naples, and province of Abruzzo Ultra: twenty-three miles south-west of Aquila.

COL'LE SALVIE'TA, a town of Italy, in the duchy of Tuscany: ten miles from Pisa.

COL'LEAGUE, *s.* [*collega*, Lat.] A partner in office or employment. Anciently accented on the last syllable:

Easy it might be seen that I intend
Mercy *colleague* with justice sending thee. *Milton.*

To COLLE'AGUE, *v. a.* To unite with:

Colleagued with this dream of his advantage,
He hath not fail'd to pester us with message,
Importing the surrender of those lands. *Shakespeare.*

COLLE'CHIO, a town of Italy, in the Parmesan: four miles west of Parma.

To COLLE'CT, *v. a.* [*colligo*, *collectum*, Lat.] To gather together; to bring into one place.—'Tis memory alone that enriches the mind, by preserving what our labour and industry daily *collect*. *Watts.*—To draw many units, or numbers, into one sum.—Let a man *collect* into one sum as great a number as he pleases, this multitude, how great soever, lessens not one jot the power of adding to it. *Locke.*—To gain by observation:

The reverent care I bear unto my lord,
Made me *collect* these dangers in the duke. *Shakespeare.*

To infer as a consequence; to gather from premises.—How great the force of erroneous persuasion is, we may *collect*

collect from our Saviour's premonition to his disciples. *Decay of Piety.*—To *collect* himself. To recover from surprise; to gain command over his thoughts; to assemble his sentiments.—Prosperity unexpected often maketh men careless and remiss; whereas they, who receive a wound, become more vigilant and *collected*. *Hayward.*

As when of old some orator renown'd
In Athens or free Rome, where eloquence
Flourish'd, since mute, to some great cause address'd,
Stood in himself *collected*, while each part,
Motion, and each act, won audience. *Milton.*

COL'LECT, *s.* [*collecta*, low Lat.] A short comprehensive prayer, used at the sacrament; any short prayer. —Then let your devotion be humbly to lay over proper *collects*. *Taylor.*

COLLECTA'NEOUS, *adj.* [*collectaneus*, Lat.] Gathered up together; collected; notes compiled from various books.

COLLECT'EDLY, *adv.* Gathered in one view at once.—The whole evolution of ages from everlasting to everlasting, is so *collectedly* and presentificly represented to God. *More.*

COLLECT'IBLE, *adj.* That which may be gathered from the premises by just consequence.—Whether thereby be meant Euphrates, is not *collectible* from the following words. *Brown.*

COLLEC'TION, *s.* The act of gathering together. An assemblage; the things gathered.—The gallery is hung with a *collection* of pictures. *Addison.*

No perjur'd knight desires to quit thy arms,
Fairest *collection* of thy sex's charms. *Prior.*

The act of deducing consequences; ratiocination; discourse. *This sense is now scarcely in use:*

Thou shalt not peep through lattices of eyes,
Nor hear through labyrinths of ears, nor learn
By circuit or *collections* to discern. *Donne.*

A corollary; a confectary deduced from premises; deduction; consequence:

When she, from sundry arts, one skill doth draw;
Gath'ring, from divers fights, one act of war;
From many cases like, one rule of law:
These her *collections*, not the senses are. *Davies.*

COLLECTI'TIOUS, *adj.* [*collectitius*, Lat.] Gathered up.

COLLECT'IVE, *adj.* [from *collect*; *collectif*, Fr.] Gathered into one mass; aggregated; accumulative.—A body *collective* containeth a huge multitude. *Hooker.*—The difference between a compound and a *collective* idea is, that a compound idea unites things of a different kind; but a *collective* idea things of the same. *Watts.*—Employed in deducing consequences; argumentative.—Antiquity left many falsities controulable not only by critical and *collective* reason, but contrary observations. *Brown.*—In grammar, a *collective* noun is a word which expresses a multitude, though itself be singular; as, a *company*, an *army*.

COLLECT'IVELY, *adv.* In a general mass; in a body; not singly; not numbered by individuals; in the aggregate; accumulatively; taken together; in a state of combination or union.—Singly and apart many of them are subject to exception, yet *collectively* they make up a good moral evidence. *Hale.*

COLLECT'OR, *s.* [*collector*, Lat.] A gatherer; he that collects scattered things together. A compiler; one that gathers scattered pieces into one book.—The best English historian, when his stile grows antiquated, will be only considered as a tedious relater of facts, and perhaps consulted to furnish materials for some future *collector*. *Swift.* —A tax-gatherer; a man employed in levying duties or tributes.—A great part of this treasure is now embezzled, lavished, and feasted away by *collectors*, and other officers. *Temple.*

COLLE'DA, a town of Germany, in the circle of Upper Saxony, and country of Thuringia: twelve miles north of Weimar, and sixteen north-north-east of Erfurt.

COLLE'GATARY, *s.* [from *con* and *legatum*, a legacy, Lat.] In the civil law, a person to whom is left a legacy in common with one other or more persons.

COL'LEGE, *s.* [*collegium*, Latin.] A community; a number of persons living by some common rules:

On barbed steeds they rode in proud array,
Thick as the *college* of the bees in May. *Dryden.*

A society of men set apart for learning or religion:

He is return'd with his opinions,
Gather'd from all the famous *colleges*
Almost in Christendom. *Shakespeare.*

The house in which the collegians reside.—Huldah the prophetess dwelt in Jerusalem in the *college*. *Kings.*—A college, in foreign universities, is a lecture read in public.

Among the Romans, colleges served indifferently for those employed in the offices of religion, of government, the liberal and even mechanical arts, and trades; so that, with them, the word signified what we call a corporation or company, similar to our incorporated companies of freemen in London, which seem to have been founded on the above institution of the Romans. They had also the college of augurs, and the college of capitolini, i. e. of those who had the superintendence of the capitoline games. Plutarch observes, that it was Numa who first divided the people into colleges; which he did to the end that each consulting the interests of their college, whereby they were divided from the citizens of the other colleges, they might not enter into any general conspiracy against the public repose. Each of these colleges had distinct meeting places or halls, like ours in London; and likewise, in imitation of the state, a treasury and common chest, a register, and one to represent them upon public occasions, and acts of government. These colleges had the privilege of manumitting slaves, of being legates, and making by laws for their own body, provided they did not clash with those of the government.

The three political colleges of the German empire are the college of electors, or their deputies, assembled in the diet of Ratisbon. The college of princes, or body of princes, or their deputies, at the diet of Ratisbon. The college of cities, or body of deputies which the imperial cities send to the diet.

With us, the term *college* usually denotes a public place endowed with certain revenues, where the several parts of learning are taught. An assemblage of several of these colleges constitute an university. The erection of colleges is part of the royal prerogative, and not to be done without the king's licence. The establishment of colleges is a remarkable period in literary history. The schools in cathedrals and monasteries confined themselves chiefly to the teaching of grammar. There were only one or two masters employed in that office. But, in colleges, professors are appointed to teach all the different parts of science. The first obscure mention of academical degrees in the university of Paris (from which the other universities in Europe have borrowed most of their customs and institutions), occurs A. D. 1215. See the article UNIVERSITY.

COLLEGE OF CIVILIANS, commonly called Doctors Commons; a college founded by Dr. Harvey, dean of the arches, for the professors of the civil law residing in London: where usually, likewise, resides the judge of the arches court of Canterbury, judge of the admiralty, of the prerogative court, &c. with other civilians; who live, as to diet and lodging, in a collegiate manner, commoning together; whence the appellation of doctors commons. Their house being consumed in the great fire, they all resided at Exeter-house in the Strand till 1672; when their former house was rebuilt at their own expence

pence in a very splendid manner. To this college belong thirty-four proctors, who make themselves parties for their clients, manage their causes, &c.

COLLEGE OF PHYSICIANS, a corporation of physicians in London, who by several charters and acts of parliament of Henry VIII. and his successors, have the exclusive privileges, whereby no man, though a graduate in physic of any university, may, without licence under the the said college-seal, practise physic in or within seven miles of London; with power to administer oaths, fine and imprison offenders in that and several other particulars; to search the apothecaries shops in and about London, to see if their drugs be wholesome, and their compositions according to the form prescribed by the said college in their dispensatory. By the said charter they are also freed from all troublesome offices, as to serve on juries, be constable, keep watch, provide arms, &c. The society had anciently a college in Knight-rider-street, the gift of Dr. Linacre physician to Henry VIII. Since that time they had a house built by the famous Dr. Harvey in 1652, at the end of Amen-corner, Pater-noster Row, which he endowed with his whole inheritance in his lifetime: but this being burnt in the great fire in 1666, a new one was erected, at the expence of the fellows, in Warwick-lane, with a noble library, given partly by the marquis of Dorchester, and partly by sir Theodore Mayerne. Of this college there are at present a president, four censors, eight electors, a registrar, and a treasurer, chosen annually in October; the censors have, by charter, power to survey, govern, and arrest, all physicians, or others practising physic, in or within seven miles of London; and to fine, amerce, and imprison them, at discretion. The number of fellows was anciently thirty, till Charles II. increased their number to forty: and James II. giving them a new charter, allowed the number of fellows to be enlarged so as not to exceed fourscore; reserving to himself and successors the power of placing and displacing any of them for the future.

COLLEGE OF PHYSICIANS IN EDINBURGH, was erected on the 29th of November 1681. The design of this institution was to prevent the abuses daily committed by foreign and illiterate impostors, quacks, &c. For this reason the king granted letters patent to erect into a body corporate and politic, certain physicians in Edinburgh, and their successors, by the title of "the President and Royal College of Physicians at Edinburgh," with power to choose annually a council of seven, one whereof to be president: these are to elect a treasurer, clerk, and other officers; to have a common seal: to sue and to be sued; to make laws for promoting the art of physic, and regulating the practice thereof, within the city of Edinburgh, town of Leith, and districts of the Canongate, Westport, Pleasance, and Potter-row; through all which the jurisdiction of the college extends. Throughout the jurisdiction, no person is allowed to practise physic without a warrant from the college, under the penalty of five pounds sterling the first month, to be doubled monthly afterwards while the offence is continued; one half the money arising from such fines to go to the poor, the other to the use of the college. They are also empowered to punish all licentiates in physic within the above-mentioned bounds, for faults committed against the institutions of the college; and to fine them of sums not exceeding forty shillings. On such occasions, however, they must have one of the bailiffs of the city to sit in judgment along with them, otherwise their sentence is not valid. They are also empowered to search and inspect all medicines within their jurisdiction, and seize all such as are bad or unwholesome. That they may the better attend their patients, they are exempted from watching, warding, and serving on juries. They are, however, restrained from erecting schools for teaching the art of physic, or conferring degrees on any person qualified for the office of a physician; but are obliged to licence all such as have taken their degrees in any other university, and to admit as honorary members all the professors of physic in the rest of the universities of Scotland. These privileges and immunities are not to interfere with the rights and privileges of the apothecary surgeons, in their practice of curing wounds, contusions, fractures, and other external operations. The Edinburgh college of surgeons is but a late institution, by which the surgeons of Edinburgh are incorporated into a royal college, and authorised to carry into execution a scheme for making provision for their widows and children. They have also the privilege of examining, and licensing, if found qualified, all practitioners in surgery within certain bounds.

COLLEGE OF JUSTICE, the supreme civil court of Scotland; otherwise called *court of session*, or *of council and session*.

SION COLLEGE, or the college of the London clergy; has been a religious house time out of mind, sometimes under the denomination of a priory, sometimes under that of a spital or hospital: at its dissolution under 31st Henry VIII. it was called *Elsyn's spital*, from the name of its founder, a mercer, in 1329. At present it is a composition of both, viz. a college for the clergy of London, who were incorporated in 1630, in pursuance to the will of Dr. White, under the name of the president and fellows of Sion college; and an hospital for ten poor men and as many women. The officers of the corporation are the president, two deans, and four assistants; who are annually chosen from among the rectors and vicars of London; and are subject to the visitation of the bishop. They have a good library, built and stocked by Mr. Simpson, and furnished by several other benefactors, chiefly for the clergy of the city, without excluding other students on certain terms; and a hall, with chambers for students, generally occupied by the ministers of the neighbouring parishes.

GRESHAM COLLEGE, OR COLLEGE OF PHILOSOPHY, founded by sir Thomas Gresham, and endowed with the revenue of the Royal Exchange: one moiety of this endowment of the founder bequeathed to the mayor and aldermen of London and their successors, in trust, that they should find four able persons to read, within the college, divinity, geometry, astronomy, and music; who are chosen by a committee of the common council, consisting of the lord mayor and three aldermen and eight commoners, and allowed each, besides lodging, fifty pounds per annum. The other moiety he left to the company of mercers, to find three more able persons, chosen by a committee of that company, consisting of the master and three wardens, during their office, and eight of the court of assistants, to read law, physic, and rhetoric, on the same terms; with this limitation, that the several lecturers should read in term-time, every day in the week except Sundays; in the morning in Latin, in the afternoon the same in English: but that in music to be read only in English. By 8th George III. c. 32. the building appropriated to this college was taken down, and the excise-office erected in its room. Each of the professors is allowed fifty pounds per annum, in lieu of the apartments, &c. relinquished by them in the college, and is permitted to marry, notwithstanding the restriction of sir Thomas Gresham's will. The lectures are now read in a room over the Royal Exchange; and the city and mercers company are required to provide a proper place for this purpose. In this college formerly met the Royal Society, that noble academy, instituted by Charles II. and celebrated throughout the world for their improvements in natural knowledge. See their history and policy under SOCIETY.

COLLEGE DE PROPAGANDA FIDE, was founded at Rome in 1622, by Gregory XV. and enriched with ample revenues. It consisted of thirteen cardinals, two priests, and a secretary; and was designed for the propagation and maintenance of the Romish religion in all parts of the world. The funds of this college were considerably augmented by Urban VIII. and many private donations. Missionaries were supplied by this institution, and sent to preach

preach the gospel among savages and Indians, together with a variety of books suited to their several appointments. Seminaries for their instruction were supported by it, and a number of charitable establishments connected with and conducive to the main object of its institution. Another college of the same denomination was established by Urban VIII. in 1627, in consequence of the liberality of John Baptist Viles, a Spanish nobleman. This is set apart for the instruction of those who are designed for foreign missions. It was at first committed to the care of three canons of the patriarchal churches; but ever since the year 1641, it has been placed under the same government with the former institution.

College of Heralds, commonly called the heralds office; a corporation founded by a charter of Richard III. who granted them several privileges, as to be free from subsidies, tolls, offices, &c. They had a second charter from Henry VI. and a house built near Doctors-commons, by the earl of Derby, in the reign of Henry VII. was given them by the duke of Norfolk, in the reign of queen Mary, which house is now rebuilt. This college is subordinate to the earl-marshal of England. They are assistants to him in his court of chivalry, usually held in the common-hall of the college, where they sit in their rich coats of his majesty's arms. See Herald.

COL'LEGER, *s.* A local name for a boy on the foundation at Eton school. *Mason's Supplement to Johnson's Dictionary.*

COLLE'GIAL, *adj.* Relating to a college; possessed by a college.

COLLE'GIAN, *s.* An inhabitant of a college; a member of a college.

COLLE'GIANTS, *s.* A religious society formed among the Arminians and Anabaptists in Holland, about the beginning of the seventeenth century; so called because of their colleges, or meetings, twice every week; where every one, females excepted, has the same liberty of expounding the scripture, praying, &c. They are said to be all either Arians or Socinians; they never communicate in the college, but meet twice a-year from all parts of Holland at Rhinsbergh, whence they are also called *Rhinsberghers*, a village two miles from Leyden, where they communicate together; admitting every one that presents himself, professing his faith in the divinity of the holy scriptures, and resolution to live suitably to their precepts and doctrines, without regard to his sect or opinion. They have no particular ministers, but each officiates as he is disposed. They never baptize without dipping.

COLLE'GIATE, *adj.* [*collegiatus*, low Lat.] Containing a college; instituted after the manner of a college.—I wish that you yourselves did well consider how opposite certain of your positions are unto the state of *collegiate* societies, whereon the two universities consist. *Hooker.*

COLLE'GIATE, *s.* A member of a college; a man bred in a college; an university man.—These are a kind of empirics in poetry, who have got a receipt to please; and no *collegiate* like them, for purging the passions. *Rymer.*

COLLE'GIATE CHURCH, is that which consists of a dean and secular canons; or more largely, it is a church built and endowed for a society, or body corporate, of a dean or other president, and secular priests, as canons or prebendaries in the said church. There were many of these societies distinguished from the religious or regulars, before the reformation; and some are established at this time; as Westminster, Windsor, Winchester, Southwell, Manchester, &c.

COL'LERIES, a tribe of Indians, who live under a chief, and inhabit the strong woody countries of Madura and Tinnovelly in Hindoostan. They are said to consist of thirty or forty thousand men in arms, who live chiefly a roving life, and subsist by hostility and plunder. In native savageness and brutality of manners they far exceed the polygars. They have fire-arms, which those rajahs who hired them as mercenaries, first taught them the use of; but their favourite weapons are spears of vast length, with which they creep along the ground, favoured by the brush and underwood; when on a sudden they rise, and make great havock among horses and men. While some are heard firing among the thickets, others may be seen wielding their long spears on the adjacent heights, leaping from rock to rock, and using the most horrid screams and howlings. Their name, in the language of the country, signifies a thief; given them, no doubt, to designate their predatory life. They have a sort of feudal government, and are wonderfully attached to their idols or houshold gods, the depriving them of which enrages them to madness. Colonel Heron, an officer in the service of our East-India company, on taking one of their forts, in 1755, carried off several of these images; in revenge for which they afterwards waylaid and put to death every foe, English or English-sepoy, or even women and children, that fell into their hands.

COL'LET, *s.* [Fr. from *collum*, Lat. the neck.] Anciently something that went about the neck; sometimes the neck itself. With jewellers, that part of a ring in which the stone is set. A term used by turners; and in glass-making, it is that part of glass vessels which sticks to the iron instrument wherewith the metal was taken out of the melting-pot: these are afterwards used for making green glass.

COL'LET-DE-DEZES (Le), a town of France, in the department of the Lozere, and chief place of a canton, in the district of Villefort: twelve miles south of Villefort.

COL'LETON, a county of North America, in the state of South Carolina.

COL'LI (Le), a town of Italy in the kingdom of Naples, and province of Abruzzo Ultra: fifteen miles west of Celano.

COL'LICIÆ, *s.* [from *colligo*, Lat. to collect.] In medicine, the ducts which convey the humours of the eyes from the *puncta lachrymalia* to the cavity of the nose.

COLLI'CULUM [dim. of *collis*, Lat. a hill.] The nympha, or prominency within the vagina of a woman.

To COLLI'DE, *v. a.* [*collido*, Lat.] To strike against each other; to beat, to dash, to knock together.—Scintillations are not the accension of air upon collision, but inflammable effluencies from the bodies *collided*. *Brown.*

COL'LIER, *s.* A digger of coal; one that works in the coal-pits. A coal-merchant; a dealer in coals.—I knew a nobleman a great grasier, a great timberman, a great *collier*, and a great landman. *Bacon.*—A ship that carries coals.

COL'LIER, a town of United America, in the state of North Carolina: eleven miles north-east of Wilmington.

COL'LIER (Jeremy), a learned English nonjuring divine, born in 1650, and educated in Caius college Cambridge. He had first the small rectory of Ampton, near St. Edmund's Bury in Suffolk; which in six years he resigned, to come to London, in 1685, where he was made lecturer of Gray's Inn: but the change of government that followed soon rendered the public exercise of his function impracticable. He was committed to Newgate for writing against the revolution; and again, for carrying on a correspondence which that change of events made treasonable; but was released both times, without trial, by the intervention of friends. It is observable that he carried his scruples so far, as to prefer confinement to the tacit acknowledgment of the jurisdiction of the court by accepting his liberty upon bail. Suitable to these principles, he next acted a very extraordinary part with two other clergymen of his own way of thinking, at the execution of sir John Friend and sir William Perkins for the assassination plot; by giving them solemn absolution, and by imposition of hands: absconding for which, he continued under outlawry to the day of his death in 1726. These proceedings having put a stop to his activity, he employed his retired hours rather more usefully in literary works. In 1698, he attempted to reform our theatrical entertainments, by publishing his Short View of

of the Immorality and Profaneness of the English Stage: which engaged him in a controversy with the wits of the time: but, as Mr. Collier defended his censures not only with wit, but with learning and reason, it is allowed that the decorum observed, for the most part, by succeeding dramatic writers, has been owing to his animadversions. He next undertook a translation of Morreri's great Historical and Geographical Dictionary; a work of extraordinary labour, and which appeared in four volumes folio. After this he published An Ecclesiastical History of Great Britain, chiefly of England, in two volumes folio; which is allowed to be written with great judgment and impartiality. He was besides engaged in several controversies, which his conduct and writings gave rise to, not material to mention. In queen Anne's reign, Mr. Collier was tempted, by offers of considerable preferment, to a submission; but as he was a nonjuror upon principle, he could not be brought to listen to any terms.

COL'LIERY, *s.* The place where coals are dug. The coal trade.

COL'LIFLOWER, *s.* [*flos brasicæ*; from capl, Sax. cabbage, and *flower*; properly *cauliflower*.] A species of cabbage. See BRASSICA.

COLLIGA'TION, *s.* [*colligatio*, Lat.] A binding together.—These the midwife contriveth into a knot, whence that tortuosity or nodosity in the navel, occasioned by the *colligation* of vessels. *Brown.*

COLLIGEN'DUM BONA DEFUNCTI, (Letters *ad.*) In defect of representatives and creditors to administer to an intestate, &c. the ordinary may commit administration to such discreet person as he approves of, or grant him these letters, *to collect the goods of the deceased*, which neither make him executor nor administrator; his only business being to keep the goods in his safe custody, and to do other acts for the benefit of such as are entitled to the property of the deceased. 2 *Comm.* 505.

COLLIMA'TION, *s.* [from *collimo*, Lat.] The act of aiming at a mark; aim.—The *collimation line*, in a telescope, is a line passing through the intersection of those wires that are fixed in the focus of the object-glass, and the centre of the same glass. *Hutton.*

COLLINEA'TION, *s.* [from *collineo*, Lat.] The act of aiming.

COL'LINS (Antony), a polemical writer, born at Heston near Hounslow in Middlesex, in 1676, was the son of Henry Collins, a gentleman of about 1500l. a-year. He was first bred at Eton-school, and then went to king's-college Cambridge, where he had for his tutor Mr. Francis Hare, afterwards bishop of Chichester. He became a student of the Temple; but not relishing the law, soon abandoned that study. He was an ingenious man, and author of several curious books. His first remarkable piece was published in 1707, An Essay concerning the Use of Reason in Propositions, the Evidence whereof depends on Human Testimony. In 1702, he entered into the controversy between Mr. Clark and Dr. Dodwell, concerning the immortality of the soul. In 1713, he published his discourse on free-thinking; which made a prodigious noise. In 1715, he retired into the county of Essex, and acted as a justice of peace and deputy lieutenant for the same county, as he had done before for that of Middlesex and liberty of Westminster. The same year, he published a Philosophical Essay concerning Human Liberty. In 1718, he was chosen treasurer of the county of Essex; and this office he discharged with great honour. In 1724, he published his Historical and Critical Essay on the Thirty-nine Articles. Soon after, he published his Discourse of the Grounds and Reasons of the Christian Religion; to which is prefixed, An Apology for Free Debate and Liberty of Writing; which piece was immediately attacked by a great number of writings. In 1726, appeared his Scheme of Literary Prophecy Considered, in a view of the controversy occasioned by a late book entitled, A Discourse of the Grounds, &c. In this discourse, he mentions a manuscript dissertation of his to show the Sibylline oracles to be a forgery made in the times of the primitive Christians, who, for that reason, were called Sibylists by the Pagans; but it never appeared in print. His Scheme of Literary Prophecy was replied to by several writers; and particularly by Dr. John Rogers in his Necessity of Divine Revelation asserted. In answer to which Collins wrote A Letter to the Reverend Dr. Rogers, on occasion, &c. His health began to decline some years before his death, and he was very much afflicted with the stone, which at last put an end to his life at his house in Harley square in 1729. He was interred in Oxford chapel, where a monument was erected to him. His curious library was open to all men of letters, to whom he readily communicated all the assistance in his power: he even furnished his antagonists with books to confute himself, and directed them how to give their arguments all the force of which they were capable. He was remarkably averse to indecency and obscenity of discourse; and was, independent of his scepticism, a sincerely good man.

COL'LINS (John), an eminent mathematician, born at Wood-Eaton near Oxford, March 5, 1624. At sixteen years of age he was put apprentice to a bookseller at Oxford; but his genius appeared so remarkable for the study of the mechanical and mathematical sciences, that he was taken under the tuition of Mr. Marr, who drew several curious dials, which were placed in different positions in the king's gardens; under whom Mr. Collins made no small progress in the mathematics. In the course of the civil wars, he travelled abroad, to prosecute his favourite study; and on his return he took upon him the profession of an accountant, and published, in 1652, a large work entitled, An Introduction to Merchants Accompts; which was followed by several other publications on different branches of accounts. In 1658, he published a treatise called The Sector on a Quadrant; containing the description and use of four several quadrants, each accommodated to the making of sun-dials; to which he afterwards added an appendix concerning reflected dialling, from a glass placed reclining. In 1659, he published his Geometrical Dialling; and the same year also his Mariner's Plain Scale new plained. Collins now became a fellow of the royal society in London, to which he made various communications.

He wrote also several commercial tracts, highly acceptable to the public; viz. A Plea for bringing over Irish Cattle, and keeping out the fish caught by foreigners: For the promotion of the English fishery: For the working the Tin-mines; A Discourse of Salt and Fishery. He was frequently consulted in nice and critical cases of accounts, of commerce, and engineering. On one of these occasions, being appointed to inspect the ground for cutting a canal between the Isis and the Avon, he contracted a disorder by drinking cider when he was too warm, which ended in his death, the 10th of November 1683, at fifty-nine years of age. Mr. Collins was as it were the register of all the new improvements made in the mathematical sciences; the magazine to which the curious had frequent recourse: insomuch that he acquired the appellation of the English Mersennus.

COLLINS (William), an unfortunate but admirable poet, born at Chichester, December 25, 1720, the son of a reputable hatter in that city. In 1733 he was admitted scholar of Winchester college under Dr. Burton, and at nineteen was elected upon the foundation to New-college in Oxford. He was first upon the list; and, in order to wait for a vacancy in that society, was admitted a commoner of queen's college in the same university. But unfortunately, which is a case that seldom falls out, no such vacancy happened during the time limited, and he was thus alienated from the Wickhamists. His tutor, very sensible of his desert, recommended him to the society of Magdalen; which recommendation, backed by an uncommon display of genius and learning in the exercises performed on the occasion, procured him to be elected a

demy of that college in July 1741. During his residence in this place, which was till he had taken a bachelor's degree, he applied himself to poetry, and published an epistle to sir Thomas Hanmer on his edition of Shakespeare, and the Persian, or, as they have been since intituled, Oriental Eclogues; with regard to which, it may justly be asserted, that in simplicity of description and expression, in delicacy and softness of numbers, and in natural and unaffected tenderness, they are not to be equalled by any thing of the pastoral kind in the English language. In 1744 he left the university, and came to London, a literary adventurer, with many projects in his head, and very little money in his pocket. He designed many works; but his great fault was irresolu ion; or the frequent calls of immediate necessity broke his schemes, and suffered him to pursue no settled plan. A man, doubtful of his dinner, or trembling at a creditor, is not much disposed to abstracted meditation, or remote enquiries. He published proposals for a History of the Revival of Learning; and Dr. Johnson has heard him speak with great kindness of Leo X. and with keen resentment of his tasteless successor. But probably not a page of the history was ever written. He planned several tragedies, but he only planned them. He wrote now and then odes and other poems, and did something, however little. About this time Dr. Johnson fell into his company, who tells us, that "the appearance of Collins was decent and manly; his knowledge considerable; his views extensive, his conversation elegant, and his disposition cheerful. By degrees," adds the doctor, "I gained his confidence; and one day was admitted to him when he was immured by a bailiff that was prowling in the street. On this occasion recourse was had to the booksellers, who, on the credit of a translation of Aristotle's Poetics, which he engaged to write with a large commentary, advanced as much money as enabled him to escape into the country. He shewed me the guineas safe in his hand. Soon afterwards his uncle, Mr. Martin, a lieutenant-colonel, left him about 2000l. a sum which Collins could scarcely think exhaustible, and which he did not live to exhaust. The guineas were then repaid; and the translation neglected. But man is not born for happiness: Collins, who, while he studied to live, felt no evil but poverty, no sooner lived to study, than his life was assailed by more dreadful calamities, disease and insanity."

Dr. Johnson's character of him, while it was distinctly impressed upon that excellent writer's memory, is as follows: "Mr. Collins was a man of extensive literature, and of vigorous faculties. He was acquainted, not only with the learned tongues, but with the Italian, French, and Spanish languages. He had employed his mind chiefly upon works of fiction, and subjects of fancy; and by indulging some peculiar habits of thought, was eminently delighted with those flights of imagination which pass the bounds of nature, and to which the mind is reconciled only by a passive acquiescence in popular traditions. He loved fairies, genii, giants, and monsters; he delighted to rove through the meanders of inchantment, to gaze on the magnificence of golden palaces, to repose by the water-falls of elysian gardens. This was however the character rather of his inclination than his genius; the grandeur of wildness, and the novelty of extravagance, were always desired by him, but were not always attained. Yet as diligence is never wholly lost; if his efforts sometimes caused harshness and obscurity, they likewise produced in happier moments sublimity and splendour. This idea which he had formed of excellence, led him to oriental fictions and allegorical imagery; and perhaps, while he was intent upon description, he did not sufficiently cultivate sentiment. His poems are the productions of a mind not deficient in fire, nor unfurnished with knowledge either of books or life, but somewhat obstructed in its progress by deviation in quest of mistaken beauties. His morals were pure, and his opinions pious: in a long continuance of poverty, and long habits of dissipation, it cannot be expected that any character should be exactly uniform. There is a degree of want by which the freedom of agency is almost destroyed; and long association with fortuitous companions will at last relax the strictness of truth, and abate the fervour of sincerity. That this man, wise and virtuous as he was, passed always unentangled through the snares of life, it would be prejudice and temerity to affirm; but it may be said that at least he preserved the source of action unpolluted, that his principles were never shaken, that his distinctions of right and wrong were never confounded, and that his faults had nothing of malignity or design, but proceeded from some unexpected pressure, or casual temptation. The latter part of his life cannot be remembered but with pity and sadness. He languished some years under that depression of mind which enchains the faculties without destroying them, and leaves reason the knowledge of right without the power of pursuing it. These clouds which he perceived gathering on his intellects, he endeavoured to disperse by travel, and passed into France; but found himself constrained to yield to his malady, and returned. He was for some time confined in a house, of lunatics, and afterwards retired to the care of his sister in Chichester, where death, in 1756, came to his relief. After his return from France, the writer of this character paid him a visit at Islington, where he was waiting for his sister, whom he had directed to meet him: there was then nothing of disorder discernible in his mind by any but himself; but he had withdrawn from study, and travelled with no other book than an English testament, such as children carry to the school: when his friend took it into his hand, out of curiosity, to see what companion a man of letters had chosen: "I have but one book," says Collins; "but that is the best." Such was the fate of Collins, with whom I once delighted to converse, and whom I yet remember with tenderness. He was visited at Chichester, in his last illness, by his learned friends Dr. Warton and his brother; to whom he spoke with disapprobation of his Oriental Eclogues, as not sufficiently expressive of Asiatic manners, and called them his Irish Eclogues. He shewed them, at the same time, an ode inscribed to Mr. John Hume, on the Superstitions of the Highlands; which they thought superior to his other works. His disorder was not alienation of mind, but general laxity and feebleness, a deficiency rather of his vital than intellectual powers. What he spoke wanted neither judgment nor spirit; but a few minutes exhausted him, so that he was forced to rest upon the couch, till a short cessation restored his powers, and he was again able to talk with his former vigour. The approaches of this dreadful malady he began to feel soon after his uncle's death; and with the usual weakness of men so diseased, eagerly snatched that temporary relief with which the table and the bottle flatter and seduce. But his health continually declined, and he grew more and more burthensome to himself. To what I have formerly said of his writings may be added, that his diction was often harsh, unskilfully laboured, and injudiciously selected. He affected the obsolete when it was not worthy of revival; and he puts his words out of the common order, seeming to think, with some later candidates for fame, that not to write prose is certainly to write poetry. His lines commonly are of slow motion, clogged and impeded with clusters of consonants. As men are often esteemed who cannot be loved, so the poetry of Collings may sometimes extort praise when it gives little pleasure. Collins was extremely attached to a young lady of Chichester, who was born the day before him, and who did not return his passion with equal ardour. He said, on that occasion, "that he came into the world a day after the *fair*." A monument has been erected in Chichester cathedral to the memory of this unfortunate genius, with an elegant inscription in English verse, from the joint pens of Sargent and Hayley.

COL'LINSON (Peter), an eminent English botanist.

Tha

The family of this ingenious horticulturalist is of ancient standing in the north. Peter and James were the great grandsons of Peter Collinson, who lived on his paternal estate called Hugal-hall, or Height of Hugal, near Windermere Lake, in the parish of Staveiy, about ten miles from Kendal in Westmoreland. Peter, whilst a youth, discovered his attachment to natural history. He began early to make a collection of dried specimens of plants; had access to the best gardens at that time in the neighbourhood of London; and became early acquainted with the most eminent naturalists of his time; the doctors Derham, Woodward, Dale, Lloyd, and Sloane, were his friends. Among the great variety of articles which form that superb collection, now (by the wise disposition of sir Hans and the munificence of parliament) the British museum, small was the number of those with whose history Collison was not well acquainted; he being one of those few who visited sir Hans at all times familiarly; their inclinations and pursuits in respect to natural history being the same, a firm friendship had early been established between them. Peter Collinson was elected F. R. S. December 12, 1728; and perhaps was one of the most diligent and useful members, not only in supplying many curious observations himself, but in promoting and preserving a most extensive correspondence with learned and ingenious foreigners, in all countries, and on every useful subject. Besides his attention to natural history, he minuted every striking hint that occurred either in reading or conversation; and from this source he derived much information, as there were very few men of learning and ingenuity, who where not of his acquaintance at home; and most foreigners of eminence in natural history, or in arts and sciences, were recommended to his notice and friendship. His diligence and œconomy of time was such, that though he never appeared to be in a hurry, he maintained an extensive correspondence with great punctuality; acquainting the learned and ingenious in distant parts of the globe, with the discoveries and improvements in natural history in this country, and receiving the like information from the most eminent persons in almost every other. His correspondence with the ingenious Cadwallader Colden, esq. of New-York, and the justly celebrated Dr. Franklin of Philadelphia, furnish instances of the benefit resulting from his attention to all improvements. The latter of these gentlemen communicated his first essays on electricity to Collinson, in a series of letters, which were then published, and have been reprinted in a late edition of the doctor's ingenious discoveries and improvements. His conversation, so cheerful and usefully entertaining, rendered his acquaintance much desired by those who had a relish for natural history, or were studious in cultivating rural improvements; and it secured him the intimate friendship of some of the most eminent personages in this kingdom, distinguished as well by their taste in planting and horticulture, as by their rank and dignity. He was the first who introduced the great variety of trees and shrubs, which are now the principal ornaments of every garden; and it was owing to his indefatigable industry, that so many persons of the first distinction are now enabled to behold groves transplanted from the western continent flourishing so luxuriantly in their several domains, as if they were already become indigenous to Britain. He had some correspondents in almost every nation in Europe; some in Asia, and even at Pekin, who all transmitted to him the most valuable seeds they could collect, in return for the treasures of America. The great Linnæus, during his residence in England, contracted an intimate friendship with Mr. Collinson, which was reciprocally increased by a multitude of good offices, and continued to the last. Besides his attachment to natural history, he was very conversant in the antiquities of our own country, having been elected F. S. A. April 7, 1737; and he supplied them often with curious articles of intelligence, and observations respecting both our own and other countries. His person was rather short than tall; he had a pleasing and social aspect; of a temper open and communicative, capable of feeling for distress, and ready to relieve and sympathize. Excepting some attacks of the gout, he enjoyed, in general, perfect health, and great equanimity of spirits, and had arrived at his 75th year; when, being on a visit to lord Petre, for whom he had a singular regard, he was seized with a total suppression of urine, which, baffling every attempt to relieve it, proved fatal August 11, 1768. Mr. Collinson left behind him many materials for the improvement of natural history; and the present refined taste of horticulture may in some respects be attributed to his industry and abilities. The late lord Petre, the late duke of Richmond, and others of the first rank in life and letters, were his friends, and he was continually urging them to prosecute the most liberal improvements.

COL'LINSONIA, *s.* [so named in honour of *Peter Collinson*, F. R. S. a most distinguished promoter of botanical studies, and the first who introduced this plant, among many others, to the English gardens.] In botany, a genus of the class diandria, order monogynia, natural order of personatæ. The generic characters are—Calyx: perianthium one-leafed, tubular, two-lipped; upper lip three-cleft, reflex, wider; lower lip two parted, more erect, subulate, permanent. Corolla: one-petalled, unequal; tube funnel form, many times longer than the calyx; borders five-cleft; upper divisions obtuse, very short; the two upper ones reflex; lower lip longer, many-cleft, capillary. Stamina: filaments two, bristle form, erect, very long; antheræ simple, incumbent, compressed, obtuse. Pistillum: germ four-cleft, obtuse, with a larger glandule lying below the germ; style bristle-form, length of the stamens, inclined to one side; stigma bifid acute. Pericarpium: none; calyx cherishes the seed in its bottom, and is ringent with an irregular mouth. Seed: single, globose. *Essential Character.* Corolla, unequal; calyx, of the fruit, one-leafed, toothed; of the flower, bifid; seed, one under the calyx of the flower.

Species. 1. Collinsonia Canadensis, or nettle-leaved collinsonia: leaves ovate, both they and the stems smooth. This has a perennial root. In America it usually rises the height of four or five feet, but in England it seldom grows above three feet high. The stalks decay in the autumn, and fresh shoots come out in the spring. The stalks are square, with heart-shaped leaves, opposite, and serrate. The flowers are produced at the extremity of the stalks in loose spikes; they are of a purplish yellow, and appear in July; the seeds ripen in autumn. One seed only generally comes to maturity, the others being almost always abortive; this is globose, ash-coloured obscurely reticulated with dusky veins. Native of North America, in Pennsylvania and that latitude, in little woods and among bushes, in a rich soil; not farther to the south, nor to the north above 43° 15′. Mr. Bartram was the first who discovered it, and sent it to Europe. It has a peculiar scent, which is agreeable but very strong. It is reputed to be an excellent remedy against pains in the limbs and a cold, if the parts affected be rubbed with it: a decoction of it is also said to have cured the bite of the rattle-snake. In New-York, &c. they call it *horseweed*, because the horses eat it in the spring, before any other plant comes up. Introduced, 1735, by Peter Collinson.

2. Collinsonia scabriuscula, or rough-stalked collinsonia: leaves ovate, subcordate, somewhat hairy; stem somewhat hairy, scabrous. Native of East Florida; found there by Mr. John Bartram. Perennial.

Propagation and Culture. The first species may be easily propagated by parting the roots in October. These roots should be planted at three feet distance, for they require much nourishment, otherwise they will not thrive. It will live in the open ground, if it is planted in a sheltered situation. But unless it is kept warm, and is duly watered, it rarely flowers well: therefore many persons keep the

the plants in large pots: but these seldom produce good seeds; whereas those which are planted in the full ground, and are constantly watered, will ripen seeds very well in good seasons. The second species is more tender, and requires the protection of the green-house. It may be increased in the same manner with the other.

COLLIOU'RE, a town of France, in the department of the East Pyrenées, and chief place of a canton, in the district of Ceret, with a small port, on the Mediterranean, defended by a castle, on a rock, chiefly inhabited by fishermen. The Spaniards took this town from the French republicans in 1793, but they were driven out, and the town retaken, in May 1794. The national convention decreed, that a column should be erected on the spot in memorial that "here seven thousand Spaniards laid down their arms before the republicans:" five leagues south-east of Perpignan, and five east of Ceret.

COL'LIQUABLE, *adj.* Easily dissolved; liable to be melted.—The tender consistence renders it the more *colliquable* and consumptive. *Harvey.*

COLLI'QUAMENT, *s.* The substance to which any thing is reduced by being melted.

COLLIQUAMEN'TUM, *s.* [from *colliqueo*, to melt.] The transparent fluid in an egg, observable after two or three days incubation; it contains the first rudiments of the chick.

COL'LIQUANT, *adj.* That which has the power of melting or dissolving.

To COL'LIQUATE, *v. a.* [*colliqueo*, Lat.] To melt; to dissolve; to turn from solid to fluid.—The fire melted the glass, that made a great shew, after what was *colliquated* had been removed from the fire. *Boyle.*—The fat of the kidneys is apt to be *colliquated* through a great heat from within, and an ardent colliquative fever. *Harvey.*

To COL'LIQUATE, *v. n.* To melt; to be dissolved.—Ice will dissolve in fire, and *colliquate* in water or warm oils. *Brown.*

COLLIQUA'TION, *s.* [from *colliquatio*, Lat.] The act of melting.—Glass may be made by the bare *colliquation* of the salt and earth remaining in the ashes of a burnt plant. *Boyle.*—From them proceed rarefaction, *colliquation*, concoction, maturation, and most effects of nature. *Bacon.*—Such a temperament or disposition of the animal fluids as proceeds from a lax compages, and wherein they flow off through the secretory glands faster than they ought. *Quincy.*—Any kind of universal diminution and *colliquation* of the body. *Harvey.*

COLLI'QUATIVE, *adj.* Melting; dissolvent.—A *colliquative* fever is such as is attended with a diarrhœa, or sweats, from too lax a contexture of the fluids. *Quincy.*—It is a consequent of a burning *colliquative* fever, whereby the humours, fat, and flesh, of the body are melted. *Harvey.*

COLLIQUEFAC'TION, *s.* [*colliquefacio*, Lat.] The act of melting together; reduction to one mass by fluxion in the fire.—After the incorporation of metals by simple *colliquefaction*, for the better discovering of the nature and consents and dissents of metals, it would be tried by incorporating of their dissolutions. *Bacon.*

COLLI'SION, *s.* [from *collisio*, Lat.] The act of striking two bodies together.—The flint and the steel you may move apart as long as you please; but it is the hitting and *collision* of them that must make them strike fire. *Bentley.*

Or, by *collision* of two bodies, grind
The air attrite to fire. *Milton.*

The state of being struck together; a clash:

Then from the clashes between popes and kings,
Debate, like sparks from flint's *collision*, springs. *Denham.*

Striking bodies, mathematically considered, are either elastic, or non-elastic. They may also be either both in motion, or one of them in motion, and the other at rest. When non-elastic bodies strike, they unite together as one mass; which, after collision, either remains at rest, or moves forward as one body. But when elastic bodies strike, they always separate after the stroke. See Mechanics.

COL'LIUS (François), a doctor of the Ambrosian college at Milan, and great penitencier of that diocese, died in 1640, at a very advanced age; made himself famous by a treatise De Animabus Paganorum, published in two volumes, quarto, at Milan, in 1622 and 1623. He here examines into the portion in the world to come of several illustrious pagans. He hazards bold and ingenious conjectures on matters far beyond the reach of our intellect. He saves the Ægyptian midwives, the queen of Sheba, Nebuchadnezzar, &c. He does not despair of the salvation of the seven sages of Greece, nor of that of Socrates; but damns, without mercy, Pythagoras, Aristotle, and several others, though he acknowledges that they knew the true God. This work, properly speaking, seems to be nothing more than a vehicle for the display of the author's erudition, of which it doubtless contains a great deal. It is moreover well written, curious, and rare. He also wrote Conclusiones Theologicæ, 1609, quarto; and a treatise De sanguine Christi, full of profound disquisition, and citations innumerable. It appeared at Milan, 1617, quarto.

COLLIWI'LI, a town of the island of Ceylon: fifty miles west of Trincomaly.

COLL'MEN, or Cullmen, a town of Germany, in the circle of Upper Saxony, and circle of Leipsic: six miles east-north east of Mutschen.

COLLOBRIE'RES, a town of France, in the department of the Var, and chief place of a canton, in the district of Hieres: eighteen miles north-east of Toulon.

To COL'LOCATE, *v. a.* [*colloco*, Lat.] To place; to station.—If you desire to superinduce any virtue upon a person, take the creature in which that virtue is most eminent: of that creature take the parts wherein that virtue is *collocate*. *Bacon.*

COLLOCA'TION, *s.* [*collocatio*, Lat.] The act of placing; disposition. The state of being placed.—In the *collocation* of the spirits in bodies, the *collocation* is equal or unequal; and the spirits coacervate or diffused. *Bacon.*

COLLOCOC'CA, and Collococcus, *s.* in botany. See Cordia.

COLLOCU'TION, *s.* [*collocutio*, Lat.] Conference; conversation.

To COLLO'GUE, *v. n.* [probably from *colloquor*, Lat.] To wheedle; to flatter; to please with kind words. *A low word.*

COLLON'GE, a town of France, in the department of the Ain, and chief place of a canton, in the district of Gex: five leagues south-south-west of Gex.

COL'LOP, *s.* [it is derived by Minshew from *coal* and *op*, a rasher broiled upon the coals, a carbonade.] A small slice of meat.—Sweetbread and *collops* were with skewers prick'd. *Dryden.*—A piece of any animal.—The lion is upon his death-bed: not an enemy that does not apply for a *collop* of him. *L'Estrange.*—In burlesque language, a child:

Thou art a *collop* of my flesh,
And for thy sake I have shed many a tear. *Shakespeare.*

COLLO'QUIAL, *adj.* Whatever relates to common conversation.

COL'LOQUY, *s.* [*colloquium*, Lat.] Conference; conversation; alternate discourse; talk.—In retirement make frequent *colloquies*, or short discoursings, between God and thy own soul. *Taylor.*

My earthly, by his heav'nly over-power'd,
In that celestial *colloquy* sublime,
As with an object that excels the sense,
Dazzled, and spent, sunk down. *Milton.*

COL'LOW, *s.* [more properly *colly*, from *coal.*]—*Collow* is the word by which they denote black grime of burnt coals, or wood. *Woodward.*

COLLUC'TANCY, *ſ.* [*colluctor*, Lat.] A tendency to conteſt; oppoſition of nature.

COLLUCTA'TION, *ſ.* [*colluctatio*, Lat.] Conteſt; ſtruggle; contrariety; oppoſition; ſpite.—The thermæ, natural baths, or hot ſprings, do not owe their heat to any *colluctation* or effervescence of the minerals in them. *Woodward.*

To COL'LUDE, *v. n.* [*colludo*, Lat.] To conſpire in a fraud; to act in concert; to play into the hand of each other.

COL'LUM, *ſ.* [from κωλον, a member, as being one of the chief; or dim. of *columna*, as being the pillar and ſupport of the head; or from *collis*, a hill, becauſe it riſes from the ſhoulders, like a hill.] In anatomy, the vertebræ of the neck.

COLLU'SION, *ſ.* [*colluſio*, Lat.] Concerted fraud, or deceitful compact between two or more perſons, for ſome evil purpoſe; deceptive or unfair dealing.—By the ignorance of the merchants, or diſhoneſty of weavers, or the *colluſion* of both, the ware was bad, and the price exceſſive. *Swift.*

COLLU'SION, *ſ.* in law, is an agreement between two or more perſons for the purpoſe of bringing an action to defraud a third perſon of his right. This *colluſion* is either apparent, when it ſhews itſelf on the face of the act; or, which is more common, it is ſecret, where done in the dark, or covered over with a ſhow of honeſty. And it is a thing the law abhors: wherefore, when found, it makes void all things dependant upon the ſame, though otherwiſe in themſelves good. *Co. Lit.* 109, 360. *Colluſion* may ſometimes be tried in the ſame action wherein the covin is, and ſometimes in another action, as for lands aliened in mortmain by a *quale jus*; and where it is apparent there needs no proof of it; but when it is ſecret, it muſt be proved by witneſſes, and found by a jury like other matters of fact. 9 *Rep.* 33. The ſtatute of Weſtminſter 2. 13 Edw. I. c. 33, gives the writ *quale jus*, and inquiry in theſe caſe; and there are ſeveral other ſtatutes relating to deeds, made by *colluſion* and fraud.

COLLU'SIVE, *adj.* Fraudulently concerted.

COLLU'SIVELY, *adj.* In a manner fraudulently concerted.

COLLU'SORY, *adj.* [from *colludo*, Lat.] Carrying on a fraud by ſecret concert.

COLLU'THIANS, *ſ.* A religious ſect, who roſe about the beginning of the fourth century, on occaſion of the indulgence ſhewn to Arius by Alexander patriarch of Alexandria. Several people being ſcandalized at ſo much condeſcenſion, and, among the reſt, Colluthus, a prieſt of the ſame city, he hence took a pretence for holding ſeparate aſſemblies, and by degrees proceeded to the ordination of prieſts, as if he had been a biſhop; pretending a neceſſity for this authority, in order to oppoſe Arius. To his ſchiſm he added hereſy; teaching, that God did not create the wicked. He was condemned by a council held at Alexandria by Oſius, in the year 330.

COLLU'VIES, *ſ.* [from *colluo*, Lat. to cleanſe.] Filth, excrement. The diſcharge from an old ulcer.

COL'LY, *ſ.* The ſmut of coal.—Suppoſe thou ſaw her dreſſed in ſome old hirſute attire, out of faſhion, coarſe raiment, beſmeared with ſoot, *colly*, perfumed with opoponax. *Burton.*

To COL'LY, *v. a.* To grime with coal; to ſmut with coal:

Brief as the lightning in the *collied* night,
That, in a ſpeen, unfolds both heav'n and earth;
And, ere a man hath pow'r to ſay, behold,
The jaws of darkneſs do devour it up. *Shakeſpeare.*

COL'LYBUS, *ſ* [κολλυβος, Gr.] In antiquity, the ſame with what is now called the *rate of exchange*.

COL'LYRÆ, or COLLYRIDES, *ſ.* in antiquity, an ornament of hair worn by the women on their necks. It was made up in the form of ſmall roundiſh cakes called κολλυραι, *collyræ*.

COLLYRI'DIANS, *ſ.* A ſect towards the cloſe of the fourth century, denominated from a little cake, called by the Greeks κολλυριδιαι, *collyridia*, which they offered to the Virgin Mary. This ſect conſiſted chiefly of Arabian women, who met on a certain day annually, to celebrate a ſolemn feaſt, and to render divine honours to the Virgin Mary. St. Epiphanius decried it as an idolatrous ceremony.

COL'LYRIS, *ſ.* [κολλυρις, Gr. a little round cake.] The bump or knob which riſes after a blow; ſo called from its likeneſs to a cake or gingerbread-nut.

COLLY'RIUM, *ſ.* [from κωλυω, to reſtrain, παρα το κωλυειν τον ρευ, becauſe it ſtops the defluxion. קלר *kolera*, Arab.] An application to the eyes, to repel hot ſharp humours.

COLM, a ſmall iſland of Scotland, in the Frith of Forth: ſix miles ſouth-eaſt of Dumferline.

COL'MAN (George), ſon of Thomas Colman, eſq. Britiſh reſident at the court of the grand duke of Tuſcany at Piſa, whoſe wife was a ſiſter of the counteſs of Bath. Mr. George Colman was born at Florence, about the year 1733, and placed at a very early age in Weſtminſter-ſchool, where he ſoon diſtinguiſhed himſelf by the rapidity of his attainments, and the dawning ſplendour of his talents. In 1758 he removed to Chriſt-church college, Oxford, where he took the degree of M. A. During his progreſs at Weſtminſter, and while at college, he formed thoſe literary connections with whom he remained in friendſhip till they ſeverally dropped off the ſtage of life. Lloyd, Churchill, Bonnel Thornton, and other celebrated wits of a former day, were among the intimate aſſociates of Mr. Colman, and gave a luſtre to his name, by noticing him in ſome of their compoſitions. Even ſo early as the publication of the Roſciad, Churchill propoſed Mr. Colman as a proper judge to decide on the pretenſions of the ſeveral candidates for the chair of Roſcius; and only complains that he may be thought too juvenile for ſo important an award. It was during his reſidence at Oxford that he engaged with his friend Bonnel Thornton, in publiſhing the Connoiſſeur, a periodical paper, which appeared once a-week, and was continued from January 31, 1754, to September 30, 1756. When the age of the writers of this entertaining miſcellany is conſidered, the wit and humour, the ſpirit, the good ſenſe, and ſhrewd obſervations on life and manners, with which it abounds, will excite ſome degree of wonder, but will, at the ſame time, evidently point out the extraordinary talents which were afterwards to be more fully diſplayed in the Jealous Wife, and the Clandeſtine Marriage.

When Colman came to London, the recommendation of his friends, or his choice, but probably the former, induced him to fix upon the law for his profeſſion, and he was received with great kindneſs by lord Bath, who ſeemed to mark him for the object of his patronage; a circumſtance that gave riſe to the ſuſpicion that his lordſhip had a natural bias in favour of young Colman. He was entered of the ſociety of Lincoln's-inn, and in due ſeaſon called to the bar. He remained there a very ſhort time, though, from the frequency of his attendance on the courts, we muſt conclude that it was not for want of encouragement that he abandoned the profeſſion. It is reaſonable to ſuppoſe that he felt more pleaſure in attending to the muſe than to briefs and reports; and it will therefore excite no ſurpriſe, that he took the earlieſt opportunity of relinquiſhing purſuits not congenial to his taſte. "Apollo and Littleton," ſays Wycherley, "ſeldom meet in the ſame brain." At this period Lloyd addreſſed to him a very pleaſant poem on the importance of his profeſſion, and the ſeducements to which he was liable, on account of his attachment to the ſiſters of Helicon. His firſt poetical performance is a copy of verſes addreſſed to his couſin lord Pulteney, written in 1747, while he was yet at Weſtminſter, and ſince in a work publiſhed by his unfortunate friend Robert Lloyd, in conjunction with whom he wrote the beſt parodies of modern times, the odes to Oblivion and Obſcurity. In 1760, his firſt dramatic piece, Polly Honeycomb, was acted

acted at Drury-lane, with great success. For several years before, the comic muse seemed to have abandoned the stage. No comedy had been produced at either theatre since the year 1751, when Moore's Gil Blas was with difficulty performed nine nights. At length, in the beginning of 1761, three different authors were candidates for public favour in the same walk, and almost at the same time, viz. Mr. Murphy, who exhibited the Way to Keep Him; Mr. Macklin, the Married Libertine; and Mr. Colman, the Jealous Wife. The former and latter of these were most successful, and the latter in a much higher degree. Indeed, when the excellent performers, Messrs. Garrick, Yates, O'Brien, King, Palmer, Moody, with Mrs. Pritchard, Clive, and Miss Pritchard, are recollected, it would have shewn a remarkable want of taste in the town, not to have followed, as they did, this admirable piece, with the greatest eagerness and perseverance.

In July, 1764, lord Bath died, and left Mr. Colman a very comfortable annuity, though far less than had been expected, owing, it was said, to some little difference that had arisen between them just before the death of that nobleman; however, he now found himself in circumstances fully sufficient to enable him to follow the bent of his genius. The first publication which he produced, after this event, was a translation of the comedies of Terence, in the execution of which he rescued that author from the hands of his former tasteless and ignorant translators. The successor of lord Bath, general Pulteney, died in 1767; and Mr. Colman found himself also remembered in his will by a second annuity, which confirmed the independency of his fortune. He seems, however, to have felt no charms in an idle life; as, about the year 1768, Mr. Beard, being incapable of bearing any longer the fatigues of a theatrical life, and wishing to retire from the management of Covent-garden theatre, he disposed of his property in that house to Messrs. Colman, Harris, Powell, and Rutherford. These gentlemen carried on the management conjointly; but, in a short time, Mr. Colman appearing to aspire to a greater authority than the other patentees, excepting Mr. Powell, were disposed to grant, Mr. Colman, after a severe literary contest, which was published, sold his share, and retired. Soon after, Mr. Foote, then proprietor of the Haymarket theatre, having been induced to withdraw from the stage, disposed of his theatre to Mr. Colman for a handsome annuity, which he did not long enjoy. On his death, Mr. Colman obtained the licence; and, from that period, conducted the theatre with great judgment and assiduity, occasionally supplying many dramas from his own fancy, as well as many pleasant translations from the French. To sagacity in discovering the talents of his performers, he joined the inclination and ability to display them with every advantage. To him Mr. Henderson, Miss Farren, Mrs. Bannister, Miss George, Mrs. Wells, and in some measure Mr. Edwin, (whose comic powers had been buried a whole season under Mr. Foote's management,) besides some others, owed their introduction to a London audience; and the great improvements made by Mr. Palmer, Mr. Parsons, &c. bore witness to the judgment and industry of their director.

While Mr. Colman was thus shewing his attention to the theatre he did not entirely neglect his classical studies. He gave the public a new translation of Horace's Art of Poetry, accompanied with a commentary, in which he produced a new system to explain that very difficult poem. In opposition to Dr. Hurd, he supposes, "that one of the sons of Piso, undoubtedly the elder, had either written or meditated a poetical work, most probably a tragedy; and that he had, with the knowledge of the family, communicated his piece, or intention, to Horace; but Horace, either disapproving of the work, or doubting of the poetical faculties of the elder Piso, or both, wished to dissuade him from all thoughts of publication. With this view he formed the design of writing this epistle, addressing it with a courtliness and delicacy perfectly agreeable to his acknowledged character, indifferently to the whole family, the father and his two sons: Epistola ad Pisones de arte poetica." This hypothesis is supported with much learning, ingenuity, and modesty; and if not fully established, is at least as well entitled to applause as that adopted by the bishop of Worcester. On the publication of the Horace, the bishop said to Dr. Douglas: "Give my compliments to Colman, and thank him for the handsome manner in which he has treated me; and tell him, that I think he is right." About the year 1790, Mr. Colman had a stroke of the palsy, which nearly deprived him of the use of one side of his body; and in a short time afterwards he gave evident signs of mental derangement; in consequence of which he was placed under proper management at Paddington, and the conduct of the theatre was vested in his son. He died the 14th of August, 1794. Mr. Colman, as a scholar, holds a very respectable rank, as may be seen by his translations of Horace's art of poetry, and of the comedies of Terence; and his manners were as pleasing as his talents were respectable.

Thus far his biographer.—And in addition it may be proper to notice a pamphlet, published in 1795, containing "Some Particulars of the Life of George Colman, Esq. written by *himself*, and delivered by *him* to Robert Jackson, Esq. (one of his Executors) for Publication after his Decease." The design of this memoir appears to have been to set the public right, with regard to a few of the principal circumstances respecting the family and fortunes of the writer: 1. It had been the prevailing opinion, that Mr. Colman was the *son* of the celebrated William Pulteney, afterwards earl of Bath. The physical impossibility of the fact is here irrefragably evinced. Mr. Colman's mother was a sister of the lady of Mr. Pulteney, and she had resided with her husband, at Florence, where he was situated as British minister plenipotentiary, for four or five years before the existence of Mr. Colman, who was born at Florence; during which time, Mr. Pulteney and his family were constantly in England. 2. It had been generally said, and groundlessly believed, that, by his literary pursuits and dramatic compositions, Mr. Colman had lost the favour and affection of the earl of Bath; and that, by his purchase of a fourth of the patent of Covent-garden theatre, he knowingly and voluntarily forfeited lord Bath's intended bequest of the Newport estate, under the will of general Pulteney. The contrary of all this is here strongly affirmed, and (we believe) with unquestionable truth, so far as respects the lasting affection, even to fondness, of lord Bath. Certain it is that the immense estate formerly belonging to lord Newport, and repeatedly given in several wills by lord Bath to Mr. Colman, was left subject to the discretion of his lordship's brother and heir, general Pulteney; who continued, as the earl had done, to behave with the greatest appearance of the most cordial regard for this ingenious, witty, and pleasant, man.

When Mr. Colman was in treaty for the purchase of the above-mentioned share in the property of Covent-garden theatre, general Pulteney, according to this account, manifested some degree of disapprobation of Mr. Colman's engagement; on which the latter, rather than offend the general, proposed to relinquish his contract, at the expence of 3000l. forfeit; in which measure general Pulteney did not seem much inclined to acquiesce, on account of the heavy penalty; and so the business, as the public well know, was allowed to take its full effect. But the general continued to give Mr. Colman assurances of his friendly intentions towards him, as fully appears from the letters inserted in those pages; though there seems to be a little abatement in the warmth of his expression, after the play-house connection took place. In fine, at the general's decease, a few years afterwards, it was found that Mr. Colman was deprived of the splendid provision which lord Bath had made for him, and which general Pulteney had thought it proper to commute for an annuity of

of only four hundred pounds.—What a mortifying reduction from the many thousands per annum which he expected! for great was the value of the Newport estate.

COL'MAR, *s.* [Fr.] A sort of pear.

COL'MAR, a town of Germany, in the duchy of Holstein: five miles south-east of Gluckstadt.

COL'MAR, a town of France, and capital of the department of the Upper Rhine, situated on two small rivers the Fecht and the Lauch, and surrounded by a wall, flanked with towers. It contains about 15,000 inhabitants: ten leagues and a half north of Bâle. Lat. 47. 35. N. lon. 25. 2. E. Ferro.

COL'MARS, a town of France, in the department of the Lower Alps, and chief place of a canton, in the district of Castellane: seventeen miles north-east of Digne, and twenty-two north of Castellane.

COLM'BERG, or KOLBENBERG, a town of Germany, in the circle of Franconia, and principality of Anspach: nine miles north-west of Anspach.

COLME (La), a river of France, which branches from the river Aa, at Watte, in the department of the Straits of Calais. See AA.

COL'MENAR, a town of Spain, in Old Castile, on the confines of New Castile: seven leagues north-west of Talavera de la Reina.

COL'MENAR, a town of Spain, in New Castile: five leagues north-east of Escurial.

COL'MITZ, a town of Germany, in the archduchy of Austria: four miles south-south-west of Droffendorf.

COLN, a river of England, which passes by Uxbridge and Colnbrook, and runs into the Thames at Staines, separating the county of Middlesex from Buckinghamshire.

COLN, a river of England, which runs into the sea near Colchester.

COLN, a river of England, which runs into the Thames at Cricklade.

COLN'BROOK, a market town in Buckinghamshire, eighteen miles from London, and three from Windsor, situated on four branches of the river Coln, over each of which is a bridge. A small part of it is in Middlesex. Here is an ancient chapel, said to have been founded by Edward III. Some antiquarians have supposed this place to have been a Roman station, but this opinion seems unfounded.

COLNE, a small town in Lancashire, distant from Manchester thirty miles, twenty from Halifax, and 215 from London. It is situated near Pendle-hill, on the east side of the county, and appears to have been very ancient, if not a Roman station, from the many coins, both of copper and silver, that have been cast up here by the plough. It has a market on Wednesdays, and fairs on May 14, and October 10. The manufactures carried on here are worsted and cotton.

COLO, a town of Poland, in the palatinate of Kalisch, where the king, with his army, passed the Warta in 1655: twenty miles north of Kalisch.

COLOBO'MA, *s.* [κολόβωμα, Gr.] A growing together of the lips, eye-lids, or nostrils; or a preternatural cleaving of the ears to the head. But Castill. Renov. tells us (far more agreeably to the etymology of the word, which signifies a *mutilation*) that it is used to express something deficient in the lips, nose, ears, or in the angles of the eyes; the defect of whose glandules is in particular styled *rhæas*.

COLOCA'SIA, *s.* in botany. See ARUM.

COLOCYN'THIS, *s.* in botany. See CUCUMIS and TRICHOSANTHES.

COLOC'ZA, a town of Hungary, on the Danube, the see of an archbishop, formerly a city of great extent, but now much gone to decay, in consequence of repeated wars: sixty miles north of Bacs, and 136 south-east of Vienna. Lat. 46. 33. N. lon. 36. 22. E. of Ferro.

COLO'DI, a town of Italy, in the republic of Lucca: seven miles from Lucca.

COLO'GNA, a podestaria or district of the dogad of Venice, in Maritime Austria, is situated on the left bank of the Adige, and bounded on the east by the territory of Verona, which the river Rabbiosa separates from it; on the south by the territory of Padua, and on the west and north by the territory of Vicenza. It is one of the most fertile districts of the continent, affording an abundance of corn, wine, and silk. The river Gna, which precipitates itself from the Vicentine mountains, divides this district into two nearly equal parts. It comprehends one town, thirteen great villages, and 12,500 inhabitants.

COLO'GNA, in the above district, was built but at the latter end of the twelfth century, and is a very rich and flourishing town, situated on the new river, or *Fiume Nuovo*, which divides it into two portions. It contains 300 houses, fine churches and convents, and 6,100 inhabitants, who carry on a considerable trade in wine and silk.

COLO'GNE, an electoral bishopric of Germany, in the circle of the Lower Rhine, divided into several districts by other estates: the greater part is situated upon the Rhine, between the duchies of Juliers and Berg; another part is situated between Juliers and Treves; the duchies of Recklinghausen and Westphalia form another. It takes its name from the city of Cologne. The soil is unequal; being composed of mountains and forests, sandy lands, and fertile fields: there is plenty of game, fish, and mineral springs, and vineyards, from which is made excellent wine. It contains seventy-two towns and cities; the states are composed of prelates, nobles, and cities; the assemblies are held at Bonn. The inhabitants are Romans catholics in general. Cologne was a bishopric in 314, and was erected into an archbishopric, in 799, by Charlemagne, with the bishoprics of Liege, Munster, and Osnabruck, for suffragans, but enjoying no spiritual power over the latter. The archbishop of Cologne has long since borne the pallium and the cross, and takes the title of born legate of the holy see, and arch-chancellor of the sacred empire for Italy. He gives his vote after the elector of Treves, and sits at the right hand of the emperor at assemblies held in his own diocese, in Gaul, or in Italy. The metropolitan church and chapter are at Cologne; the chapter is composed of twenty-five canons and thirty-six dignitaries, all of which are princes or counts, except eight doctors: the electorate pays 1828 florins for a Roman month, and is taxed for the imperial chamber 812 crowns fifty-eight kruetzers for each term.

COLO'GNE, a free and imperial city of Germany, in the circle of Westphalia, and capital of the archbishopric to which it gives name. It is built in the form of a crescent, on the borders of the Rhine, and fortified in the ancient manner. They reckon at Cologne thirty-four gates, ten collegiate and forty-nine parish churches, four abbies, fifty-six convents, sixteen hospitals, and fifty chapels. This city is perhaps the most remarkable of any in the world for the great number of popish relics it contains. In the church of St. Ursula, they pretend to shew her tomb, and the bones of the 11,000 pretended virgin martyrs, though that story is entirely owing to a mistaken inscription. The heads of some of these imaginary martyrs are kept in cases of silver, others are covered with stuffs of gold, and some have caps of cloth of gold and velvet. Brevat says, he saw between 4 and 5000 skulls, decked with garlands, and coronets, ranged on shelves. The canonesses of St. Ursula, who must be all countesses, have a handsome income. In their church they pretend to show three of the thorns of our Saviour's crown, and one of the vessels which contained the water that he converted into wine at the marriage of Cana. In the church of St. Gereon are 900 heads of Moorish cavaliers, said to have been in the army of Constantine before it was converted, and to have been beheaded for refusing to sacrifice to idols. Every one of the heads has a cap of scarlet, adorned with pearls. In the magnificent cathedral of St. Peter, the three wise men who came from the east to visit our Saviour, are said to be interred. They lie in a large purple shrine spangled with gold set upon a pedestal of

of brass, in the midst of a square mausoleum, faced within and without with marble and jasper. It is opened every morning at nine o'clock, if two of the canons of the cathedral are present, when these kings or wise men are seen lying at full length, with a crown of gold garnished with precious stones on each of their heads. Their names, which are Gaspar, Melchier, and Balthasar, are in purple characters on a little grate, which is adorned with an infinite number of large rich pearls and precious stones, particularly an oriental topaz as big as a pigeon's egg, and valued at 30,000 crowns. Over against them are six large branches of silver, with wax candles, which burn night and day. The bones of these men, we are told, were brought to Constantinople by Helena mother to Constantine, from thence to Milan by Eustorpius bishop of that see, and afterwards hither by archbishop Rainold. In the Jesuits college are the portraits of the first thirteen generals of that order, with Ignatus Loyola at their head; and in the church, which is the finest in Cologne, are many rich statutes, with an amazing quantity of fine silver plate; and the utensils for mass are all of gold enriched with precious stones.

The Protestants hold their religious assemblies at Millheim, a small town dependent on the duchy of Berg. Cologne acknowledges the power of the archbishop in spirituals, but not as a prince; and on his inauguration he takes an oath to maintain the rights and immunities; nay, the inhabitants pretend that he cannot reside in the city three days without permission. The streets are narrow, winding, and gloomy, and the city, though well situated on the Rhine for commerce, is not populous. The principal manufacture is that of ribbons. The city pays 1100 florins for the Roman month, and 405 rixdollars seventy-two kruitzers to the Imperial chamber. The military force consists of four companies of soldiers. Of the present state of this city, a German traveller in 1798, gives the following account: Cologne exhibits a disheartening instance of a city once flourishing, but now hastening to decay. The wealth, which, in the season of its prosperity, it had acquired by commerce, served to excite and to feed the rapacity of the clergy; and it was wasted on ecclesiastical establishments, which, instead of promoting the cause of Christianity, tended only to favour the indolence and authority of priests, who perverted the best and most benevolent religion, so as to render it the worst and most malignant. Oppression, intolerance, and superstition, produced their usual effects; and Cologne, instead of being the opulent residence of commerce, is now the abode of ignorance and indolence, of bigotted monks, and useless prelates. Except the advantages which result from the passage of goods along the Rhine, it has no other trade than what is carried on by a few manufacturers of ribbands, stockings, snuff, and laces; and even this is declining. The internal government of Cologne is, like that of most of the imperial cities, an imitation of the ancient republic of Rome: but so many abuses have crept into it, that it is no longer capable of promoting the happiness of the people. It may justly be called a corrupt republic, in which the forms of a free constitution remain, but in which the most salutary regulations are either eluded, or so perverted as to become detrimental to the public interest. Hence it has that lot, which ever befalls states that are sunken into these circumstances of moral and political degradation, it is ruled by an arbitrary aristocracy; the senate acts as it pleases, and all the endeavours of the representatives of the people, and even of the citizens themselves, who are assembled in their several tribes, are of no avail. This is not surprising when it is considered that the people of Cologne, even when they oppose the aristocracy, are not animated by any spirit of true liberty, but merely by a servile and obstinate attachment to ancient usages, and to whatever has been long established: their tenacity in this respect generally bids defiance to all reason, and frequently operates to their own disadvantage. In no place, says the author, are the people so terrified at the idea of innovation, and no where are prejudices of every kind so deeply rooted. Hence it may easily be conceived how much the inhabitants are inferior to those of other places, in every thing which renders human nature respectable; and how little improvement in science and manners can be expected from them. The French republican army, after the defeat of general Clairfayt, entered Cologne on the 6th of October, 1794, and were received rather as friends than enemies. The inhabitants, it is said, pressed upon them with the most unequivocal tokens of joy and admiration. The magistrates had previously sent four deputies to the French general to deprecate the admission of light troops within the walls; the request was granted, and he entered only at the head of 4000 men. Very few of the inhabitants left the place; the persons and property of all who remained were in the most perfect security; and the secular clergy were permitted the free exercise of their functions. Sixty-five miles north-north-east of Treves. Lat. 50. 58. N. lon. 28. 26. E. Ferro.

COLO'GNE, a town of France, in the department of Gers, and chief place of a canton, in the district of L'Isle-en-Jourdain: six leagues east of Auch.

COLOGNO'LI, a town of Italy, in the duchy of Tuscany: six miles east of Leghorn.

COLOKI'TIA, or KOLOKITIA, a town of European Turkey, on the southern coast of the Morea, in a gulf to which it gives name: twenty-five miles south-south-east of Misitra. Lat. 36. 47. N. lon. 40. 20. E. Ferro.

COLOMAY', a town of Poland, in the palatinate of Red Russia: five miles north-east of Halicz.

COLOM'BES, a town of France, in the department of Paris, and chief place of a canton, in the district of St. Denys: one league and a half north-west of Paris.

COLOMBEY' AUX BELLES FEMMES, a town of France, in the department of the Meurte, and chief place of a canton, in the district of Vezelize: fifteen miles south-west of Nancy.

COLOMBIER', a town of France, in the department of the Upper Saône, and chief place of a canton, in the district of Vesoul: four miles north-east of Vesoul, and ten west of Lure.

COLOMBIER', a town of Swisserland, in the county of Neufchatel: two miles south-west of Neufchatel.

COLOMBIERE (Claude de la), a famous jesuit, born at St. Symphorien, near Lyons, acquired great reputation by his extraordinary talents in the pulpit. He was preacher for two years at the court of James II in England, who listened to his sermons with great pleasure, and, as it is said by the Romanists, with edification; but, falling under the suspicion of being concerned in a conspiracy, he was banished England, and retired to Parai, where he died, at the age of forty-one, in February 1682. His masterly eloquence displays itself even in the extreme simplicity of his style, as we are told by the abbe Trublet, speaking of his sermons, published at Lyons in 1757, in six volumes 12mo. These sermons breathe the most gentle, and at the same time the most fervent, piety: he has been equalled by few in the art of affecting his hearers, and no enthusiast ever fell less into the familiar. The celebrated Patru, his friend, speaks of him as the best skilled of his time in the refinements and niceties of the French language. There are likewise by him, Moral Reflections, and Spiritual Letters.

COLOM'BO. See COLUMBO.

COLOMBRA'RO, a town of Italy, in the kingdom of Naples, and province of Basilicata: four miles and a half south-south-west of Tursi.

COLO'MIES, or COLOMESIUS (Paul), born at Rochelle, in 1638. After having traversed France and Holland, he withdrew to England, at the solicitation of Isaac Vossius, then canon of Windsor; and died at London in 1692. The republic of letters are indebted to him for many useful works as, 1. Gallia Orientalis, reprinted at Hamburg, in 1709, 4to, under the care of the learned Fabricius. 2. Hispania & Italia Orientalis. 3. Bibliotheque Choisie: reprinted at Paris in 1731, with notes of M. de

M. de la Monnoye. This is an useful work, and of great erudition. 4. Theologorum Presbyterianorum Icon. 5. Des Opuscules critiques & historiques, collected and published in 1709 by Fabricius. 6. Melanges historiques. 7. La Vie du pere Sirmond.

CO'LON, in anatomy, the first and most considerable of the large intestines. See ANATOMY, vol. i. p. 613.

CO'LON, *s.* [κῶλον, a *member.*] A point [:] used to mark a pause greater than that of a comma, and less than that of a period. Its use is not very exactly fixed; nor is it very necessary, being confounded by most with the semicolon. It was used, before punctuation was refined, to mark almost any sense less than a period. To apply it properly, we should place it, perhaps, only where the sense is continued without dependence of grammar or construction; as, *I love him, I despise him: I have long ceased to trust, but shall never forbear to succour him.*

CO'LONEL, *s.* [of uncertain etymology. *Skinner* imagines it originally *colonialis*, the leader of a colony. *Minshew* deduces it from *colonna*, a pillar: as, *patriæ columen*; *exercitus columen*. Each is plausible.] The chief commander of a regiment; a field officer of the highest rank, next to the general officers. It is now generally sounded with only two distinct syllables, *col'nel.*—The chiefest help must be the care of the *colonel*, that hath the government of all his garrison. *Spenser.*

Captain or *colonel*, or knight in arms,
Whose chance on these defenceless doors may seize,
If deed of honour did thee ever please,
Guard them, and him within protect from harms. *Milton.*

CO'LONELSHIP, *s.* The office or character of colonel.—While he continued a subaltern, he complained against the pride of colonels towards their officers, yet, in a few minutes after he had received his commission for a regiment, he confessed that *colonelship* was coming fast upon him. *Swift*

COLO'NIA, anciently a town of the Trinobantes, a little above Camelodunum; now Colchester, in Essex, according to Cambden, who supposes it to take its name from the river Colne, and not that it was a colony. Though others think Antonine's distances agree best with Sudbury.

COLONIA EQUESTRIS, an ancient and noble colony on the Lacus Lemanus. It appears to be the work of Julius Cæsar, who settled there *Equites Limitanei*; and to this Lucan is thought to refer. By the Itinerary it is supposed to have stood between Lausane and Geneva, twelve miles from the last place by Peutinger's map; which directs to Nyon, placed in Cavo Lemano, according Lucan's expression, that is, a bay or cove of the lake. Its ancient name was *Noviodunum*, (Notitia Galliæ); hence its modern name.

COLONIA METALLINA, or METALLINENSIS, anciently a town of Lusitania, situated on the right or west side of the Anas, or Guadiana; but now on the left or east side, from the river's shifting its bed or channel, and called Medelin, in Estremadura.

COLONIA MORINORUM, a town of Belgica, supposed to be Tarvenna, the capital of the Morini; now Terrouen.

COLONIA NORBENSIS, or NORBA CÆSAREA, a town of Lusitania, to the south of Trajan's bridge on the Tagus; now Alcantara, in Estremadura.

COLONIA TRAJANA, a town of Belgica; surnamed also *Ulpia* and *Tricesima*, from being the station of the thirtieth legion; now Kellen, a village of the duchy of Cleves, a mile from the Rhine.

COLONIA VALENTIA, a town of the Hither Spain, on the Turias; destroyed by Pompey, and restored by Julius Cæsar; still called *Valencia*, on the river Guadalaviar, in Valencia.

COLO'NIA, a town of Istria: five miles south-south-east of Rovigno.

COLO'NICAL, *adj.* [*colonus*, Lat.] Of husbandmen; a law term.—*Colonical* services were those which were done by the ceorls or socmen to their lords. *Spelman.*

To CO'LONIZE, *v. a.* To plant with inhabitants; to settle with new planters; to plant with colonies.

CO'LONIZING, *s.* Forming colonies. *Robertson.*

COLON'NA, a town of European Turkey, in Dalmatia: twenty-four miles north of Spalatro.

COLON'NA, a town of Italy, in the Campagna-di-Roma: twelve miles from Rome.

COLON'NA (Pompeio), cardinal archbishop of Montreal in Sicily. He was equally qualified to wear the cardinal's hat and the helmet, and experienced more than once the reverse of fortune. Julius II. removed him from all his dignities; but Leo I. restored him, created him cardinal, and sent him on several embassies. Clement VII. divested him of the purple, and again restored him to it. He died viceroy of Naples, in 1532. He wrote some poems in praise of Isabella Filamarini, and another work, *De laudibus mulierum.*

COLON'NA (Fabio), born at Naples, in 1567, the natural son of the cardinal Pompeio Colonna. He devoted himself to the pursuit of natural history, and particularly to that of plants. He studied them in the writings of the ancients; and, by his indefatigable application, brought to light, from under the errata with which the manuscripts abounded, what would have remained hid from every other researcher, less penetrating, less unremittingly laborious. The languages, music, mathematics, drawing, painting, optics, the civil and canon law, filled up the moments which he did not bestow on botany. The works he published in the last-mentioned department were considered as masterpieces previous to the appearance of the labours of the latter botanists. We are indebted to him for, 1. Plantarum aliquot ac Piscium Historia, 1592, 4to. with copper-plates. 2. Minus cognitarum rariorumque stirpium Descriptio; itemque de aquatilibus, aliisque nonnullis animalibus libellus. Rome, 1616. This work affords a judicious critique in opposition to Matthiolo, Dioscorides, Theophrastus, Pliny, &c. 3. A Dissertation on the Glossopetræ, in Latin, to be found with a work of Augustine Scilla on marine substances. Rome, 1647, 4to. 4. He was concerned in the American Plants of Hernandez. Rome, 1651. 5. A Dissertation on the Porpura, in Latin; a piece much esteemed, but become scarce, was reprinted at Kiel, 1675, 4to. with notes by Daniel Major, a German physician. The first edition is of 1616.

COLON'NA (Francisco Maria Pompeio), an able philosopher, left several curious works, of which the principal is, the Natural History of the Universe, 1734, 4 vols. 12mo. He perished in a fire which burnt the house he lived in at Paris, in 1726.

COLONNA'DE, *s.* [from *colonna*, Ital. a column.] A peristyle of a circular figure; or a series of columns disposed in a circle, and insulated within side.

Here circling *colonnades* the ground inclose,
And here the marble statue breathe in rows. *Addison.*

Any series or range of pillars.

For you my *colonnades* extend their wings. *Pope.*

COLON'NE, a town of France, in the department of the Jura, and chief place of a canton, in the district of Poligny: two leagues west-north-west of Poligny.

COLO'NOS, an eminence near Athens, whither Œdipus, after his banishment from Thebes, is said to have retired: and hence Sophocles calls the tragedy on the subject, *Oedipus Coloneus.*—A place sacred to Neptune, where stood an equestrian statue of him. Here also stood Timon's tower; who, for his love of solitude, and hatred to mankind, was called *Misanthropos. Pausanias.*

COLON'SA, one of the western islands of Scotland, about six miles long, and two broad: four miles north from Ila.

COLO'NUS, *s.* an husbandman, or villager, who was bound to pay yearly a certain tribute, or at certain times of

of the year to plough some part of the lord's land; and from hence comes the word *clown*, who is called by the Dutch *boor*.

CO'LONY, *s.* [*colonia*, Lat.] A body of people drawn from the mother-country to inhabit some distant place.—Osiris, or the Bacchus of the ancients, is reported to have civilized the Indians, planting *colonies*, and building cities. *Arbuthnot.*—The country planted; a plantation:

The rising city, which far you see,
Is Carthage, and a Tyrian *colony*. *Dryden.*

Colonies may be divided into three classes or kinds: First, those serving to ease or discharge the inhabitants of a country, where the people are become too numerous, so that they cannot any longer conveniently subsist. The second are those established by victorious princes and people in the middle of vanquished nations, to keep them in awe and obedience. The third may be called colonies of commerce; because, in effect, it is trade that is the occasion and object of their settlement.

It was by means of the first kind of colonies, some ages after the deluge, that the east first, and successively all the other parts of the earth, became inhabited: and without mentioning any thing of the Phœnician and Grecian colonies, so famous in ancient history, it is certain that it was for the establishment of such colonies, that, during the declension of the empire, those torrents of barbarous nations, issuing out of the north, over-ran the southern parts of Europe; and, after several bloody battles, divided the country with the ancient inhabitants.

The second kind of colonies were adopted by the Romans more than by any other people; and that to secure the conquests they had made from the west to the east. Many cities in Gaul, Germany, Spain, and even in England, value themselves on their having been of the number of Roman colonies. There were indeed two kinds of colonies among the Romans: those sent by the senate; and the military ones, consisting of soldiers, broken and disabled with the fatigues of war, who were thus provided with lands as the reward of their services. The colonies planted by the senate were either Roman or Latin, i. e. composed either of Roman citizens, or Latins. The Coloniæ Latinæ were such as enjoyed the *jus Latii*: said to consist in two things: one, that whoever was edile or pretor in a town of Latium, became for that reason a Roman citizen: the other, that the Latins were subject to the edicts of their own, and not to those of the Roman magistrates: in the year of the city six hundred and sixty-two, after the social war, the city was granted to all Latium, by the *lex Julia*. The coloniæ Romanæ, were such as had the jus Romanum, but not in its full extent; namely, in the right of suffrage, putting up for honours, magistracies, commands in the army, &c. but the jus Quiritium only, or private right; as right of liberty, of gentility, or dignity of family, sacrifice, marriage, &c. According to Ulpian there were other colonies, which had little more than the name; only enjoying what they called *jus Italicum*, i. e. free from the tributes and taxes paid by the provinces. Such were the colonies of Tyre, Berytus, Heliopolis, Palmyra, &c. M. Vaillant has filled a volume with medals struck by the several colonies, in honour of the emperors who founded them.

Colonies of commerce, are those which have been established in more modern times by the British, French, Spaniards, Portuguese and other nations in several parts of Asia, Africa, and America; either to keep up a regular commerce with the natives, or to cultivate the ground, by planting sugar-canes, indigo, tobacco, and other commodities. The practice of settling commercial colonies in distant countries was also adopted by the wisest nations of antiquity. This was the case with the ancient Egyptians, the Chinese, the Phœnicians, the commercial states of Greece, the Carthaginians, and even the Romans; for, though the colonies of the latter were chiefly military, it could easily be shewn that many of them were likewise made use of for the purposes of trade. In glancing over our own settlements on the coast of Africa, the settlements of the East India Company in India, the China trade, Nootka Sound, and many other places, we see lands and territories under very different circumstances, and dependent upon political considerations of infinite variety; respecting some of which it must be extremely difficult to determine whether they are within the statute 7 and 8 Will. III. c. 22, (for regulating the plantation trade,) as colonies or plantations; or indeed, which is a further doubt, whether they are within any part of the act of navigation, as lands, islands, or territories to his majesty belonging, or in his possession. These are questions of great importance to the navigation system, and deserve a serious attention.

As to the terms *colony* or *plantation*, whatever distinction may, at one time, have been made between them, there seems now to be none at all. The plantations of Ulster, Virginia, Maryland, and other places, all implied the same idea of introducing, instituting, and establishing, colonies, where every thing was desert before. Colony did not come much into use, with us, till the reign of Charles II. and it seems to have denoted the sort of political relation in which such plantations stood to this kingdom. Thus the different parts of New England were, in a great measure, voluntary societies planted without the direction or participation of the English government; so that, in the time of Charles II. there were not wanting persons who pretended to doubt of their constitutional dependance upon the crown of England; and it was recommended, in order to put an end to such doubts, that the king should appoint governors, and so make them colonies. A colony therefore might be considered as a plantation, when it had a governor and civil establishment, subordinate to the mother country. All the plantations in America, except those of New England, had such an establishment; and they were, upon that idea, colonies as well as plantations. Those terms seem accordingly to be used without distinction in 7 and 8 Will. III. and in those made afterwards.

Plantations or colonies, in distant countries, (says Blackstone,) are either such where the lands are claimed by right of occupancy only, by finding them desert and uncultivated, and peopling them from the mother country; or where, when already cultivated, they have been either gained by conquest, or ceded by treaties. And both these rights are founded upon the law of nature, or at least upon that of nations. But there is a difference between these two species of colonies, with respect to the laws by which they are bound. For it hath been held, that if an uninhabited country be discovered and planted by English subjects, all the English laws then in being, which are the birth-right of every subject, are immediately there in force. *Salk.* 411. 2 *P. Wms.* 75. But this must be understood with very many, and very great, restrictions. Such colonists carry with them only so much of the English law as is applicable to their own situation and the condition of an infant colony; such, for instance, as the general rules of inheritance, and of protection from personal injuries. The artificial refinements and distinctions incident to the property of a great and commercial people, the laws of police and revenue, (such especially as are inforced by penalties,) the mode of maintenance for the established clergy, the jurisdiction of spiritual courts, and a multitude of other provisions, are neither necessary nor convenient for them, and therefore are not in force. What shall be admitted and what rejected, at what times, and under what restrictions, must, in case of dispute, be decided in the first instance by their own provincial judicature, subject to the revision and control of the king in council: the whole of their constitution being also liable to be new-modelled and reformed by the general superintending power of the legislature in the mother country. But in conquered or ceded countries, that have already laws of their own, the king may indeed alter and change those laws: but, till he does actually change them, the ancient laws of the country remain

main in force; unless such as are against the law of God, as in the case of an infidel country. In the case of Campbell *v.* Hall, there is an elaborate argument of lord Mansfield, to prove the king's legislative authority, by his prerogative alone, over a ceded or conquered country. *Cowp.* 204. Our American plantations are principally of this latter sort, obtained either by right of conquest, driving out the natives, or by treaties. And therefore the common law of England, as such, has no allowance or authority there; they being no part of the mother country, but distinct (though dependant) dominions. They are subject however to the control of the parliament; though (like the Isle of Man, and the rest) not bound by any acts of parliament, unless particularly named. 1 *Comm. Introd.* p. 108.

With respect to their interior polity, our colonies are stated by Blackstone to be properly of three sorts: 1. Provincial establishments; the constitutions of which depend on the respective commissions issued by the crown to the governors, and the instructions which usually accompany those commissions; under the authority of which, provincial assemblies are constituted, with the power of making local ordinances, not repugnant to the laws of England. 2. Proprietary governments; granted out by the crown to individuals, in the nature of feudatory principalities, with all the inferior regalities, and subordinate powers of legislation, which formerly belonged to the owners of counties-palatine: yet still with these express conditions, that the ends for which the grant was made be substantially pursued, and that nothing be attempted which may derogate from the sovereignty of the mother country. 3. Charter governments; in the nature of civil corporations, with the power of making bye-laws for their own interior regulation, not contrary to the laws of England; and with such rights and authorities as are specially given them in their several charters of incorporation. The form of government in most of them is borrowed from that of England. They have a governor named by the king, (or in some proprietary colonies by the proprietor,) who is his representative or deputy. They have courts of justice of their own, from whose decisions an appeal lies to the king and council here in England. Their general assemblies, which are their house of commons, together with their council of state, being their upper house, with the concurrence of the king or his representative, the governor, make laws suited to their own emergencies. But it is particularly declared by 7 and 8 Will. III. c. 22, that all laws, bye-laws, usages, and customs, which shall be in practice in any of the plantations, repugnant to any law, made or to be made in this kingdom relative to the said plantations, shall be utterly void and of none effect. And because several of the colonies had claimed the sole and exclusive right of imposing taxes upon themselves the statute 6 Geo. III. c. 12. was passed, expressly declaring, that all his majesty's colonies and plantations in America have been, are, and of right ought to be, subordinate to and dependent upon the imperial crown and parliament of Great Britain; who have full power and authority to make laws and statutes of sufficient validity to bind the colonies and people of America, subjects of the crown of Great Britain, in all cases whatsoever. This authority was afterwards enforced by stat. 7 Geo. III. c. 59, for suspending the legislation of New York, and by several subsequent statutes: but by 22 Geo. III. c. 46, his majesty was empowered to conclude a truce or peace with the colonies in North America; and for that purpose, to repeal, or to suspend, the operation of any acts of parliament so far as they related to the said colonies. A peace was soon after concluded, and the independence, which the above-mentioned colonies had before declared, was allowed to them, under the title of the United States of America; and the stat. 23 Geo. III. c. 39, gives his majesty certain powers for the better carrying on trade and commerce between England and the United States. See the article AMERICA, vol. i. p. 412, &c. See stat. 5 Geo. II. c. 7, as to suits in the courts of law and equity in the plantations; and the making houses, lands, negroes, and real estates, assets to pay debts. Stat. 13 Geo. III. c. 14, as to mortgages of estates in the West India colonies, and the mode of proceeding to enforce the same. Stat. 22 Geo. III. c. 75, by which offices in plantations can only be granted by patent, during the residence of the grantee, and *quamdiu se bene gesserit*; and on absence or misbehaviour, the officer is removable by the governor and council, who may also give leave of absence. As to the limits and government of the province of Quebec, see 14 Geo. III. c. 83. 31 Geo. III. c. 31. Courts of civil jurisdiction in Newfoundland, are established and regulated by 31 Geo. III. c. 29. 32 Geo. III. c. 46. 33 Geo. III. c. 76. 34 Geo. III. c. 44. 35 Geo. III. c. 25. A court of criminal jurisdiction in Norfolk Island, on the eastern coast of New South Wales, whither felons are now transported, is established and regulated by 27 Geo. III. c. 2. 34 Geo. III. c. 45. 35 Geo. III. c. 18.

COLOO'R, a town of Hindoostan, in the circar of Guntoor, in which is a diamond mine, situated on the south side of the Kistnah: thirteen miles north-west of Condavir.

CO'LOPHON, *s.* [κολοφων, accomplishment or close.] A note, either by the author or printer, usually placed at the end of old books.

CO'LOPHON, anciently a town of Ionia, at a small distance from the sea, first built by Mopsus the son of Manto, and colonized by the sons of Codrus. It was the native country of Mimnermus, Nicander, and Xenophanes, and one of the cities which disputed for the honour of having given birth to Homer. Apollo had a temple there. *Strabo.*

CO'LOPHONY, *s.* The resinous residuum after the distillation of the light oil from turpentine. It has the properties of other resins, and the same principles may be obtained from it by analysis. It receives its name of *colophonia* from Colophon, a city of Ionia; because the best was formerly brought from thence. Two sorts are mentioned in ancient writings; the one dry, the other in a liquid form. The latter seems to have been liquid pitch, which is the crude resin of the pine brought from Colophon; the other was called *resina fricta*, and consisted only of the former deprived of its humid parts.

COLOQUIN'TIDA, *s.* [*colocynthis*, Lat. from κολοκυνθις, Gr.] In botany. See CUCUMIS.

COLORA'DO, a river of New Mexico, which runs into the bay of St. Bernard. Lat. 29. 0. N. lon. 79. 17. W. Ferro.

COLORA'DO, or RIVER OF MARTYRS, a river of North America, which runs into the northern part of the Gulf of California.

COLOR'ADO, or RIVIERE ROUGE, a river of North America, in Louisiana, which runs into the Gulf of Mexico, fifty miles below New Orleans.

COLORA'DOS (Los), a numerous cluster of small islands, or rocks, near the north west coast of the island of Cuba.

CO'LORATE, *adj.* [*coloratus*, Lat.] Coloured; dyed; marked or stained with some colour.—Had the tunicles and humours of the eye been *colorate*, many rays from visible objects would have been stopt. *Ray.*

COLORA'TION, *s.* [*coloro*, Lat.] The art or practice of colouring.—Some bodies have a more departable nature than others, as is evident in *coloration*; for a small quantity of saffron will tinct more than a great quantity of brasil. *Bacon.*—The state of being coloured.—Amongst curiosities I shall place *coloration*, though somewhat better; for beauty in flowers is their preheminence. *Bacon.*

COLORATU'RA, *s.* [Ital.] in music, denotes all manner of variations, trillos, diminutions, &c. serving to make a song agreeable.

COLORE'DO, a town of Italy, belonging to the state of Venice, in the country of Friuli: seven miles north-west of Udina.

COLORI'FIC,

COLORI'FIC, *adj.* [*colorificus*, Lat.] That which has the power of producing dyes, tints, colours, or hues.—In this composition of white, the several rays do not suffer any change in their *colorific* qualities by acting upon one another; but are only mixed, and by a mixture of their colours produce white. *Newton.*

COLOR'NO, a town of Italy, in the Parmesan: seven miles north of Parma.

CO'LOS, a town of Transilvania: four miles north of Colofvar.

COLOS'SE, or COLOSSIS, anciently a large town of Phrygia, near Laodicea, of which the government was democratical, and the first ruler called *archon*.

COLOS'SE, or COLOSSUS, *s.* [*colossus*, Lat.] A statue of enormous magnitude; figuratively, any person of an overgrown or gigantic size:

There huge *colossus* rose, with trophies crown'd,
And runic characters were grav'd around. *Pope.*

A celebrated brazen image at Rhodes, which passed for one of the seven wonders of the world. Its feet were upon the two moles, which formed the entrance of the harbour, and ships passed full sail between its legs. It was seventy cubits, or 105 feet, high, and every thing in equal proportion, and few could clasp round its thumb. It was the work of Chares, the disciple of Lysippus, and the artist was twelve years in making it. It was begun 300 years before Christ; and after it had remained unhurt during fifty-six or eighty-eight years, it was partly demolished by an earthquake, 224 years before Christ. A winding staircase ran to the top, from which you could easily discern the shores of Syria, and the ships that sailed on the coast of Egypt, by the help of glasses, which were hung on the neck of the statue. It remained in ruins for the space of 894 years; and the Rhodians, who had received several large contributions to repair it, divided the money among themselves, and frustrated the expectations of the donors, by saying that the oracle of Delphi forbade them to raise it up again from its ruins. In the year 672 of the Christian era, it was sold by the Saracens, who were masters of the island, to a Jewish merchant, who loaded 900 camels with the brass, whose value has been estimated at 36,000l. English money.

COLOSSE'AN, *adj.* [*colosseus*, Lat.] In form of a colossus; of the height and bigness of such a statue; giant-like.

COLOS'TRUM, *s.* The first milk of any animal after bringing forth its young; that from cows is called *beestings*. It is remarkable that this milk is generally cathartic, and purges off the meconium; thus serving both as an aliment and medicine. An emulsion prepared with turpentine dissolved with the yolk of an egg, is sometimes called by this name.

COLOSVA'R, or CLAUSENBURG, a town of Transilvania, on the river Samos, where the states of the province generally assemble. It had an university, which was suppressed in 1782: 255 miles east-south-east of Vienna, and 145 north-north-east of Belgrade. Lat. 46. 57. N. lon. 40. 7. E. Ferro.

COLOUR, *s.* [*color*, Lat. from *colo*, to adorn.] The appearance of bodies to the eye only; hue; dye.—It is a property inherent in light, by which, according to the various sizes of its parts, or from some other cause, it excites different vibrations in the optic nerve; which, propagated to the sensorium, affect the mind with different sensations. *Hutton.*—It is a vulgar idea of the *colours* of solid bodies, when we perceive them to be a red, or blue, or green, tincture of the surface; but a philosophical idea, when we consider the various *colours* to be different sensations, excited in us by the refracted rays of light reflected on our eyes in a different manner, according to the different size, or shape, or situation of the particles of which surfaces are composed. *Watts.*—The lights of *colours* are more refrangible one than another in this order; red, orange, yellow, green, blue, indigo, deep violet. *Newton.*

For though our eyes can nought but *colours* see,
Yet *colours* give them not the pow'r of sight. *Davies.*

The freshness or appearance of blood in the face:

A sudden horror seiz'd his giddy head,
And his ears trickled, and his *colour* fled. *Dryden.*

The tint of the painter:

The treach'rous *colours* the fair art betray,
And all the bright creation fades away. *Pope.*

The representation of any thing superficially examined.—Their wisdom is only of this world, to put false *colours* upon things, to call good evil, and evil good, against the conviction of their own consciences. *Swift.*—Concealment; palliation; excuse; superficial colour.—Their sin admitted no *colour* or excuse. *King Charles.*—Appearance; pretence; false shew:

Under the *colour* of commending him,
I have access my own love to prefer. *Shakespeare.*

Kind; species; character.—Boys and women are, for the most part, cattle of this *colour*. *Shakespeare.*—In the plural, a standard; an ensign of war: they say the *colours* of the foot, and *standard* of the horse.—The banks were filled with companies, passing all along the river under their *colours*, with trumpets sounding. *Knolles.*—Colours is used singularly by *Addison*.—An author compares a ragged coin to a tattered *colour*. *Addison.*

The doctrine of *colours* has long been a species of research but little known to the artist, whether engaged in the sublime science of painting, or in the more diffuse processes of the useful art of dying. A line of separation has for ages past been drawn between the philosopher and the artist, pregnant with evils too generally annexed to established orders in society. The former, secluded from the great school of the world, abused his talents in decking out the phantoms of a prolific imagination; while the latter, directed by no classic views, but urged by the incessant calls of interest, was imperceptibly led, as accident suggested, to the discovery of many valuable facts; obscured, however, and incumbered by a copious mixture of error and absurdity. It is, however, the peculiar boast of the present age, that philosophy has emerged from the shades of retirement, to mingle in the active scenes of life. The torch of science is extended to illumine every subject which can exercise the ingenuity or the industry of man. Those mysteries, which craft or ignorance heretofore employed to veil their operations, have gradually vanished, or have sunken into contempt; and a liberal curiosity, awakened and inflamed, advances its enquires in all directions. The mass of knowledge accumulated among artists during the lapse of ages, and the new facts which are continually developed by varying their procedures, afford abundant materials with which we may build and improve rational theories. The philosopher now instructs the operator to distinguish what is essential to the success of his manipulations from what is extraneous or hurtful; and each particular art, reduced to elegance and system, is rendered easy of acquisition. Nor are there wanting signal instances of discoveries, the most important in their application to practice, which have originated in the minds of speculative men. This alliance, so happily formed between speculation and action, between the sciences and the arts, has therefore proved reciprocally beneficial. Its influence has already, in a very perceptible degree, sweetened the various conditions of life; and perhaps it is finally destined to change the fortunes of the human race. Modern chemistry has enlightened the doctrine of colours, as well for ascertaining the most valuable pigments, as for augmenting the beauty and durability of tints, in the delicate art of dying. In England, some valuable essays relating to this subject were given, about forty years ago, by the ingenious Dr. Lewis; but his labours have been lately superceded by a number of ingenious men in France, who have

have devoted a principal part of their fortunes and their lives to a practical investigation of this subject. Among these are the respected names of Dufay, Hellot, Macquer, Fourcroy, and Barthollet, from whose united labours our treatises on this speculation are compiled, and for which see the articles CHEMISTRY, PIGMENT, and DYING.—For the theory of natural or primitive colours, see the article CHROMATICS, p.524 of this volume.

Concerning the *vision* of colours, or that the same colours appear the same to all men, we have lately had a very extraordinary proof to the contrary. This is manifested in a memoir, transmitted to the Manchester Philosophical Society, in 1798, by Mr. John Dalton, who had long suspected some peculiarity in his own vision, with respect to colours. To him pink and blue appeared nearly allied, pink and red scarcely at all. In the autumn of 1792, however, he was convinced that his vision was not like that of the generality of men, by viewing the flower of the *geranium zonale* by candle-light. The flower is said to be pink: but to the author it appeared by day sky blue, and by candle-light a red; a colour which to him forms a strong contrast to blue. Remarking this phænomenon to his friends, they likewise observed the flower, but all agreed (excepting his brother) that its colour in candle-light did not differ materially from its colour in day-light. Having thus ascertained a peculiarity in his own vision, he did not enter into any investigation of the subject until two years afterward; and the following are the particulars and the result of this investigation:

"It may be proper to observe that I am short-sighted. Concave glasses about five inches focus suit me best. I can see distinctly at a proper distance; and am seldom hurt by too much or too little light; nor yet with long applications. My observations began with the solar spectrum, or coloured image of the sun, exhibited in a dark room by means of a glass prism. I found that persons in general distinguish six kinds of colour in the solar image; namely, red, orange, yellow, green, blue, and purple. Newton, indeed, divides the purple into indigo and violet; but the difference between him and others is merely nominal. To me it is quite otherwise: I see only two, or at most three distinctions. These I should call yellow and blue; or yellow, blue, and purple. My yellow comprehends the red, orange, yellow, and green, of others, and my blue and purple coincide with theirs. That part of the image which others call red, appears to me little more than a shade, or defect of light; after that the orange, yellow, and green, seem one colour, which descends pretty uniformly from an intense to a rare yellow, making what I should call different shades of yellow. The difference between the green part and the blue part is very striking to my eye: they seem to be strongly contrasted. That between the blue and purple is much less so. The purple appears to be blue, much darkened and condensed. In viewing the flame of a candle by night through the prism, the appearances are pretty much the same, except that the red extremity of the image appears more vivid than that of the solar image. I now proceed to state the results of my observations on the colours of bodies in general, whether natural or artificial, both by day-light and candle-light. I mostly used ribbons for the artificial colours.

RED, *by day light*.—Under this head I include crimson, scarlet, red, and pink. All crimsons appear to me to consist chiefly of dark blue; but many of them seem to have a strong tinge of dark brown. I have seen specimens of crimson, claret, and mud, which were very nearly alike. Crimson has a grave appearance, being the reverse of every shewy and splendid colour. Woollen yarn died crimson [illegible] blue is the same to me. Pink seems to be com[illegible] nine parts of light blue, and one of red, or some [illegible] which has no other effect than to make the light [illegible] dull and faded a little. Pink and light blue, [illegible] compared together, are to be distinguished no [illegible] as a splendid colour from one that has lost a little of its splendour. Besides the pinks, roses, &c. of the gardens, the following British flora appear to me blue; namely, Statice Armeria, Trifolium pratense, Lychnis Flos-cuculi, Lychnis dioica, and many of the Gerania. The colour of a florid complexion appears to me that of a dull, opaque, blackish blue, upon a white ground. A solution of sulphat of iron in the tincture of galls (that is, dilute black ink) upon white paper, gives a colour much resembling that of a florid complexion. It has no resemblance of the colour of blood. Red and scarlet form a genus with me totally different from pink. My idea of red I obtain from vermilion, minium, sealing-wax, wafers, a soldier's uniform, &c. These seem to have no blue whatever in them. Scarlet has a more splendid appearances than red. Blood appears to me red; but it differs much from the articles mentioned above. It is much more dull, and to me is not unlike that colour called bottle-green. Stockings spotted with blood or with dirt would scarcely be distinguishable. *By candle-light*, red and scarlet appear much more vivid than by day. Crimson loses its blue and becomes yellowish red. Pink is by far the most changed; indeed it forms an excellent contrast to what it is by day. No blue now appears; yellow has taken its place. Pink, by candle-light, seems to be three parts yellow and one red, or a reddish yellow. The blue, however, is less mixed by day than the yellow by night. Red, and particularly scarlet, is a superb colour by candle-light: but by day some reds are the least shewy imaginable: I should call them dark drabs.

ORANGE *and* YELLOW, *by day-light and candle-light*.—I do not find that I differ materially from other persons in regard to these colours. I have sometimes seen persons hesitate whether a thing was white or yellow by candle-light, when to me there was no doubt at all.

GREEN, *by day-light*.—I take my standard idea from grass. This appears to me very little different from red. The face of a laurel-leaf (Prunus Laurocerasus) is a good match to a stick of red sealing-wax; and the back of the leaf answers to the lighter red of wafers. Hence it will be immediately concluded, that I see either red or green, or both, different from other people. The fact is, I believe that they both appear different to me from what they do to others. Green and orange have much affinity also. Apple-green is the most pleasing kind to me; and any other that has a tinge of yellow appears to advantage. I can distinguish the different vegetable greens one from another as well as most people; and those which are nearly alike, or very unlike, to others, are so to me. A decoction of bohea tea, a solution of liver of sulphur, ale, &c. which others call brown, appear to me green. Green woollen cloth, such as is used to cover tables, appears to me a dull, dark, brownish red, colour. A mixture of two parts mud and one red would come near it. It resembles a red soil just turned up by the plough. When this kind of cloth loses its colour, as other people say, and turns yellow, then it appears to me a pleasant green. Very light green paper, silk, &c. is white to me. *By candle-light*, I agree with others, that it is difficult to distinguish greens from blues; but, with me, the greens only are altered and made to approach the blues. It is the real greens only that are altered in my eye; and not such as I confound with them by day-light, as the brown liquids above-mentioned, which are not at all tinged with blue by candle light, but are the same as by day, except that they are paler.

BLUE, *by day-light and candle-light*.—I apprehend this colour appears very nearly the same to me as to other people.

PURPLE, *by day-light and candle-light*.—This seems to me a slight modification of blue. I seldom fail to distinguish purple from blue; but should hardly suspect purple to be a compound of blue and red. The difference between day-light and candle-light is not material." Mr. Dalton then proceeds to make some miscellaneous observations,

vations, and gives an account of several persons whose vision is similar to his own. These persons are, his own brother, Mr. Harris, of Maryport, in Cumberland, (who had three other brothers with the same peculiarity in their vision,) two of the author's pupils, &c. In endeavouring to assign the cause of this peculiarity in his vision, the author conjectures that one of the humours of his eye must be a transparent, but coloured, medium, so constituted as to absorb red and green rays principally. He suspects that it is the vitreous humour which is coloured, and that the colour is some modification of blue. Those who have attended to the theory of colours, will easily perceive how far this hypothesis may be sufficient to account for the phænomena above related.

Accidental Colours, a name given to a very curious optical phenomenon, which was first noticed by the Comte de Buffon. That philosopher wrote a short paper on it, which was published in the Memoirs of the Academy of Sciences for 1743. If a person look stedfastly and for a considerable time at a small red square painted upon white paper, he will at last observe a kind of green-coloured border surround the red square. If he now turns his eyes to some other part of the paper, he will see an imaginary square of a delicate green bordering on blue, and corresponding exactly, in point of size, with the red square. This imaginary square continues visible for some time, and indeed does not disappear till the eye has viewed successively a number of new objects. It is to this imaginary square that the improper name of accidental colour has been given. If the small square be yellow, the imaginary square or accidental colour of green is blue; the accidental colour of green is red; of blue, yellow; or white, black; and on the contrary, that of black is white.

The first person who gave a satisfactory explanation of these phenomena was Professor Scherffer, of Vienna, whose dissertation, translated by M. Bernouilli, has been published in the twenty-sixth volume of the Journal de Physique. In order to understand these phenomena, we should recollect that light consists of seven rays, namely, red, orange, yellow, green, blue, indigo, violet; that whiteness consists in a mixture of all these rays; and that those bodies which reflect but very little light are black. Those bodies that are of any particular colour, reflect a much greater quantity of the rays which constitute that particular colour than of any other rays. Thus red bodies reflect most red rays; green bodies, most green, and so on. Let us also recollect, that when two impressions are made at the same time upon any of our organs of sensation, one of which is strong, and the other weak, we only perceive the former. Thus if we examine by the prism the rays reflected by a red rose, we shall find that they are of four kinds, namely, red, yellow, green, and blue. In this case, the impression made by the red rays makes that made by the others quite insensible. For the same reason, when a person goes from broad day-light into an ill-lighted room, it appears to him at first perfectly dark, the preceding strong impression rendering him for some time incapable of feeling the weaker impression.

With the assistance of these two remarks, it will not be difficult to explain the phenomena of accidental colours. When a person considers attentively for some time a white square lying on any black substance (paper for instance), is is evident that the part of the retina on which the white square is painted, receives a stronger impression than any other part; at least the greatest number of rays strike upon it. A weaker impression, therefore, will act on it with much less force than upon the rest of the retina. Consequently, when the eye is turned from the white square to some other part of the black paper, a square is perceived of the same size with the white square, and much blacker than any other part of the paper; this is evidently in consequence of the weaker impression made by the rays reflected by the black paper upon that part of the eye previously fatigued by the copious reflection from the white square. For the very same reason, if, after looking for a sufficient time at a white square lying on a black ground, we turn our eyes upon a sheet of white paper, we perceive a very well defined black square. In this case the part of the retina already fatigued is not so sensible to the rays reflected by the white paper as the other parts of it which have not been fatigued. The reason then that black is the accidental colour of white is sufficiently evident. On the contrary, when we look a sufficient time at a black square lying upon a white ground, if we turn our eyes to any other part of the white paper, or even upon black paper, we shall perceive a small square answering to the black square, and much brighter than any other part of the paper; evidently because that part of the retina on which the black square was painted being less fatigued, is more susceptible of impressions than any other part of the eye. Thus we see why the accidental colour of black is white, and why that of white on the contrary is black. These facts, indeed, have been long known, and they have been generally explained in this manner.

When a person has looked for a sufficient time at a red square placed on a sheet of white paper, and then turns his eyes to another part of the paper, that part of the retina on which the red was painted being fatigued, the red rays reflected from the white paper cease to make any sensible impression on it, and consequently there will be seen upon the white paper a square similar to the red square, and the colour of which is that which would result from the mixture of all the rays of light except the red. In general, therefore, the accidental colour is the colour which results from the mixture of all the rays of light, those rays excepted which are the same with the primitive colour. Now, in order to discover these accidental colours, let us recollect the manner which Newton employed to determine the colour which results from the mixture of several others, the species and quantity of which are known. He did it by dividing the circumference of a circle, so that the arches are to one another in the proportion of a string shortened by degrees, in order to sound one after another the notes of an octave; which is nearly the proportion that the different rays occupy when light is decomposed by means of the prism. Or suppose the circumference of the circle, as usual, divided into 360 degrees, the different rays, according to Benvenut, should occupy the following arches:

Red, - - - -	45°.
Orange, - - - -	27.
Yellow, - - - -	48.
Green, - - - -	60.
Blue, - - - -	60.
Indigo, - - - -	40.
Violet, - - - -	80.

Let us now compare the action of colours on one another with that of different weights; and for that purpose let us suppose each colour concentrated in the centre of gravity of its arch. In order to find the colour resulting from any mixture, we have only to find the common centre of gravity of the arches which represent the different colours: the colour resulting from the mixture will be that of the arch to which the common centre of gravity approaches nearest. And if that common centre of gravity is not in the straight line which joins the centre of the circle, and the centre of gravity of the arch to which it is most contiguous, the resulting colour will approach more or less to the colour of the contiguous arch towards which the line, passing through the centre of the circle and the common centre of gravity of the arches, falls. And farther, the resulting colour will be more or less deep, according to the distance of the common centre of gravity from the centre of the circle.

In the case under consideration, namely, to determine the different accidental colours, the application of this method is remarkably easy; because only one of the seven primitive colours is excluded, and consequently the six colours from the mixture of which we wish to know the resulting

resulting colour are all contiguous. For it is evident, that the sum of six arches, representing these six colours, will be divided into two equal parts by the line which passes through the centre of the circle and their common centre of gravity; and that if the same line be produced till it reaches the circumference of the circle on the other side, it will also divide the arch representing the seventh or omitted colour into two equal parts. Let us suppose, for instance, that the violet is omitted, and that we want to know the colour resulting from the mixture of the other six colours, we have only to bisect the arch representing the violet, and from the point of section to draw a diameter to the circle, the arch of the circle opposite to the violet through which the diameter passes, will indicate the colour of the mixture. The arch representing the violet being 80°, let us take the half of it, which is 40°, and let us add to it 45° for the red, 27° for the orange, and 48° for the yellow, we shall have 160°, which wants 20° of half the circumference of the circle. If now we add the 60° for the green, the sum total will be 220°, considerably more than half the circumference: consequently the common centre of gravity is nearest the green arch; but it fails 10° nearer the yellow than the straight line which joins the centre of the circle and the centre of gravity of the green arch. Hence we see that the resulting colour will be green, but that it will have a shade of yellow. It is evident then that the accidental colour of violet must be green with a shade of yellow: and this is actually the case, as any one may prove by making the experiment.

Suppose, now, we wish to know the accidental colour of green, or, which is the same thing, the colour resulting from the mixture of all the primitive rays except the green. The green arch is 60°, the half of which is 30°; if to this we add 60° for the blue arch, and 40° for the indigo arch, we shall have 130°, or 50° less than a semicircle. If to this we add the violet arch, which is 80°, we shall have 30° more than the semicircle; consequently the common centre of gravity falls nearest the violet, and it is 10° nearer the red arch than is the centre of gravity of the violet arch. Hence we know that the accidental colour of green will be violet or purple, with a shade of red; and experiment confirms the fact.

Buffon observed, that the accidental colour of blue was reddish and pale. Let us see whether we shall obtain the same result from our method. Let us suppose that Buffon employed a light blue. In that case, if to 30, the half of the blue arch, we add 60 for the green, 48 for the yellow, and 27 for the orange, we shall have 165°, or 15° less than half the circumference of the circle: consequently the common centre will fall nearest the red arch, but within 15° of the orange. The accidental colour must therefore be red, with a shade of orange; or, which is the same thing, it must be a pale red. In the same manner we may discover, that the accidental colour of indigo is yellow, inclining a good deal to orange; and that the accidental colour of indigo and blue together is orange, with a strong shade of red. Both of which correspond accurately with experiment. It would be easy to indicate, in the same manner, the accidental colour of any primitive colour, if what has been said were not sufficient to explain the cause of accidental colours, and to show that their phenomena correspond exactly, both with the Newtonian theory of optics, and with what we know to be the laws of our sensations in other particulars.

From the theory above given, which is that of professor Scherffer, the following consequences may be deduced: 1. The accidental colour of a red square, lying upon a white or a black ground, ought to be blackish, if we cast our eyes upon a red coloured surface. 2. If the surface upon which we look at a red square be itself coloured, if it be yellow, for instance, the white paper upon which we afterwards cast our eyes will appear blue, with a green square in it corresponding to the original red square. And, in general, we ought to perceive the accidental colour of the ground on which the square is placed, as well as the square itself. 3. If while we are looking at the little square we change the situation of the eye, so that its image shall occupy a different place on the retina, when we turn our eyes to the white paper we shall see two squares, or at least one unlike the figure of the original one. 4. If the white paper on which we look be farther distant than the little square, the imaginary square will appear considerably larger than the true one. 5. If while we are looking at the little square, we gradually make the eye approach to it, without altering its situation, the imaginary square will appear with a pale border. These, and many other consequences that might easily be deduced, will be found to take place constantly and accurately, if any one chooses to put them to the test of experiment; and therefore may be considered as a complete confirmation of the theory given above of the cause of accidental colours.

There is another circumstance respecting accidental colours which deserves attention. If we continue looking stedfastly at the little square longer than is necessary, in order to perceive its accidental colour, we shall at last see its border tinged with the accidental colour of the ground on which the square is lying. For instance, if a white square be placed upon blue paper, its border becomes yellow; if upon red paper, it becomes green; and it becomes reddish upon green. In like manner, the border of a yellow square becomes greenish upon a red ground, and that of a red square on a green ground becomes purple. The cause of the phenomenon seems to depend upon the contraction and extension of the image of the square painted on the retina. We know for certain, that the diameter of the pupil changes during our inspecting the square; at first it becomes less, and afterwards increases. And, though we cannot see what passes in the bottom of the eye, we can scarcely doubt that similar movements are going on there, if we attend to the changes that are continually taking place in the border of the little square; sometimes it is large, sometimes small; at one time it disappears altogether, and the next moment makes its appearance again.

There is another phenomenon connected with accidental colours which, though all persons more or less experience and observe, yet it is not so easy to explain; namely, that if we look at these little squares for a very long time, till the eye is very much fatigued, their accidental colours will appear even after we shut our eyes. The same thing takes place if we attempt to look at a very luminous object; as the sun, or a strong fire. Professor Scherffer thinks that this may be partly owing to the light which still passes through the eye-lids. That some light passes through the eye-lids is evident, because when we look towards a strong light with our eye-lids shut, we see distinctly their colour, derived from the blood vessels with which they are filled; and if we pass our finger before our eyes, we see the shadow of the finger though our eye-lids be shut, provided our eyes be turned towards the window. But that this light is not sufficient to explain the phenomenon in question is evident from this circumstance, that the same accidental colours make their appearance though we go immediately into the darkest place. Hence it seems more likely to arise from the idea, or impression made by the primary object, than from any intervention of light after the eyes are shut.

To COʹLOUR, *v. a.* [*coloro*, Lat.] To mark with some hue, or dye.—The rays, to speak properly, are not *coloured*: in them there is nothing else than a certain power and disposition to stir up a sensation of this or that colour. *Newton.*—To palliate; to excuse; to dress in specious colours, or fair appearances.—I told him that I would not favour or *colour* in any sort his former folly. *Raleigh.*—He *colours* the falsehood of Æneas by an express command from Jupiter to forsake the queen. *Dryden.*—To make plausible.—We have scarcely heard of an insurrection that was not *coloured* with grievances of the highest kind

kind, or countenanced by one or more branches of the legislature. *Addison.*—To *colour* a stranger's goods, is when a freeman allows a foreigner to enter goods at the custom-house in his name; so that the foreigner pays but single duty when he ought to pay double. *Phillips.*

To CO'LOUR, *v. n.* To blush. *A low word, only used in conversation.*

CO'LOURABLE, *adj.* Specious; plausible. *It is now little used.*—They have now a *colourable* pretence to withstand innovations, having accepted of other laws and rules already. *Spenser.*

CO'LOURABLY, *adv.* Speciously; plausibly.—The process, howsoever *colourably* awarded, hath not hit the very mark whereat it was directed. *Bacon.*

CO'LOURED, *part. adj.* Streaked; diversified with variety of hues.—The *coloured* are coarser juiced, and therefore not so well and equally concocted. *Bacon.*

CO'LOURING, *s.* The part of the painter's art that teaches to lay on his colours with propriety and beauty:

But as the slightest sketch, if justly trac'd,
Is by ill *colouring* but the more disgrac'd;
So by false learning is good sense defac'd. *Pope.*

CO'LOURIST, *s.* A painter who excels in giving the proper colours to his designs.—Titian, Paul Veronese, Van Dyck, and the rest of the good *colourists*, have come nearest to nature. *Dryden.*

CO'LOURLESS, *adj.* Without colour; not distinguished by any hue; transparent.—Transparent substances, as glass, water, and air, when made very thin by being blown into bubbles, or otherwise formed into plates, exhibit various colours, according to their various thinness; although, at a greater thickness, they appear very clear and *colourless*. *Newton.*

COL'PO, a town of South America, and capital of a jurisdiction in Peru.

COLPOCE'LE, *s.* [from κολπος, the vagina, and κηλη, a tumour.] A tumour or hernia seated in the vagina.

COLPO'DA, *s.* in zoology, a genus of pellucid worms, belonging to the order of infusoria, of which Dr. Gmelin enumerates six species.

COLPOO'N, *s.* in botany. See EUONYMUS.

COLPOPTO'SIS, *s.* [from κολπος, the vagina, and πιπτω, to fall down.] A bearing or falling down of the vagina.

COL'POS, *s.* [κολπος, Gr.] The vagina, or *cavitas muliebris.* Also an ulcer called a *sinus.*

COL'RANE (Henry Hare, lord baron of), descended from John, younger brother to sir Nicolas Hare, baronet, master of the rolls, and privy counsellor to Henry VIII. was born at Blechingley, in Surrey, May 10, 1693, and educated at Corpus Christi college, Oxford, under the tuition of Dr. Rogers. A lyric poem, by lord Colrane, appeared in the Academiæ Oxoniensis Comitia Philologica, 1713, and in the Musæ Anglicanæ, vol. iii. p. 303, under the title of Musarum oblatio ad Reginam. Dr. Basil Kennet, who succeeded Dr Turner in the presidency of that society, inscribed to his lordship an epistolary poem on his predecessor's death. He was a great proficient in the learned languages, particularly the Greek; and eminently versed in history, both civil and ecclesiastical. He was grand master of the society of free-masons, and had made the tour of Italy three times; in which he made a noble collection of prints and drawings of all the antiquities, buildings, and pictures, in Italy, given after his decease to Corpus Christi college. The esteem in which he was held by the literati, procured him admittance into the Republica Literaria di Arcadia, and the particular intimacy of the marquis Scipio Maffei, who afterwards visited him at his ancient manor and seat at Tottenham, in Middlesex. His lordship died at Bath, Aug. 4, 1749. His very valuable collection of prints relative to English antiquities, with a portrait of him, by Richardson, were obtained after his death by Mr. Henry Baker for the society of antiquaries. His natural and only daughter, Henrietta Rosa Peregrina, born in Italy, and afterwards naturalized, was married in 1764 to James Townsend, esq. alderman of London.

COL'SIR, a town of Asia, in the country of Thibet: fifty miles north-east of Harachar Hotun.

COL'STERWORTH, a small town in Lincolnshire, on the great north road. It is pleasantly situated on the east side of the river Witham, which meanders through a pleasant valley dividing Colsterworth from Woolsthrope, a small hamlet belonging to it, and where that great luminary in the British hemisphere, sir Isaac Newton, was born, in 1642. Many travellers have curiosity enough to visit the manor-house in Woolsthrope, which gave birth to so unbounded a genius. Near Colsterworth is also Grimstorpe, the elegant seat of his grace the duke of Ancaster.

COL'STON (Edward), ever memorable for his benefactions and charities, was the eldest son of William Colston, esq. an eminent Spanish merchant, and born in Bristol, November 2, 1636. He was brought up to trade, and resided some time in Spain; as did also his brothers, two of whom were inhumanly murdered there by assassins. He inherited a handsome fortune from his parents, which received continual additions from the fortunes of his brethren, all of whom, though numerous, he survived. This family substance he increased immensely by trade; and, having no near relations, he disposed of a great part of it in acts of charity and beneficence. In 1691 he built, at the charge of about 2500l. St. Michael's hill alms-houses in Bristol; and endowed them with lands, whose yearly rent long ago amounted to 282l. 3s. 4d. The same year he gave houses and lands, without Temple-gate in that city, to the society of merchants for ever, towards the maintenance of six poor old decayed sailors, to the yearly value of 24l. In 1696, he built in Temple-street, at his own charge, a school and dwelling-house for a master, to instruct forty boys, who are also clothed. The estate given for this charity amounts to 80l. yearly, clear of all charges. In 1702 he gave 500l. towards rebuilding queen Elizabeth's hospital on the College-green in Bristol; and for the clothing and educating of six boys there, appropriated an estate of 60l. a-year, clear of charges, besides 10l. for placing out the boys apprentices. In 1708, he settled his great benefaction of the hospital of St. Augustin in Bristol, consisting of a master, two ushers, and one hundred boys; for the maintenance of whom he gave an estate of 138l. 15s. 6½d. a-year. The charge of first setting up this hospital, and making it convenient for the purpose, amounted, it is said, to about 11,000l. He gave also 6l. yearly to the minister of All Saints in Bristol, for reading prayers every Monday and Tuesday morning throughout the year, and 1l. a year to the clerk and sexton; also 6l. a-year for ever, for a monthly sermon and prayers to the prisoners in Newgate there; and 20l. yearly for ever to the clergy beneficed in that city, for preaching fourteen sermons in the time of Lent, on subjects appointed by himself. The subjects are these: the Lent fast; against atheism and infidelity; the catholic church; the excellence of the church of England; the powers of the church; baptism; confirmation; confession and absolution; the errors of the church of Rome; enthusiasm and superstition; restitution; frequenting the divine service; frequent communion; the passion of our blessed Saviour. He bestowed upwards of 2000l. in occasional charities and benefactions to churches and charity-schools, all within the city of Bristol. He gave also 6000l. for the augmentation of sixty small livings. Any living that was entitled to queen Anne's bounty might have this too, on condition that every parish, which did receive this, should be obliged to raise 100l. to be added to the 100l. raised by Colston; and many livings have had the grant of this bounty. He gave to St. Bartholomew's hospital in London, 2000l. with which was purchased an estate of 100l. a-year, which is settled on that hospital; and he left to the same, by will, 500l. To Christ's hos-

pital, at several times, 1000l. and 1000l. more by will. To the hospitals of St. Thomas and Bethlehem, 500l. each. To the workhouse without Bishopsgate, 200l. To the society for propagating the gospel in foreign parts, 300l. He built an alms-house for six poor people at Shene, in Surrey, and left very handsome legacies to Mortlake, in the same county, where he died: that is, he gave 45l. yearly, to be continued for twelve years after his death, for clothing and educating twelve boys and twelve girls in that place; and also 85l. he being so many years old, to eighty-five poor men and women there, to each 1l. to be distributed at the time of his decease. He gave 100l. per annum, to be continued for twelve years after his death, and to be distributed by the direction of his executors; either to place out every year ten boys apprentices, or to be given towards the setting up ten young tradesmen, to each 10l. He gave likewise to eighteen charity-schools in several parts of England, and to be continued to them for twelve years after his death, to each school yearly 5l. Finally, he gave towards building a church at Manchester, 20l. and towards the building of a church at Tiverton, in Devonshire, 50l.

Besides these known and public benefactions, he gave away every year large sums in private charities, for many years together; and the preacher of his funeral sermon gives us to understand, that these did not fall much short of his public ones. We have no encouragement to say to our reader, "Go and do thou likewise;" there being so very few whose situation and circumstances will permit them to imitate Colston even in the most distant degree. Much delicacy and judgment are required to dispose of gratuities so as to make the parties relieved the better for them: Colston seems to have possessed no small share of this judgment; for, among other instances of it, one may be noted in his not giving any thing to common beggars. This he never did; but he always ordered, that poor house-keepers, sick and decayed persons, should be sought out as the fittest objects of his charity. We must not forget to observe, that though charity was this gentleman's shining virtue, yet he possessed other virtues in an eminent degree. He was a person of great temperance, meekness, equanimity of temper, patience, and mortification. He always looked cheerful and pleasant, was of a peaceable and quiet disposition, and remarkably circumspect in his actions. Some years before his decease he retired from business, and lived occasionally in London, and at Mortlake in Surrey, where he had a country seat. Here he died, October 11, 1721, almost eighty-five; and was buried in the church of All Saints, Bristol, where a monument is erected to his memory, on which are enumerated his public charities, mentioned in this article. His funeral sermon was preached by Dr. Harcourt, and printed at London the same year.

COLT, *s.* [colt, Sax.] A young horse; used commonly for the male offspring of a horse, as foal is for the female. See EQUUS.—Like *colts* or unmanaged horses, we start at dead bones and lifeless blocks. *Taylor.*

No sports, but what belong to war, they know;
To break the stubborn *colt*, to bend the bow. *Dryden.*

A young foolish fellow.—Ay, that's a *colt* indeed; for he doth nothing but talk of his horse. *Shakespeare.*

To COLT, *v. n.* To frisk; to be licentious; to run at large without rule; to riot; to frolic.—As soon as they were out of sight by themselves, they shook off their bridles, and began to *colt* anew, more licentiously than before. *Spenser.*

To COLT, *v. a.* To befool.—What a plague mean ye, to *colt* me thus? *Shakespeare.*

"A ragged COLT may make a good horse." A very ancient and applicable proverb. *Mechant poulain peut devenir bon cheval,* say the French. *Un cattivo puledro puo divenire un buon cavallo,* say the Italians. The general drift of this proverb is to shew, that an untoward youth may make a good man; though it is sometimes used to denote, that children who are not handsome when young, may be so when grown up. The reverse of this proverb is, "Fair in the cradle, and foul in the saddle." Though this is chiefly, or perhaps wholly, in the latter sense.

COLT-EVIL, *s.* See the article FARRIERY.

COLTS-FOOT, *s.* in botany. See CACALIA, and TUSSILAGO.

COLTS-TOOTH, *s.* An imperfect or superfluous tooth in young horses. A love of youthful pleasure; a disposition to the practices of youth. Figuratively, for a salacious disposition in old people:

Well said, lord Sands;
Your *colts-tooth* is not cast yet! *Shakespeare.*

COL'TER, *s.* [culꞇoꞃ, Sax. *culter*, Lat.] The sharp iron of a plough that cuts the ground perpendicularly to the share.

COLT'ISH, *adj.* Having the tricks of a colt; wanton.

COLU'BER, *s.* [*quod colat umbram*, because it delights in the shade of woods, hiding for its prey.] The VIPER, or ADDER; in zoology, a genus of reptiles belonging to the order of amphibiæ serpentes. The generic characters of the coluber are these: it is furnished under the neck and belly with plates, called *abdominal scuta*, like the boa; but under the tail, instead of scuta, or plates, which are continued in the boa, it has only squamæ, or scales, so formed as to resemble scuta in their appearance; and being divided by a line down the middle, are called *sub-caudal squamæ*, whence, in reckoning their number, they are usually counted by pairs. In distinction from the ordinary scales which cover other parts of the body, the sub-caudal squamæ are often termed *scutellæ*. Of this abundant genus of noxious reptiles, Dr. Gmelin, in his corrected edition of the Systema Naturæ of Linnæus, enumerates no less than one hundred and seventy-one species; and Dr. Russell, in his Account of Serpents found on the Coast of Coromandel, describes twenty-nine new species, and several varieties, not noticed by any other author.

The serpent tribes have hitherto been so partially explained, and their number, variety, and general habitudes, so little known or investigated by English writers, that we have thought it needful to describe all the known species of the viper genus, in as comprehensive a manner as the nature of our work will admit; and also to illustrate the most celebrious and rare individuals, by correct and authentic engravings. Indeed it must be acknowledged that this department of Natural History offers no attractive allurements, and that those who have sufficient leisure for such researches, are more likely to pursue objects less disgusting, and less accompanied with personal danger. It is certain that the bite of many of this genus is cruel and deadly. Some bring on almost instant death; others a dissolution more lingering, attended with excruciating pain and torture. Some there are that appear quite harmless; and others whose bite merely induces pain, without any danger from poison. Those reptiles furnished with dog-teeth or fangs, are certainly venomous, and often fatal; but where these are wanting we may pronounce the serpent at least not poisonous, although its bite may produce inflammation and swelling on the part. Dr. Russell seems to have established it as a certain rule, that none of those snakes are poisonous which have three rows of common teeth in the upper jaw; one exterior, and two inferior: the former of which he terms *marginal*, the other two *palatal*. In those subjects where the marginal row of common teeth is wanting, fangs or dog-teeth are constantly found; and hence we are assured that all such species are poisonous. But for a more obvious discrimination of this subject, we must refer the reader to a view of the poisoning apparatus in the anatomy of the viper, given under SERPENTES; and for the mode of inflicting its venom, with its deleterious effects, and the best known means of relief, to the article POISON.

1. Coluber vipera, the true viper or adder of Africa and Asia,

The Clotho, or Deadly Viper?

Asia, which has been almost universally used in medicine; particularly as an incitement to libidinous desires. It is abundant in Egypt; and is found in other parts of Africa as well as Asia. It is from twenty inches long, to three feet and upwards, variegated with rich chesnut brown spots or bands, on a lighter brown ground, the scales remarkably short, close set, and hard; the eyes are vertical, the head compressed and covered with very minute dark brown scales, and reddish stripes. It is very poisonous, but not often fatally so, and is furnished with 118 abdominal scuta, and twenty pair of sub-caudal squamæ; in all 138. Linnæus calls it a native of Egypt; whence its common name *Egyptian viper*. Our engraving of this viper, in the Coluber, Plate V. was taken from the living subject by Seba, and is therefore undoubtedly correct.

2. Coluber variegatus, the variegated viper; so named from the mixture of colours on its body, which is mottled with white, brown, and grey; the sides and belly are pale yellow; and its form and size is much the same as the preceding. It is a native of America, but not poisonous.

3. Coluber venosus, the veined viper; a species of a dusky red colour, with transverse white narrow veins or bands. The scales are small, and thick set; the head oblong, elevated or enlarged in the hinder part. It is a native of South America, Ceylon, and the East Indies; and perfectly harmless.

4. Coluber intestinalis, the intestine viper; lurking in secret and hidden places for its prey. It is a small species, inoffensive to man, and devoid of poison. Its prey is insects, lizards, frogs, toads, and mice. The ground colour of its body is a reddish brown, mottled and variegated with white transverse bands, and narrow longitudinal lines on the back and sides. It is a native of Africa, and found plentifully on the coast of Guinea.

5. Coluber Clotho, the deadly viper; native of South America and Ceylon. It is one of the largest and most dangerous of this genus; yet it is an elegantly glittering and beautiful serpent, covered with large oblong scales, radically fastened in the skin, but yet loose and easy to move, which when irritated it erects, as a dog does the the bristles of his neck when enraged; and by that means it makes a noise like the rushing of hail; intended doubtless by providence to admonish those who are near to be upon their guard. The scales, when they lie close one upon another, give a light yellow tint, variegated with dark brown spots, and between these, other smaller ones like streaks; from the neck to the end of the tail, and to each of the scales on the upper part of the body, there is a small deep brown spot, with a small termination like the eye of a needle. Many scales occur between the bright speckles, heightened by a cinereous colour, with a dash of yellow, which are no small ornament to the undulating motion of this serpent. The head is short, round, and shining, with two large eyes flashing with fire. It has four long teeth in the mouth, crooked, two above and two below, not fastened in the jaw, but tied and secured by tendons, so that they appear encased in a sheath; there are also small teeth, which are fastened near the throat, like little hooks, at the end of the cheek bone; the tongue is forked, long, and capable of being much extended. The mouth is encircled by an elegant, broad, squamated fringe; the upper part of the body is beautifully ornamented with thin squamulæ, charged with transparent brownish spots. The mouth is large and the nostrils very wide. The sub-caudal squamæ are transverse, very large, of a pale cinereous, and marked by irregular faint brown spots. Francis Hernandez, in his History of the Reptiles of New Spain, p. 70. says, "This species of the Clotho is found in the island of Cuba, with a head like a calf, armed with four teeth;" and that the animal is upwards of four yards long. Near the commencement of the tail are two spherical testicles, each marked with a black speck. It is a curious circumstance in animals of this genus, to find the male genital members outwardly affixed, it is supposed they only come down during the season allotted them for procreation.

6. Coluber Lachesis, the fatal viper; very nearly resembling the preceding both in its form and habitudes. Like it, the head is short and round; the mouth large and wide, armed with four curvated teeth, two in each jaw; the eyes darting fire; and its bite inflicting cruel and inevitable death. It has also the faculty of erecting its scales at pleasure, or when irritated, and of closing them again with a loud rushing noise. Seba considers it as the female of the Clotho; but Linnæus and Gmelin make it a separate species. A border of silver white scales surround the mouth; the tongue is fleshy and forked, which the creature can protrude to a great length when offended; at which time it also shews its teeth in a menacing posture, like a snarling dog, and thus it can shew or conceal its fangs at pleasure. The scales on the upper part of the body are elegantly speckled with pale yellow, cinereous grey, black, brown, pale yellow, and white, glistening most superbly in the sun. It is found in South America, and in the island of Ceylon; it will attack man or beast with great fury, erecting its crest, and darting forward with singular rapidity and courage.

7. Coluber Atropos, or life-consuming viper; a native of the burning zone of Africa, and of the warm regions of South America; it is also found in the island of Ceylon, and in the remote provinces of Asia. The ground colour is a silvery white, variegated with black irregular spots and blotches. The head is broad and gibbous; the mouth large and blunt; the eyes like drops of pearl, surrounded with a green iris; the head cordated with a quadruple row of transverse white beadlike lines, passing behind the eyes, on a black ground; the scales are varied, some large and shield-formed; others small and pointed; all remarkably strong and close set. This, like the two preceding, is a most dangerous and formidable serpent, whose poison, though not so rapid in its effects as the others, yet causes a stupefaction of the mental faculties, a wasting of the flesh by incurable consumption, and finally death: whence these three last-mentioned vipers, by way of metaphor, have been denominated *the three fatal sisters*. This is furnished with 131 abdominal scuta, and 22 pair of sub-caudal squamæ; in all 153. The figures we have engraved of these three terrible serpents, are by Albertus Seba, and may therefore be depended upon as authentic.

8. Coluber leberis, the cast-skin viper; a native of North America, found principally in Upper and Lower Canada. It is marked with black lineal stripes, and often casts its skin. The abdominal scuta are 110, the sub-caudal squamæ 50; in all 160.

9. Coluber lutrix, the otter viper; a native of South America, and India. It preys on fish, and is often found on the banks of lakes and rivers. The body is of a dull yellow, and bluish on the sides. It has 134 abdominal cuta, and 27 sub-caudal squamæ; in all 161.

10. Coluber calamarius, the quilted viper; of an elegant livid colour, intersected or quilted over with brown lineal stripes; the under parts and sides fringed with brown. It is a native of America, and considered as inoffensive. The abdominal scuta are 140, and the sub-caudal squamæ 22; making in the whole 162.

11. Coluber dubius, the doubtful viper, a native of America, and not known to be injurious. It has 141 abdominal scuta, and 24 sub-caudal squamæ; in all 165.

12. Coluber simus, the flat-nosed viper; a native of Carolina. The head is gibbous, flat, and armed with pointed scales; little curved black stripes pass between the eyes, with a small cross on the hind part of the head, marked with a black spot in the middle. The upper part of the body is a mixture of black and white, disposed in obscure bands; the under part black. It has 124 abdominal scuta, and 46 sub-caudal squamæ; in all 170.

13. Coluber striatulus, the furrowed viper; a native of America, found principally in Carolina. It is long and slender;

ſlender; the head oblong and ſmooth; a white longitudinal furrow riſes below the neck, and extends to the anus; the upper part is brown, with duſky ſpots; the under much lighter: it is quite harmleſs and inoffenſive. The abdominal ſcuta are 126, the ſub-caudal ſquamæ 45; in all 171: but theſe are found to differ in ſeveral individuals; that deſcribed by Cateſby has more ſcuta, and leſs ſub-caudal ſquamæ, than the one deſcribed by Linnæus.

14. Coluber ammodytes, the ſand-coloured viper; a native of the eaſtern and mountainous parts of Illyria, eſpecially in the country round Caſtel del Duino; and is ſold in the ſhops of Germany promiſcuouſly with the berus, for medical and pharmaceutical uſes. Dr. Gmelin ſeems to doubt whether it be ſufficiently diſtinct from the berus, to conſtitute a ſeparate ſpecies. It is found ſometimes brown, ſomes pale blue, and often decorated with a broad indented black band or fillet on the back. The noſe is terminated by a large rough wart. Like the berus it is armed with fangs, but not fatal to man. It has 142 abdominal ſcuta, and 32 ſub-caudal ſquamæ; in all 174.

15. Coluber ceraſtes, the horned viper; a moſt venomous ſerpent, native of the Eaſt Indies, South America, and Africa; but moſt abundant in Egypt, where it has been made celebrious as the inſtrument of charms and incantations. The moſt ſatisfactory account we have of this viper, is that communicated by John Ellis, eſq. to the Royal Society of London, and publiſhed in the 56th volume of their Tranſactions; wherein it is ſtated, that "the ancient Eyptians moſt certainly eſteemed it a hieroglyphic of ſome importance; for when we examine their monuments of the greateſt antiquity, ſuch as their obeliſks, temples, ſtatues, palaces, and even their mummies, we are almoſt ſure to find many repreſentations of it on them. Thoſe two immenſely large ſtones, brought from Alexandria in Egypt, now in the court-yard of the Britiſh muſeum, which appear to be part of the grand cornice of ſome magnificent palace, have many figures of the ceraſtes curiouſly engraved upon them."

Dr. Haſſelquiſt, a pupil of the celebrated Linnæus, who was in Egypt in 1750, has given a particular deſcription of this curious animal; but neither he nor the former writers on Egypt, that mention the ceraſtes, ſay any thing about the venom of its bite. This however we are appriſed of by Dr. Turnbull, who lived many years in Egypt, both at Alexandria and Cairo, and who ſaw many inſtances of its fatal effects. His deſcription of it is illuſtrated by the annexed engraving, and is as follows: The head, between the horns, is much depreſſed; the cheeks are ſwelled out, ſo that the hinder part of the head is conſiderably thicker than the neck; the ſnout is ſhort and blunt; the outward front of the upper and under jaws have a ſmall cavity or depreſſion in both; the noſtrils project like thoſe of a pug dog. The eyes have a perpendicular narrow and black pupil; the iris is of a yellowiſh grey colour; the orbits of the eyes are neatly ſet round with ſmall, ſtrong, hemiſpherical ſcales. The tongue is forked or divided at the extremity into two parts. In the upper jaw there are no teeth, but two bones placed lengthways in the palate; in them are fixed ſeveral ſmall teeth, generally about ten: they are ſharp, of an equal length, and bend a little towards the throat. On the ſides of the under jaw, near the ſnout, are placed three or four remarkable teeth; but none quite in the fore part or hinder part. Juſt above the eyes, near the upper part of their orbit, are two tentacula, called horns, about a quarter of an inch long; they are not ſtraight, but bend a little outwards; they are channelled lengthways, ſharp-pointed, but not very hard; their baſis is ſurrounded with a circle of ſmall erect ſcales. The body is narrow towards the neck; the diameter of the thickeſt part of the middle about one inch; the tail grows ſuddenly taper, and ends in a ſharp point. The top of the head, the back, and upper part of the tail, are variegated with dark irregular chetnut-coloured ſhining ſpots, on a bright ochry or orange-coloured ground; the throat, belly, and under part of the tail, are whitiſh. The length of this ſpecimen was as follows: from the noſe to the anus twenty-two inches and a half, the tail three inches and a half, ſo that the whole ſerpent was twenty-ſix inches long. The belly was covered with 145 ſcuta, and the tail with 43 pair of ſquamæ. The number, however, differs in different ſubjects. Dr. Gmelin ſtates them to have 150 abdominal ſcuta, and 25 ſub-caudal ſquamæ; in all 175.

Mr. Bruce, in his Travels into Abyſſinia, makes the following obſervations on the incantation of this ſerpent by the Indians. "I forbear to fatigue the reader by longer inſiſting upon this ſubject. A long diſſertation would remain upon the incantation of ſerpents. There is no doubt of its reality. The ſcriptures are full of it. All that have been in Egypt have ſeen as many different inſtances as they choſe. Some have doubted that it was a trick, and that the animals ſo handled had been firſt trained, and then diſarmed of their power of hurting; and, fond of the diſcovery, they have reſted themſelves upon it, without experiment, in the face of all antiquity. But I will not heſitate to aver, that I have ſeen at Cairo (and this may be ſeen daily without trouble or expence) a man who came from above the catacombs, where the pits of the mummy birds are kept, who has taken a ceraſtes with his naked hand from a number of others lying at the bottom of the tub, has put it upon his bare head, covered it with the common red cap he wears, then taken it out, put it in his breaſt, and tied it about his neck like a necklace; after which it has been applied to a hen, and bit it, which has died in a few minutes; and, to complete the experiment, the man has taken it by the neck, and beginning at his tail, has ate it as one would do a carrot or a ſtock of celery, without any ſeeming repugnance. We know from hiſtory, that where any country has been remarkably infeſted with ſerpents, there the people have been ſcreened by this ſecret. The Pſylli and Marmarides of old undoubtedly were defended in this manner. *Ad quorum cantus mites jacuère ceraſta.*—SIL. ITAL. lib. iii.

"To leave ancient hiſtory, I can myſelf vouch, that all the black people in the kingdom of Sennaar, whether Funge or Nuba, are perfectly armed againſt the bite of either ſcorpion or viper. They take the ceraſtes in their hands at all times, put them in their boſoms, and throw them to one another as children do apples or balls, without having irritated them, by this uſage, ſo much as to bite. The Arabs have not this ſecret naturally, but from their infancy they acquire an exemption from the mortal conſequences attending the bite of theſe animals, by chewing a certain root, and waſhing themſelves (it is not anointing) with an infuſion of certain plants in water.

"One day when I was with the brother of Shekh Adelan, prime miniſter of Sennaar, a ſlave of his brought a ceraſtes which he had juſt taken out of a hole, and was uſing it with every ſort of familiarity. I told him my ſuſpicion that the teeth had been drawn; but he aſſured me they were not, as did his maſter Kittou, who took it from him, wound it round his arm, and at my deſire ordered the ſervant to carry it home with me. I took a chicken by the neck, and made it flutter before the mouth of the ceraſtes; his ſeeming indifference left him, and he bit it with great ſigns of anger, the chicken died almoſt immediately; I ſay his ſeeming indifference, for I conſtantly obſerved, that however lively the viper was before, upon being ſeized by any of theſe barbarians, he ſeemed as if taken with ſickneſs and feebleneſs, frequently ſhut his eyes, and never turned his mouth towards the arm of the perſon that held him. I aſked Kittou how they came to be exempted from this miſchief? He ſaid, they were born ſo, and ſo ſaid the grave and reſpectable men among them. Many of the lighter and lower ſort talked of enchantments by words and by writing, but they all knew how to prepare any perſon by medicine, which were decoctions of herbs and roots. I have ſeen many

The Lachesis, or fatal Viper.

The Atropos, or Life consuming Viper.

many thus armed, do pretty much the same feats as those that possessed the exemption naturally; the drugs were given me, and I several times armed myself, as I thought, resolved to try the experiment, but my heart always failed me when I came to the trial; because among these wretched people it was a pretence they might very probably have sheltered themselves under, that I was a Christian, that therefore it had no effect upon me."

16. Coluber versicolor, the camelion viper; a beautiful and harmless species, of a bright ferruginous colour, mixed with blue, green, and white, changing or varying in different lights, as it writhes and folds itself about. It has 136 abdominal scuta, and 39 sub-caudal squamæ; in the whole 175.

17. Coluber melanis, the violet-coloured viper; resembling the berus in size and appearance, and frequenting the dunghills and putrid marshes about the Volga and Samar. The iris is brown, the pupil vertically pointed, the edge silvery, the body black, thick, and the under part smooth, with darkish spots; of a sky-colour towards the sides and at the throat, the tail short, and conical. It has 148 abdominal scuta, and 27 sub-caudal squamæ; making in the whole 175.

18. Coluber exalbidus, the whitish viper; the body of a white ground, with very broad transverse spots mixed with black and white. The abdominal scuta consist of 135, the sub-caudal squamæ of 42; in all 177.

19. Coluber plicatilis, or folding viper; a native of the Ternatian isles. Its colour is livid; the under part of the body marked with a quadruple row of brown dots; upon the sides it has a connected line of deep chesnut-brown spots very close together, and small white specks like little eyes in the front of each; the pupil of the eye is white. The head is oblong, and covered with broad plates or laminæ, shield-form, and tapering on each side, but are wanting round the mouth and near the nose. The body much resembles that of the natrix, but is more robust and fleshy; the tail is thick, and somewhat obtuse. The abdominal scuta 131, the sub-caudal squamæ 46; in all 177. The bite of this is represented by Seba as very hurtful, but it is not marked by Linnæus as poisonous.

20. Coluber Novæ Hispaniæ, or viper of New Spain; the upper part of the body black, the under white, oblique striæ on that part of the back nearest the head, and oblique stripes on the part towards the tail. A native of Mexico; resembling the plicatilis in the head, body, and tail. The scales are very sparkling, tinged the greatest part with white, and forming broadish belts with the black to the end of the tail, which is obtuse. The sub-caudal squamæ are transverse, of a bright white, marked by small black stripes or bands. This species is not to be classed with the poisonous, as it inhabits promiscuously with the human species in South America, feeding upon mice and rats, dor-mice, locusts, beetles, &c. upon which account it is much valued by the natives.

21. Coluber coronatus, the crowned viper; an elegant species. The forehead is short and broad, and beautifully ornamented with variegated laminæ; on the middle one of which is raised as it were an oblong triangle, decorated with a perfect crown elegantly displayed on the forehead. The rest of the laminæ are variegated with red and white. The eyes are bright, the cheeks broad, and the nostrils much expanded. The scuta and squamæ are marked with handsome reddish spots, with a mixture of the cinereous.

22. Coluber domicilla, or house viper; a native of Asia. This elegant serpent is covered from the head to the extremity of the tail by a white texture or vest of round scales, encircled with the blackest fillets, broad above, narrower below; a black shining seam divides the white scuta and squamæ from the sides. The head is adorned with large and small laminæ, beautifully variegated with white and black. It is a beautiful little creature, every way so handsome and harmless, that the natives in the East Indies are not only delighted at the sight of it, but in the extremity of the heat put it in their bosom for refreshment. They likewise inhabit their houses, destroying rats and mice, and other similar vermin. The abdominal scuta are 118, the sub-caudal squamæ 60; in all 178.

23. Coluber Alidras, the Alidras viper; a native of South America and India, entirely white. It has 121 abdominal scuta, and 58 sub-caudal squamæ; in all 179.

24. Coluber punctatus, the dotted viper. The body is grey, with a triple row of small black dots; the under part of the body is yellow, to the very tip of the tail. It is a native of Carolina, having 136 abdominal scuta, and 43 sub-caudal squamæ; making 179.

25. Coluber buccatus, the trumpet-cheeked viper; a native of South America, and of India. The ground colour is white, with a triangular spot on the head, just above the nostrils; two dots on the crown of the head, and very broad brown double spots on the back, covering almost the whole surface of the body. The head is almost triangular, narrow at the nose, and very broad behind; the upper part cleft, flat, compressed laterally, the lower covered with laminæ, three of which, being the largest, are situated between the eyes; above it is imbricated with strong scales. The upper part of the cheeks swell out on each side; the body is like that of the natrix. The abdominal scuta consist of 107, the sub-caudal squamæ of 72; in all 179.

26. Coluber elegantissimus, the most elegant viper. The ground colour of this beautiful species is a snowy white, with a red cross on the forehead, and a triple row of little red specks, like beads of coral, extending all down the back; the sides are beautifully ornamented with a single row of bright red spots, all of which seem bedded in a soft nidus of gold green. The cross on the forehead is mottled with red specks, from whence a remarkably small fillet runs down the middle of the back. Though beautiful, it is a very poisonous reptile.

27. Coluber Javanus, or viper of Java. It is white, with a red and brown transverse band before the eyes, and a white one behind them; a longitudinal fillet runs from the crown of the head on the upper part of the back; on the middle and lower part it is variegated with white rhomboidal spots, dotted in the centre. A native of Java, and harmless.

28. Coluber ignobilis, or ignoble viper. The ground colour is a greyish yellow, with roundish black spots on the back, forming a band; and on both sides a row of small black dots. On the head are three shining black stripes, with the points meeting in the centre, and forming a triangle. It is long and slender, of a very glossy hue, and is abundant in Virginia, and other parts of North America. It preys on birds, which it catches by pretending to be asleep, until the victim comes within its reach.

29. Coluber nexa, the netted viper: the ground colour of which is red, with a double angular band on the back, the angles cutting each other like net-work. It is a native of Africa, and in the form of its head and body much resembles the buccatus.

30. Coluber berus, the common viper of Europe. Seba furnishes four varieties of this species, and there certainly are a great many more. The first he describes as having roundish spots on the top of the back, uniting in transverse irregular bands, those at the extremity of the tail very small: the second, as reddish, the head variegated, the neck slender: the third with the bend at the back of the head separated by a white spot: the fourth with spots on the head of various forms and sizes. It is found all over Europe, in Siberia, and in India; in the islands of St. Eustatia, and Celebes; in forests and woods, sometimes in open places, but seldom in the populous parts of Italy. It is a viper undoubtedly hurtful to most animals, but seldom fatal; the bite, however, causes a sudden and powerful inflammation, attended with fever and restlessness. It is from a foot and a half long, to two feet and a half, or more; and is sold in the shops for medi-

cinal purposes. In the regular species the body is of a shining cinereous grey, (which perhaps is peculiar to the male,) with spots of a bright black; a fillet, in some, runs down the middle of the back, broad, black, or brown and black, sometimes red and black; a lateral line, in some varieties, occurs on each side; the head is round; the body rather flat, but resembling the buccatus. The number of scuta and squamæ vary, as Linnæus gives three different numbers, viz. 146 abdominal scuta, 39 sub-caudal squamæ; making 185. In another, 148 abdominal, and 42 sub-caudal; making 190. And in another variety, 177 abdominal, and 68 sub-caudal; making 245.

To this species belongs the English viper or adder, which is also found in Ireland, and swarms in the Hebrides of Scotland. The ground colour of the British species inclines to a reddish yellow, marked on the back with a series of rhomboidal black spots, touching each other at the points; and on the sides with triangular ones, disposed in a similar manner. We have also a variety entirely black; but in which the rhomboidal spots are still very conspicuous, being of a deeper and more shining black than the rest of the body. The tongue is forked, the teeth small, and the canine teeth or fangs are two on each side in the upper jaw. They prey on frogs, toads, lizards, mice, birds, and even on the mole, which they often detect under ground. This reptile is capable of supporting very long abstinence; for some have been kept in a box full six months without food, and yet did not abate of their vivacity. In a state of liberty they only feed a small part of the year, and that in the warmest and dryest seasons. Under confinement they will touch no food; for if field-mice, their most favourite diet, be put into their box, they will instantly seize, and kill them; but they never are seen to feed upon or touch them after. The violence of their poison is said to decrease in proportion to the length of their confinement, as does also the virtue of their flesh, whatever it be. When at liberty, it remains torpid throughout the winter; but under confinement, it has never been known to take this periodical repose. The flesh of the English viper, as well as its decoction and oil, has been deemed a powerful restorative to broken and debilitated constitutions. Its poison, when communicated to the blood by a wound, produces dreadful effects; though it does not endanger life. If a viper bites itself or another viper, they die as speedily as any other animal which hath been bitten by them. The famed cure, when the viper's poison is received by a wound, is immediately to rub the fat of vipers into the wounded part, and the patient must take as much vinegar in all he drinks for some time after the accident, as is at least agreeable to the palate. As a medicine, the flesh of vipers does not appear to excel that of eels. Notwithstanding the opinion of Dr. Mead, on the efficacy of this reptile as a nutrient, Dr. Cullen does not allow it to have any peculiar powers as an aliment, nor does he admit that there is the slightest foundation for allowing them as a medicine. He considers such a supposition of their virtues existing in any uncommon degree, as a mark, among many others, of the weakness and folly of the ancients, and equally of their present followers.

31. Coluber leucomelas, or white and black viper. This is described by Dr. Gmelin as a white coluber with black spots; and having 135 abdominal scuta, and 48 sub-caudal squamæ; in all 183.

32. Coluber chersea, the solitary viper; of a ferruginous ash-colour. It is found in Sweden, particularly in the thick nut-groves and shrubberies of Smaland, Scania, and Upland; likewise in the forests of Pomerania. It much resembles the berus, but is more deadly, unless the part which is bitten be immediately cut out; its length is only nine inches and a half; the colour a dull red, with a fillet on the back, broad, and red; the head is round, and the body taper. The abdominal scuta are 150, and the sub-caudal squamæ 34; making 184. Sometimes the abdominal scuta are only 140, and the sub-caudal squamæ 39, reducing the whole number to 179.

33. Coluber Scytha, the Scythian viper; a native of the woods in the mountainous parts of Siberia, particularly the more northward. The poison of this viper, according to Dr. Pallas, possesses but a small degree of venom. It is about the thickness of a man's finger, and rather more than a foot and a half long, the upper part very black and opake, the under part smooth and white; the head marked with lines, the tail about an inch long; abdominal scuta 153, sub caudal squamæ 31; in all 184.

34. Coluber prester, the fever-causing viper. The black English viper, according to some authors, is a variety of this species, found in the northern parts of Asia and Europe, even as far as Austria. The body is entirely black, without a single spot; the scales are lanceolate, with the points placed longitudinally; the lips variegated with black and white specks. The poison of this creature induces a violent fever and insatiable thirst. Olive oil, poured hot upon the part affected, is esteemed an antidote. The abdominal scuta 152, the sub-caudal squamæ 32, together amounting to 184. In the island of Ceylon this viper is ranked among the most deadly: it there grows very large and extremely venomous.

35. Coluber Rhedi, the viper of Rhedi. The head is imbricated with the smallest imaginable scales, the body decorated with short alternate transverse striæ, arranged in a quadruple longitudinal row, the intermediate ones uniting towards the head. It is a native of the Austrian and Italian coasts, and is sold for medical uses in the shops of Naples. The bite is often fatal. A solution of gum in mercury in a decoction of bitter wort, is administered in those countries to persons bitten. It is doubtful whether it is a species different from the berus; the under part, particularly of the head and tip of the tail, are red; and it has a wart on the nose. The abdominal scuta 152, the sub-caudal squamæ 33; making 185.

36. Coluber cobra, or cobra viper; a species entirely brown, compressed, the back carinated, or keel-shaped; the head is long and somewhat taper. It is a species between the clotho and rhedi.

37. Coluber maculatus, or spotted viper. The ground colour is grey, with brown spots at the edge, and pale yellow in the middle; resembling the coluber rhedi, except that the head is compressed, white on the sides, grey on the top, a brownish line running parallel on each side before the nostrils, which are rather prominent; two triangular spots at the back of the head, and those on the back elliptic, in a triple row, of which the middle one is the largest.

38. Coluber glaucus, or sea-green viper; of a whitish sea-green colour, shaded with large spots on each side, a white band behind each eye, ferruginous at the nape of the neck; a native of the island of Martinico, much resembling the coluber rhedi; the band over the eyes is terminated with a little white line above, and a black one below.

39. Coluber Maderensis, or viper of Madras; striped with pale yellow lines, with lead-coloured quarterings; found in the country from whence it takes its name.

40. Coluber bitis, the viper bitis; a native of Brasil. The head is oblong, with a wide mouth, and it is remarkable for having very broad-cheek bones. Serpents of this species are distinguished by a wide mouth, and expanded nostrils, that they may scent things very distant from them. The head of this specimen in particular, from which Seba made his drawing, is most beautifully coloured; it is equally remarkable from its immense eyes, and from the mouth being ornamented with a deep broad fringe. The neck and tail are long and slender. It is covered with very small scales of a pale yellow and cinerous, variegated with white and a reddish brown; the scuta are of a very pale yellow, shaded with a little brown; near

COLUBER.

The Horned Viper.

1. The Egyptian Viper, or Adder of Africa. 2 The elegant Viper. 3 The Severus or red Viper.

near each side of the belly runs a line like a chain, formed by small white scales, which has a very pleasing appearance.

41. Coluber acontia, or flying viper; the upper part of a red copper colour, the carinæ of the scales of a shining white, the under part yellow spotted with red, living in the trees of the island of Santa Cruz. Pennant describes this viper as lurking among trees in the island of Ceylon, springing from bough to bough to catch their prey, which is insects and birds. It does not attack mankind, but glides from his approach: but the Indians have the same notion as the Arabs have, of its being a flying serpent, seeing it spring from one tree to another, like the flying squirrel.

42. Coluber angulatus, or angulated viper; a native of Asia, upwards of two feet long, of a bright brown colour, with pointed transverse bands, and broad black ones; the abdominal scuta 117, the sub-caudal squamæ 70; in all 187, or 20 and 60, making 180. This serpent, of which the body is long, and the neck very small, was dissected by Seba, who found in the stomach a bird most beautifully speckled, thrice as big as the head and neck of the animal itself; so that it would appear a thing impossible, that a bird comparatively so large could be swallowed by a serpent of so slender and small a head, unless he had been an eye witness of the fact. The head of this serpent is small, the front of it of a dirty brown, encircled at the back by a bright broad white chain, it is marked on its rhomboidal scales with deep brown spots.

43. Coluber cæruleus, the azure viper; a native of America, of a sky colour, the scales white on one side and white underneath; the abdominal scuta 165, sub-caudal squamæ 24; making 189.

44. Coluber albus, the white viper; a native of South America and India, entirely white, and destitute of spots; abdominal scuta 170, sub-caudal squamæ 20; total 190.

45. Coluber aspis, the asp; of which there are many varieties. The nose is terminated by a kind of wart, the body reddish yellow, with characteristic alternate uneven striæ meeting together, the under part of a steelish blue spotted with yellow. This is the viper of Moses Charas. It is a native of several parts of France; some call it a variety only of the berus. Abdominal scuta 146, sub-caudal squamæ 46, total 192; by others the squamæ are reduced to 34, making the whole 190. The above is Linnæus's description of the European asp. Seba has furnished us with drawings of the African and American asps, which are nearly alike in colour, but very dissimilar in size. Fig. 1 and 2, are the American species, male and female; of a yellowish brown, spotted with black; darkish on the head and back, white under the belly, and a white transverse band at the back part of the hindhead. Fig. 3, is the African asp found plentifully in Egypt; where, as Appian and Florus record, the celebrated Cleopatra died of its bite, having caused one of these reptiles to be conveyed to her for that purpose, hidden in a basket of fruit; the effect produced was said to be stupor, terminating in a fatal lethargy, which consigned the fair and memorable queen of Egypt into the arms of death. This viper is of a reddish copper-colour spotted with black, white under the belly, and a white collar round its neck; the head fortified with strong laminæ. Some naturalists class this species with the ammodytes, or sand-coloured viper; but it is obviously a distinct race.

46. Coluber typhlus, the blind viper; a native of South America and India, of a light blue colour, fourteen inches and a half long; abdominal scuta 140, sub-caudal squamæ 53, in all 193; or 154 and 38, making 192.

47. Coluber fasciatus, the striped viper; a native of Virginia and Carolina. The body is covered with dark bluish scales, edged with white, and indented at the sides, the scales are carinated, and the white edges, standing in uniform rows, form regular white stripes: the under side is blue; abdominal scuta 128, subcaudal squamæ 67; in all 195.

48. Coluber subfuscus, the brownish viper: the sides spotted with black, the Linnæan number of scuta and squamæ is, abdominal 149, sub-caudal 43, total 192; but they are likewise numbered abdominal 154, sub-caudal 43; and abdominal 149, sub-caudal 55; the first 197, the last 204.

49. Coluber crotalinus, the crotaline viper; a native of America, of a great size, formed much like the crotalus, or rattle-snake. It is of a yellowish ground-colour all over, and mottled with dark brown; the head cordated, the eye-brows prominent, the tail covered with scutella only, and one third of the body long; abdominal scuta 154, sub-caudal squamæ 43; total 197.

50. Coluber Halys, or Haly's viper; a very rare species, a native of the driest parts of the southern deserts of Astracan; thicker, shorter, and more poisonous, than the berus; frightful, Dr. Pallas says, from the thick-set sub-carinated scales rising on its back. The under parts are whitish, the upper of a pale grey, with transverse spots of an olive brown, smallest towards the sides. Abdominal scuta 164, sub-caudal squamæ 34; in all 198.

51. Coluber rufecens, the russet-coloured viper; the colours consist of a yellowish red and white, and the head is covered with laminæ like the naja. It is a very poisonous serpent. The abdominal 159, sub-caudal squamæ 42; total 201.

52. Coluber libitinus, the melancholy viper; a native of the East Indies and Ceylon; somewhat under a cubit in length. Its bite has the effect of opium, causing endless sleep. The back is bent inwards, the under part white, variegated with thick black or brown specks; the upper part grey, with four rows of alternate transverse spots, the middle ones yellow, those on the sides brown or black; the scales on the back are smooth, obtusely rounded, carinated, with the middle stria more conspicuous than the rest; the head is broad, flat, and chequered; the tail four inches long. The abdominal scuta 155, the sub-caudal squamæ 45, total 200; or, in another variety, 152, and 43; in all 195.

53. Coluber melanocephalus, the black-headed viper; a native of America, seventeen inches long; remarkably smooth, the upper part yellowish, the under white, a black stripe on the head and back, the back of the head dark brown. There are several varieties, which differ with respect to the number of scuta and sub-caudal squamæ.

54. Coluber Panamensis, or Panama viper. This is called by Albertus Seba, the coluber Æsculapius from Panama. He describes it as follows: "The Indians hold this species of serpent sacred, and consider it as the giver of health. It is perfectly harmless, and of a kind nature. There are many specimens of this viper described by different writers. Ælian gives it the name of παρεια, from its thick and gross cheeks. Androvandus, in his Serpentology, p. 271, gives a representation of it, and adds that it is found in the river Tiber. Some authors describe it as of a yellow colour, others green; but they seem never to have seen a living specimen. The serpent of which we have given a representation is taken from the living subject. The largest of the sub-caudal squamæ are of a bright white underneath. The upper scales are equally disposed and closely set; by the bending of the body they separate from each other, as the parts in the figure will shew. The superfices and edges of the scales look like hairs. The upper part of the head is covered with uniform laminæ, to which those under the cheek are similar. The mouth is full of teeth above and below, bent inwards, and very sharp; by these means whatever the animal seizes is forced into its jaws without any possibility of escape. This serpent discovers its prey by smell, and fascinates it with its immense eyes, viz. dor-mice, rats, mice, lizards, birds, &c. on all of which it feeds. I have not hitherto been able to observe any smell of musk from the excrements, which has been advanced by some. Abdominal scuta 164, sub-caudal squamæ 38; total 192.

55. Coluber

55. Coluber craſſicaudus, or thick-tailed viper; of a ſky-blue colour, with a thick tail. It is a native of Africa, and deſcribed by Seba as mottled or ſpotted with black. Abdominal ſcuta 142, ſub-caudal ſquamæ 60; total 202.

56. Coluber nævius, the freckled viper. The ground colour is white, freckled with duſky ſpots, and interlaced with black lines or bands. Abdominal ſcuta 153, ſub-caudal ſquamæ 50; total 203.

57. Coluber cobella, the cobella viper. It is of a duſky colour, with ſmall white bands, a very common inhabitant of America, from two to three feet long. The head is broad, with an oblique lead-coloured ſpot behind each eye; the tail becomes very ſuddenly taper, the tip of it the fifth or ſixth part of an inch, and obtuſe; the colours as well as the ſcuta and ſquamæ are various; ſometimes it is grey with little oblique lines; ſometimes the upper part brown with oblique black lines, and the under part white, with ſtripes fringed with white and brown; ſometimes the upper part is of a dark grey, the under ſtriped with white, with the lateral ſcales of a dirty white, ſtreaked with brown; ſometimes the under part is ſtriped, and the upper plain brown, with faintiſh lines, at firſt oblique, afterwards forming angles; ſometimes the under part is ſtriped, the upper of a pale brown with dorſal ſcales, here and there white on the edges; ſometimes the upper part is ſtriped with black, the under white; with faintiſh oblique lines and tranſverſe black and brown ſtripes. The ſcuta and ſub-caudal ſquamæ have been found to differ in no leſs than thirteen varieties of this ſpecies of viper.

58. Coluber purpurans, the purple viper. It is of a purple colour, decorated with black ſpots. The abdominal ſcuta 144, ſub-caudal ſquamæ 72, making 216.

59. Coluber reginæ, the royal viper; a native of South America, and India. The upper part is brown, with a purple tinge; but white underneath the chin and tail. The abdominal ſcuta are alternately white, and partly brown and black, abdominal ſcuta 137, ſub-caudal ſquamæ 70; total 207: or in others 143, and 74, making 217.

60. Coluber doliatus, the crafty viper; a native of Carolina. The ground colour is white, with black equidiſtant belts; the ſcuta not entirely encircling the abdomen, but joined on each ſide to the more remote, by which means the dorſal belts become perfect; abdominal ſcuta 164, ſub-caudal ſquamæ 43; total 207; or in other varieties 166 and 40, making 206.

61. Coluber ordinatus, the regular-marked viper. The ground colour is a very light blue, ſhaded with black, and decorated with equi-diſtant ſpeckled black and white belts, and a row of black ſpecks on the ſides: called by Seba, ſerpent *ibi boſoca* of Braſil. A native of Carolina, and other parts of North America. The abdominal ſcuta 138, the ſub-caudal ſquamæ 72; total 210, or 138, 74, making 212.

62. Coluber coccineus, the crimſon viper; a native of Florida, and New Spain, an ell in length, but the thickneſs only of the little finger. The ſkin is uſed by the inhabitants for ropes; the head is very ſmall; the face crimſon, the eyebrows black, the forehead yellow; the neck is unmarked; twenty-three crimſon ſpots decorate the back, tranſverſely rounded, or of an obtuſe ſquare form, edged with black, and moſt of them imperfect at the ſides, and marked with yellow lines ſpotted with black. The abdomen is of a ſhining ſilvery white; abdominal ſcuta 175, ſub-caudal ſquamæ 35, making 210.

63. Coluber Mexicanus, the Mexican viper. A native of South America, with 134 abdominal ſcuta, and 77 ſub-caudal ſquamæ, in all 211.

64. Coluber ſeverus, the cruel viper; called the deaf adder. It is a native of Aſia, from ſixteen inches to two feet in length, cinereous grey with white irregular bands and tranſverſe dark ſtriæ converging towards the back, the under part white, with the bands divided on the outſide; ſometimes the upper part is brown, with tranſverſe narrow cinereous bands, white on the edges, the under part of a pale colour, ſpotted with brown towards the tail; the back of the head brown; a ſingle brown ſtripe between the eyes, and another behind them. Its bite is venomous and cruel, ſeldom letting go its hold till the head is ſevered from the body: abdominal ſcuta 170; ſub-caudal ſquamæ 42; making 212. But theſe vary in the different varieties.

65. Coluber Aurora, the Aurora viper; a native of America. It has a livid-coloured ground, with a yellow back, forming a broad longitudinal band from head to tail; the tail and neck ſomewhat thick, but like the plicatilis; abdominal ſcuta 179, ſub-caudal ſquamæ 37; in all 216.

66. Coluba Sipedon, the Sipedon viper; all over of a plain brown; and a native of North America. It has 144 abdominal ſcuta, and 73 ſub-caudal ſquamæ; total 217.

67. Coluber maurus, or mooriſh viper; a native of Algiers. The upper part of the body is brown, with two dorſal lines, the under part black; and numberleſs black ſtripes on both ſides from the dorſal lines to the abdomen. It is furniſhed with 152 abdominal ſcuta, and 66 ſub-caudal ſquamæ; in all 218.

68. Coluber ſtolatus, the long-robed viper; a native of Aſia. The ground colour is a yellowiſh brown, with two white longitudinal fillets in the back, forming the ground colour into three brown broad ſtripes. The head and the ſcuta on the abdomen marked on both ſides with a black ſpeck; on the neck are light, dark brown, ſhort ſpots on a light ground; abdominal ſcuta 143, ſub-caudal ſquamæ 76; total 219. The two following varieties of this viper are deſcribed by Dr. Ruſſell, among the ſerpents he examined on the coaſt of Coromandel. The firſt has 143 abdominal ſcuta, and 70 ſub-caudal ſquamæ; making 213; and is called by the natives *wanna pam*. The head is ſomewhat broader than the neck, obtuſe-ovate, depreſſed, rather ſhort, covered with nine principal laminæ beſides ſome ſmaller. The anterior pair, ſmall, ſub-rotund; the next irregularly pentagonal; the central lamina between the eyes narrow, ſhield-form, the lateral conical; the large poſterior pair, oblique, oblong, ſemi-cordate, with two or three ſmall laminæ on each ſide. The mouth large, the lower jaw ſomewhat ſhorter than the upper. The teeth, ſmall, ſharp, reflex; a marginal and two palatal rows in the upper jaw. The eyes large, orbicular, protuberant. The noſtrils near the point of the roſtrum, large, and open. The trunk round, inveſted with oval, thick-ſet, carinated ſcales; two rows only next the ſcuta, not carinated. The length, one foot and a half; the circumference of the neck one inch and a fourth; the trunk, where thickeſt, ſeldom exceeds two inches and a fourth. The tail tapers rapidly, the laſt inch becoming exceſſively ſlender: in length four inches and a half. The colour of the head and neck a very dark green; the cheeks and throat yellow. On the neck are two blackiſh bands, from which a yellowiſh-brown fillet runs on each ſide along the trunk and part of the tail, variegated with ſmall white ſpots nearly at equal diſtances, and oppoſite to each other. Beſides theſe, moſt part of the trunk between the fillets is adorned with broader, tranſverſe, whitiſh bands; and between the fillets and the abdomen, with waving, interrupted, longitudinal, white lines. The ground colour between all theſe, approaches to black. From within a few inches of the anus, the trunk and part of the tail retain only the plain yellowiſh-brown fillet on each ſide. The ſcuta and ſub-caudal ſquamæ are of a dull pearl colour, and the former often have a black dot on each ſide. Dr. Ruſſell had no opportunity of making trials with the living ſnake, but from its want of poiſon organs, he concludes it to be innocuous. In the Syſtema Naturæ of Linnæus, it is marked poiſonous; but that this is a miſtake, has been very juſtly obſerved by Dr. Gray in the 79th volume of the Philoſophical Tranſactions.

The ſecond variety has 145 abdominal ſcuta, and 66 ſub-caudal ſquamæ, in all 211; and is called by the natives of India *wanna cogli*. This agrees in all material points

1. The Berus, or Viper of Europe. 2 The Viper of Rhedi.

The Viper Bitis, and Cobra de Monil.

points with the preceding; but some variation may be remarked in the form of the laminæ of the head: in the present subject the anterior pair are more exactly triangular, and the posterior truncate; but both specimens have carinated scales, and are destitute of poison organs. The principal distinction consists in the colour, and that might perhaps have suffered some alteration from the spirits. The prevalent colour dark, with a greenish cast. From the neck to the tail on each side runs a yellowish-brown fillet; and the neck, as well as the anterior half of the back, have between these fillets a number of cross black bands, which are continued on the sides, without intersecting the fillets. The scuta were of a dusky yellow, changed perhaps by the spirits. The above memorandum was taken at the time.

69. Coluber vittatus, the filleted viper; a native of South America and Africa; found also in the island of Ceylon. It is described by Linnæus as a coluber of a reddish brown colour, with irregular black spots on the crown of the head, encircled and mixed with lines of white. From the hindhead proceeds a double white band, which stretches the whole length of the body, ending in a double white fillet on the tail; the abdominal scuta are white edged with brown, and the sub caudal squamæ are brown edged with white: a white cordated fillet also runs along the sides, dividing the abdomen from the back. It is a very beautiful and rare species, of a delicate slender make and very long; abdominal scuta 142, sub-caudal squamæ 78; in all 220.

Seba describes a male and female of this species, in a state of dalliance preparatory to sexual contact; the mode of which he took great pains to investigate. He delineates the male as the largest of the two; its back resembling a piece of striped silk on a crimson ground, crossed and worked with edgings of a delicate white: the scuta of the abdomen partaking of a white pearly hue, with broad crimson transverse stripes at equal distances: the laminæ of the head broad, deep red, tinged with sky-colour and white: the eyes are vertical, and of a transparent blue; on the nose it has the mark of a small cross, not very strongly defined: the tail is rather short, and obtuse. Near the tail are seen its testicles, of a vast size for such a creature, and defended by sharp, hard, prickly scales. The female very much resembles the male, except that instead of crimson she is of a lighter red, and the tail long and tapering. She is said to court the male in a thousand undulating folds and postures, and to exhibit the most astonishing symptoms of lasciviousness. For the mode and manner of the propagation of vipers, see the article SERPENTES.

70. Coluber miliaris, the millet-spotted viper; a native of South America and India, the under part is white, the upper brown; the scales marked all over with minute spots like millet seed. It has 162 abdominal scuta and 59 sub-caudal squamæ; total 221.

71. Coluber Æsculapii, or viper of Æsculapius; a native of South America and India, in form and appearance resembling the natrix; about nineteen inches in length, with black and white spots and stripes, divided by a line or white belt; the upper part brown, the under white; the head broad, with a double black stripe; the body smaller than the head; the tail tapering, with the tip obtuse. The scuta and squamæ vary extremely in this species; the usual number is, abdominal scuta 180, sub-caudal squamæ 43; in all 223.

72. Coluber bipes, or two-footed viper, found in the rivers of the country of Tyrol, feeding upon frogs and fish, a biped, having yellow eyes, the lower jaw white, the dorsal scales elliptically edged, the lateral spotted with white; the scuta of the abdomen white, marked with a brown spot in the middle. 116 abdominal scuta, 58 sub-caudal squamæ; in all 174.

73. Coluber rhombeatus, or rhombeated viper; a native of South America and India; azure, with a triple longitudinal row of sub-rhomboidal spots, blue in the middle, like the plicatilis; the scuta and squamæ vary also in this coluber. They are usually, abdominal 157, sub-caudal 70; in all 227.

74. Coluber cyaneus, or bright blue viper; a native of America, and of a deep blue colour. The under part is green, with 119 abdominal scuta, and 110 sub-caudal squamæ; making 229.

75. Coluber natrix, or water-viper. Of this species there are many varieties; and, from its being so generally known, we meet with many descriptions; the most accurate of which are these, viz. 1. A unicoloured viper, with a pale yellow ring round the neck, marked with a black triangular spot. 2. A natrix of a remarkable length, of a blackish brown colour, with a few pale yellow specks; the under part cinereous. 3. The natrix Gernonensis, with the head variegated before, a short black stripe between the eyes, and a very long one at the back of the head; two large spots at the nape of the neck, which are immediately succeeded by some smaller, arranged in rows all along the back; pale yellow in the middle, and of a dirty white at the extremity. 4. A water-serpent, with a beautiful flame colour round the head and eyes, and under the throat; the back is sea-green spotted with black, the sides blue, the abdomen bluish black; a native of Germany, and a very elegant variety. 5. An azure water-viper, with black specks, and undulating transverse lines. An azure natrix, with a little white band on each side, interspersed with black spots, the carinæ white, as well as the abdomen, with a black spot on each side. There are likewise the natrix vulgaris, and the natrix torquata, found in hedge-rows, and sometimes in houses and stables, in many parts of Europe. These are harmless, delighting in sun and warmth, and bringing forth eggs in dunghills and under old decayed trees, glued together by slime into large heaps. It migrates towards autumn from the south of Pannonia, beyond Savoy, into Turkey, and returns towards the spring; the general length is three feet nine inches, but some are a great deal longer: the upper part of the body of a shining black; with a white spot on each side the neck; the back sub-carinated, the scales are mostly of a round and oblong form, the middle carinated and arranged in nineteen rows; the under part white in general, but sometimes inclining to yellow or red, with a longitudinal, irregular, broadish, black, stripe in the middle, beginning at the fifteenth scuta; the tail entirely black, the nose acute. Abdominal scuta 170, sub-caudal squamæ 60; total 230: but these differ greatly in different subjects. This viper, and all its varieties, are very dexterous in catching fish. In summer great numbers are seen lying on the branches of trees which hang over rivers. They lie in wait in this manner to surprise either birds or fish: after the latter they plunge with surprising dexterity, and catch many of a large size, which they bring to land and swallow whole.

76. Coluber Gronovianus, the viper of Gronovius; the colour of a cinereous bluish brown, the under part inclining to black; a white-pointed spot on each side the back of the head, tipped with black; the back is shaded with black, very nearly resembling the natrix.

77. Coluber lubricus, the slippery viper; the ground colour is a bright shining white, with smooth black belts; a native of Surinam, in South America, and of Africa; somewhat resembling the natrix.

78. Coluber humanus, the humane viper; the ground is black, spotted with white; the tail striped alternately with black and white; a native of Amboyna and New Spain. It is a harmless inoffensive species, and from thence takes the name of humanus.

79. Coluber punctulatus, the punctulated or studded viper; it is brown studded with very small white spots; the head defended by broad laminæ or plates, and flat; the back of the cheeks drawn down into a triangular form, the nose more pointed, the body smooth and elegant, rather narrow at the back of the head, thickest in the middle; the tail conical, long, and taper. This coluber has also great affinity with the natrix; and the three last species are, by some naturalists, all classed with the natrix.

80. Coluber varius, the streaked viper; of a bright shining black, the sides streaked with black and white. The abdominal scuta 160, sub-caudal squamæ 70; total 230.

81. Coluber Tyrolensis, the viper of Tyrol; a native of the Tyrolese, or Upper Austria, depositing amongst the rocks fourteen eggs, of a white colour, of the substance of leather, joined together, and the yolk on the side. Abdominal scuta 178, sub-caudal squamæ 68; total 238.

82. Coluber Arabicus, the Arabian viper; with a unicolour back, the abdomen inclining to black. Seba also describes one as plain brown; a native of Arabia, with 174 abdominal scuta, and 60 sub-caudal squamæ; total 234.

83. Coluber agilis, the nimble viper; a native of Ceylon, variegated with stripes, alternately white and brown, speckled with black; the head smooth, and resembling that of the plicatilis. It has 184 abdominal scuta, and 50 sub-caudal squamæ; in all 234.

84. Coluber lacteus, the milky viper; a native of South America and India; white, with double black spots; the top of the head black, with a longitudinal white line. It is furnished with 203 abdominal scuta, and 32 sub-caudal squamæ; making 235.

85. Coluber jaculatrix, the darting viper; of a cinereous blue, with black longitudinal lines; it is found at Surinam, and in all parts of South America, and is very much like the coluber lineatus. It has 163 abdominal scuta, and 77 sub-caudal squamæ, amounting to 240; or 173, and 78, making 251.

86. Coluber scutatus, the helmeted viper; found in the river Ural by Dr. Pallas. It is, like the natrix, mostly an aquatic serpent, though often found upon land. The face is like that of the natrix; black on the back, and the abdominal scuta black likewise, the alternate ones alike at either end. The head is defended by a broad plate; the teeth like needles, projecting; the roof of the palate double; the iris brown; the tail of a very uncommon triangular form, with one or two of the scales white. Abdominal scuta 190, sub-caudal squamæ 50; in all 240.

87. Coluber subalbidus, the half-white viper; the ground colour is chesnut, with thirty equidistant white bands, and twenty on the tail, divided by a line. It is a native of America; the nose is obtuse; the face has two upright white stripes. It is furnished with 165 abdominal scuta, and 75 sub-caudal squamæ; total 240.

88. Coluber atratus, the black-lined viper; a native of America. It is a brown serpent, filleted with black; having 163 abdominal scuta, and 72 sub-caudal squamæ; in all 240.

89. Coluber unicolor, the one-coloured viper; a species having only one uniform colour; and the sides lineated or fringed down to the anus; the nose pointed. It has 176 abdominal scuta, 66 sub-caudal squamæ; total 242.

90. Coluber aulicus, the courtly viper; a native of America. It is grey on the back, with numerous lineal white stripes forked at the sides; on each side the back of the head a white triangular spot, meeting at the nape of the neck: abdominal scuta 184, sub-caudal squamæ 60; total 244.

91. Coluber monilis, the monil viper, called in the East Indies, *cobra de monil*. It is a very small serpent, but its bite is said to occasion instant death. The head is black, with white lines or dots on the head and round the eyes: the body, from head to tail, beautifully annulated with black and white rings. It has 164 abdominal scuta, and 82 sub-caudal squamæ; in all 246. It is a native of South America, and of India. Though Dr. Russell employed some viper-catchers in Coromandel to procure him a specimen of this diminutive reptile, yet he was never able to succeed, though great pains were taken in the search. He has, however, furnished us with the following melancholy instances of the fatality of its poison. "The porter of Mr. Bourchier, governor of Bombay, a very stout Arab, was bitten by a small serpent, supposed to be the cobra monil, and expired almost instantaneously, after exclaiming that a snake had bit him. The governor's son, Mr. James Bourchier, added, that the snake, to which the man's death was imputed, was, by the Portuguese, called *cobra de morte*; that in the course of twenty years in India, he had only seen two of them, one on the island of Bombay, the other in his own house at St. Thomas's Mount, near Madras. That the length of the snake was from six to nine inches; its thickness that of a common tobacco pipe. The head black, with white marks, bearing some resemblance to a skull, and two cross bones. The body alternately black and white, in joints, the whole length; and that its venom is of all others the most pernicious. A Gentoo boy in the service of an English officer of the army, had been forbid by his master to smoke tobacco. The gentleman returning one morning from shooting at an earlier hour than was expected, alarmed the boy, who happened at the time to be smoking a chirroot (segar). In eagerness to extinguish the chirroot, and conceal his offence, the boy run to an old wall behind the house, and thrusting the burning chirroot into a hole in the wall, was bitten in the hand. He exclaimed loudly; and his master with a servant, running to know what had happened, found the boy hardly able to give an account of what had befallen him: in a very short time after, the boy expired. The gentleman did not pretend to be precisely exact as to time, but was pretty confident that from the time of the boy's exclamation till his death, not more than ten minutes could have elapsed.

Mr. Ives, in his account of Hindoostan, describes the cobra de monil to be about a foot long, and to kill by its bite in a quarter of an hour. Mr. Pennant gives a stronger instance of the fatal rapidity of its bite: he says, a gentleman resident in India sent his servant to fetch something from a closet, when the man hastily cried out that something had pricked his finger; but before his master could reach him, he fell down dead on the floor! Similar events unhappily occur much oftener than are recorded.

92. Coluber hydrus, the sea-viper; a native of the Caspian sea; never known to go on shore. The head is small, the cheeks not distended, the palate armed with a double row of sharp teeth bending inwards; the tongue of an immense length, and black; the eyes small, with a yellow iris; the back of a cinereous olive colour, variegated with black orbicular spots in four rows, arranged into a quincunx; a stripe on the neck, forming an angle on each side the back of the head, interfected by two bright black oblong spots; the abdomen is tessellated with yellow and black; the tail almost entirely black, terminated by two of the smallest imaginable points, one over the other. It has 180 abdominal scuta, 66 sub-caudal squamæ; total 246.

93. Coluber fulvus, the yellow-spotted viper; a native of Carolina. It has twenty-two plain black belts, and the same number alternately spotted with bright yellow and brown, white before and behind. It is furnished with 218 abdominal scuta, 31 sub-caudal squamæ, making 249.

94. Coluber pallidus, the pale coloured viper; a native of South America, and India; of a dull white colour, with grey and brown promiscuous spots and specks, and two small bright black imperfect lines at the sides; the length about a foot and a half; having 156 abdominal scuta, 96 sub-caudal squamæ; total 252.

95. Coluber lineatus, the lineated viper; a native of Asia, lately described by Dr. Russell among his Indian serpents. It has 176 abdominal scuta, and 88 sub-caudal squamæ, making 264. It is called by the Indians *condanarouse*. The head is broader than the neck, oblong, ovate, depressed above; compressed towards the rostrum; covered with nine laminæ: the first pair between the nostrils, subtriangular; the next roundish; the middle laminæ of the three between the eyes, lancet-form; the lateral pyramidal; the last pair oblong-semi-cordate. The mouth middle size; the lower jaw longer than the upper. The teeth below, and in the two palatal rows of the upper jaw numerous,

1. and 2. The American Asp, male and female. 3. The Egyptian Asp.

1. The Crotaline Viper. _ 2. The Coronated Viper.

numerous, short, reflex; but the fore teeth in the marginal row, above, remarkably long. The eyes lateral, large, oval. The nostrils small. The trunk round, swelling elegantly from the neck to the tail; covered with oblong, oval, smooth scales. The length two feet four inches and a half; circumference two inches one fourth. The tail very taper, slender, and sharp pointed. The head is of a light brown; a yellow streak behind each eye; the trunk and tail are striped with seven longitudinal bands, or fillets; of which the middlemost, and the two exterior towards the belly, are of a darker brown, with a greenish cast, and broader than the others; two of the other four are almost black, and two of a greenish yellow. The scuta and one half of the squamæ nearest them are of a straw colour; and a small, darkish-green, thread runs along each side of the scuta and sub-caudal squamæ, to near the end of the tail. Among the natives this species bears a bad character, but it certainly possesses no poisoning organs. Abdominal scuta 176, sub-caudal squamæ 88; total 264.

96. Coluber ambiguus, the ambiguous viper; a native of America, four feet six inches and a half long, white, the upper part variegated with round broad brown stripes, the under part lighter with brown and black. It has 189 abdominal scuta, 64 sub-caudal squamæ, making 253. It is supposed by some authors to be poisonous; by others not.

97. Coluber cœcus, the secret viper; a terrible and much-dreaded serpent, of a great length, cruel in its bite, and fatal in its poison. It is happily a rare species, and oftener talked of than seen even in the country where it is indigenous. Indeed its sagacity, in hiding from the pursuits of the Indians, who take them to carry about as a show, is said to be very extraordinary. They secrete themselves in impenetrable thickets, and in the branches of trees of the largest foliage. But this instinct is certainly given more for the purpose of lying in ambush for its prey, than for shunning or avoiding danger; yet it flies from the face of man, and turns not upon the defensive until it is attacked; then it erects its crest, bids defiance with a strong hissing noise, and displays the utmost courage and vigour. It bears a strong resemblance to the cobra de capello: like that viper, it is furnished with a dilatable skin on the neck, and, like it, when irritated, has the faculty of enlarging or swelling it out to a vast size, much larger than any other part of the body; but it differs in not having upon this hood the pirspicillum, or spectacle-shaped mark, inseparable from the other species. The head is broad and obtuse, the crown depressed, covered with a large and strong pair of central laminæ, surrounded with much smaller on the sides and in front, but terminated at the hindhead by a series of fine white scales, forming a broad band round the poll. This is the commencement of the inflated hood on the neck, which has the appearance of an open net work, of reddish brown and white. The whole body is covered with close thick-set scales, and is of one yellowish uniform brown colour, except the belly, which is white. It is a native of the East Indies, and the island of Ceylon.

98. Coluber naja, or naja viper; the cobra de capello or hooded serpent of Hindoostan. The strong resemblance of this to the coluber cœcus, as well in size, form, and colour, as in its general habitudes has induced several naturalists to class them together. The viper-catchers in the East Indies bring numbers of these serpents to the English settlements, where they are sold after eradicating their fangs, and are carried about for show. It is a most malignant viper, fatally venomous, and unfortunately abounding in great plenty in the East Indies, in Ceylon, and the Ternate Isles; insomuch that it not unfrequently attacks people in their gardens, and even in their houses. The description given of it by Linnæus is as follows: the head is mailed with strong laminæ; the head depressed, and the mouth blunt; the body of a cinereous yellow, some of the scales dotted with white; the skin on the fore part between the sixth and twelfth abdominal scuta dilatable, (when the animal is provoked,) into a flat orbicular expanse, marked with a white diaphanous spectacle-shaped figure, margined with black. It is furnished with 193 abdominal scuta, and 60 sub-caudal squamæ; in all 253. Mr. Pennant, in his View of Hindoostan, vol. i. p. 197, informs us, that the cobra de capello grows from four to eight or nine feet in length, and is justly dreaded by the natives. That the mortal effect sometimes takes place in a quarter of an hour, sometimes in two or three hours. That an universal gangrene ensues, and the flesh falls from the bones; convulsions sometimes bring on death, according to the degree of virus, on which the symptoms depend. The poison of this viper, in its deleterious effect and rapidity, is reckoned next in order to the cobra monil, and the rattle-snake, which see under CROTALUS.

Of this viper, and its varieties, the most authentic and circumstantial description has been lately published by Dr. Russell; from whose valuable work we select the following particulars. Among the serpents of the East Indies, the cobra de capello holds a principal place. It is generally reckoned of all others the most deadly: the occasional expansion of the skin of the neck in the form of a hood, ascertains its identity to the most superficial observer; and as it is every where in the country exhibited publicly, by way of show, it is of course more universally known than perhaps any other of the race of reptiles. The natives of India pretend to distinguish a great number of varieties of this serpent, to which they ascribe different degrees of malignity; but, on examination, the venomous property appears to be nearly equal in all. Though many of the varieties vary, yet in general they have 185 abdominal scuta, and 57 sub-caudal squamæ; in all 242. It is called by the natives *chinta nagoo*; and by the English, in Hindoostan, *cobra de capello*. The head is hardly broader than the neck, short, broad-ovate, obtuse; the crown depressed; from the eyes contracted, compressed and declining to the rostrum. Covered with ten principal laminæ: the first in front of the rostrum, triangular, the base emarginate; the pair between the nostrils also triangular; the next pair larger, sub-semicircular; the central lamina between the eyes, broad shield-form; the lateral, conical; the semi-cordate pair, slightly acuminate: the scales on the occiput small, orbicular and oval. The mouth large; the lower jaw somewhat shorter than the upper. The teeth, few in the lower jaw, sharp, reflex, at regular distances, except in front, where two or three appear closer set, and longer: in the upper jaw, (as usual in other venomous snakes,) there is no marginal row, only two palatal rows of teeth, numerous, reflex, equal, sharp, smaller than those below. Two fangs, one longer than the other, are generally found emergent from the sac on each side. The eyes rather small, lateral, orbicular, prominent. The nostrils very near the apex of the rostrum, lateral, large, gaping. The neck, when the animal is at rest, is very little thicker than the head; but the loose skin of the neck being capable, in a peculiar manner, of extension, forms, when the animal is provoked, what is called the hood, which constitutes the principal character of the species. The spectacle-like mark on the hood, is partly formed by the colour of the interstitial skin, discovered in consequence of the separation of the scales; but the tint of the scales themselves contributes also to produce this figure, especially in respect to the dark colours; and hence the mark remains in some degree visible in the collapsion of the skin, after death. The trunk is round, covered with scales comparatively small, oval, polished, contiguous, hardly (except on the hinder part and tail) imbricate, in the living subject; but two rows on each side of the belly consist of larger scales, ovate, and imbricate. The length four feet and upwards; the circumference of the middle of the trunk, four inches. The tail round, measures nine inches, covered with sub-orbicular scales, and tapers gradually to a sharp horny point. The colour, a yellowish light-brown, but in certain

tain positions, the glistening scales reflect a faint bluish-ash colour. The interstitial skin is generally white, and the edges of many scales being also white, makes them appear in spots, and less contiguous than they really are. The abdominal scuta are very long; the sub-caudal squamæ hexagonal: both are of a dull white, freckled with dusky spots. The colours of the spectacle-mark are bright; but the orange tint of the interstitial skin is not so deep, as in some other species. After this minute description of the tamarind cobra de capello, it will be sufficient merely to mention a few of the other varieties of the same serpent, not hitherto known to naturalists, and which, therefore, can only be called by such names as are allotted to them by the Indians.

Arege nagoo, a cobra capello with 189 abdominal scuta, and 60 sub-caudal squamæ. The spectacle-mark differs somewhat from the former. The cervical scuta are remarkably dark, especially five of them. Two black spots on the inside of the hood, which are common to most of the other varieties, are also more conspicuous in this. Arege is the name of one of the small grains eaten by horses in Hindoostan.

Coodum nagoo, a cobra with 187 abdominal scuta, and 57 sub-caudal squamæ. The colour in this variety is rather darker than that in the others, and the colour of the skin is more yellow; but the principal distinction is in the spectacle-like mark on the hood, which here consists of an oblong curved frame, without the usual black eye of the others; the skin in the middle being white, and the scales retaining their ordinary yellowish-brown colour. Should this, as pretended by the snake-catchers, prove a constant character, it may perhaps be sufficient to constitute a variety. Coodum signifies wheat, among which this viper much delights.

Sankoo nagoo, with 183 abdominal scuta, and 56 sub-caudal squamæ. The chief distinction is the plain hood, without any mark; and hence this appears to be the coluber cœcus of Dr. Gmelin. It was conceived by Seba to be the female of the cobra de copella species; but one brought home by Dr. Russell from India, and presented to the late John Hunter, was a male; and it is certain that the spectacle mark on the hood, is found indifferently in male and female. This is rarer than the other varieties; and takes the name sankoo, from a shell so called, which is employed for glazing paper.

Mogla nagoo, with 191 abdominal scuta, and 65 sub-caudal squamæ. This has received its name from frequenting the Caldiero hedges. The cervical scuta are here and there spotted with faint greyish spots, and four of the middle scuta are entirely of a bluish-grey.

Malle nagoo, with 191 abdominal scuta, and 62 sub-caudal squamæ. The colour of this is a lighter brown, and the scuta are whiter, and less spotted; but seven of the pectoral scuta are completely dark. Malle is a name for the Arabian jasmine, among which this serpent is mostly found.

Cumboo nagoo, with 186 abdominal scuta, and 60 sub-caudal squamæ. Some deviations are observable in the shape of the laminæ; all the cervical scuta are dusky, and the trunk bears a strong bluish cast. This seems to be the cinereous grey cobra de capello of Seba.

Jonna nagoo, with 189 abdominal scuta, and 57 sub-caudal squamæ. An orange colour prevails in the skin of the hood; the scuta of the neck are spotted with grey, and six of the lower are wholly of a bluish-grey. Jonna is the name of a small horse-grain in India.

Nalla tas pam, with 186 abdominal scuta, and 62 sub-caudal squamæ. The black on the hood is unusually deep, and all the jugular scuta remarkably dusky: hence its name.

Kistna nagoo, with 186 abdominal scuta, and 63 sub-caudal squamæ. The middle lamina of the three between the eyes is remarkably broad, and the posterior pair sub-ovate, not semi-cordate. Five of the jugular scuta are dusky, and six of the pectoral almost black.

Koric nagoo, with 184 abdominal scuta, and 57 sub-caudal squamæ. The three lamina between the eyes are remarkably narrow; the large posterior pair oval. The colour of the trunk, more especially of the scuta, unusually bluish. Dr. Russell remarked, that the specific distinctions supposed by the natives, were in general extremely vague; and, so far as his experiments went, the venomous power of the reputed varieties of the cobra de capello were, under the same circumstances, apparently equal. As a standard for comparison with other serpents, Dr. Russell never knew its bite prove mortal to a dog, in less than twenty-seven minutes; and to a chicken, in less than half a minute.

Mr. Pennant informs us, in his Account of the Island of Ceylon, that the cobra de capello never distends its hood but when it is agitated by some passion, such as fear or rage; it then quits its creeping attitude, raises the fore part of the body a third of its whole length, spreads its hood, and moves its head around, darting a fiery glare to every part, often remaining in all other respects immoveable; or its motion becomes slow, steady, and cautious, so that in India it is considered as the emblem of Prudence; whence it is held in veneration equal to a deity. The legends of the country are full of strange tales relating to its actions: they call it *nella pambou*, or the good serpent; it is often represented twisted round their deities, under the name of *calengam*, in memory of a victory supposed to have been gained by one of their gods over an enormous naja.

Dr. Russell furnishes us with the following curious experiments relative to the cobra de capello. Mr. Bourchier, governor of Bombay, had more than once made trial of the combat between the mangoose, a species of weasel called the ichneumon, and the cobra de capello; and in order to prevent the former from having recourse to any herb or other remedy, the experiments were made, not in the field, but on the terrace at the top of the house. This weasel naturally attacks all serpents, and when bitten it has recourse to an herb, which is said to perform a cure. See VIVERRA. As soon as the mangoose perceived the snake, he took his station in front, watching his motions; and, when the snake struck at him, he eluded the blow, by skipping alertly to one side; returning, however, immediately to his former station. After a short skirmish of this kind, taking the opportunity, when he was sure of his mark, he caught the snake's head in his mouth, and bit quite through the skull. This generally proved mortal; but where the snake did not die immediately, the mangoose would bite his tail to provoke him to rise again, which sometimes the snake did; and then, after some feeble exertions, was sure to be killed by a second seizure.

A nooni paragoodoo serpent was brought near a cobra de capello, which had been left at liberty in a large room. The cobra's hood was extended, and he kept his eyes fixed on the small snake, but without striking, till pushed very near him, when he struck; but did not bite. The small snake did not snap in return, but, after remaining some time quiet, moved slowly off. Being again brought close to the cobra, but rather rudely, he was bitten near the tail, though no marks of teeth could be discerned. After a short the nooni glided under the wreaths of the cobra, and was permitted to go off quietly, without any offer to hurt him as he passed. A very active mega rekula poda serpent, which snapped at every thing opposed to him, being brought close to the cobra, did not attempt to snap; and, when the cobra was provoked to bite, seemed to submit without resistance. This was the more remarkable, as he continued to snap at every thing else, and seemed to spring from the ground in eagerness to attack. It did not appear that the fangs had acted, and the bite was attended with no consequence. The next subject opposed to the cobra, was a gedi paragoodoo serpent, which, in all its movements was much tamer than either of the former two, and seemed solely intent on escaping out of the room, or retreating into a dark corner. When pushed roughly on the cobra, and consequently struck by him, he made no resistance, nor snapped in return; he did not

The Panama Viper.

The Natrix, or Water Viper.

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not even offer to retreat, but laid himſelf cloſe to the cobra, whoſe body he often touched in his convolutions, without any apparent offence being taken. The cobras de capello bite each other without any conſequence aſcribable to their poiſon, even where the fangs viſibly acted. Yet the bite of a cobra de capello proved fatal to a nooni paragoodoo ſerpent, and to a tar tutta. A cobra de capello was bitten twice on the body by a katuka rekula poda ſerpent; but, though both fangs acted, no ſymptoms of poiſon followed. Why the bite of theſe animals on each other ſometimes proves fatal, and at others not, is a problem that yet remains to be ſolved.

99. Coluber rufus, the reddiſh-brown viper; decorated with red and brown equidiſtant bands. Like the naja it has a perſpicillum, or ſpectacle mark, ſomewhat checquered, with four black ſpots, not ſeen on the cobra de capello. It is a native of Braſil, and ſometimes called the naja Braſilienſis. Indeed moſt naturaliſts conſider it as a mere variety of the naja; and, like that reptile, its bite inflicts almoſt certain death.

100. Coluber Padera, the Padera viper; a native of South America and India. It is white, with numerous double brown ſpots on the back, joined together by a ſmall line, and the ſame number ſingle, on the ſides. It has 198 abdominal ſcuta, and 56 ſub-caudal ſquamæ; total 254.

101. Coluber canus, the hoary viper. It is ornamented with large ſhining ſpots, arranged like the teeth of a ſaw, and under each a white ſpeck; it is a native of South America and India. The roſtrum round, obtuſe; the head imbricated with ſtrong ſcales, and therefore a ſpecies between the boa and the coluber. The number of ſcuta and ſquamæ vary: as 188 abdominal ſcuta, and 70 ſub-caudal ſquamæ, making 258; or 300 ſcuta, and 64 ſquamæ; making 364.

102. Coluber Getulus, the Getulian viper; a native of Getulia in Africa, and of Carolina. Its colour is between a black and a bright blue, with lineal yellow ſtripes on the ſides, divided or cloven at the abdomen; the length of the tail about the fifth of an inch. Abdominal ſcuta 215, ſub-caudal ſquamæ 44; total 259.

103. Coluber ſibilans, the hiſſing viper; a native of Aſia, of a bright blue grey, with black fillets, the under part white; a very elegant and harmleſs ſpecies. It has 160 abdominal ſcuta, and 100 ſub-caudal ſquamæ; making 260.

104. Coluber Dione, the Dione viper; a ſpecies frequenting the ſalt marſhes about the Caſpian ſea, and alſo the dry ſalt mountainous ſpots about the river Irtis. It is of a form remarkably elegant, ſlender, tripodal; the head ſmall, quadrangular, generally reticulated with brown ſeams; the roof of the palate quadruple; the back of a pleaſing light blue, or white, with three whiter longitudinal ridges with alternate brown ſtreaks, often mixing with each other; the abdomen white, with ſmall black and brown ſpots, and often with red ſpecks; the tail one-ſixth of an inch. It has 190 abdominal ſcuta, and 66 ſub-caudal ſquamæ, making 256; or 206, and 58, making 264

105. Coluber Zeylonicus, the viper of Ceylon. It is mottled with large irregular brown ſpots, on a white ground. It is perfectly harmleſs and inoffenſive; and is furniſhed with 180 abdominal ſcuta, and 80 ſub-caudal ſquamæ, amounting to 260; or 187, and 89, making 276.

106. Coluber laticaudatus, the broad-tailed viper; a native of South America, and of India, even as far as the ſhores of the iſland of Tongataboo. It is cinereous, with brown ſtripes; the tail broad, compreſſed, obtuſe, pointed, armed with a ſting. It has 220 abdominal ſcuta, and 42 ſub-caudal ſquamæ; total 262.

107. Coluber Sirtalis, the viper Sirtalis; a native of Canada, ſmall, brown, ſtriated, with three azure-coloured fillets. It has 150 abdominal ſcuta, and 114 ſub-caudal ſquamæ; making 264.

108. Coluber atrox, the fierce viper; called alſo *torrida dypſas*, and the burning ſerpent of Ceylon. It is a furious reptile, attacks with uncommon boldneſs either man or beaſt, and its bite has the effect of ſcorching fire. Its venom, ſays Mr. Pennant, is ſo ſubtile, that it inſtantly vitiates the whole maſs, and death, amid the moſt excruciating torture, inevitably follows! Seba informs us, for the comfort of mankind, that it is a ſpecies very rarely met with, and then only in thoſe hot ſuffocating regions where man can ſcarcely breathe. It inhabits the burning ſands of the Aſiatic and African deſerts, and is found, with the enormous and frightful boa, in the interior parts of Ceylon. The figure we have engraved of this viper, was taken from the living ſubject by Albertus Seba. He ſays it is a female, which are generally the fierceſt. It is of a great length; the head is large, broad, compreſſed, and ſtrongly mailed with cloſe-ſet laminæ; the eyes are prominent, the pupil large and lucid, ſurrounded with a fiery red iris; the face is of a light cheſnut brown, terminated by a patch of white on the hind head, with a row of four brown ſpots down the middle. The whole body is carinated or keel-ſhaped, being compreſſed laterally from head to tail, whence ſome have called it the tænia or tape ſerpent. The back is defended by a ſucceſſion of convex ſcuta, placed like tiles on the ridge of a houſe. The ground colour of the whole body is a ferruginous brown, darkeſt towards the tail, and decorated on the ſides with lighter brown broad belts, narrowing towards the abdomen, where they are terminated with white ſpots. The abdominal ſcuta are 196, the ſub-caudal ſquamæ 69, making together 265. The male is ſaid to reſemble the female in all reſpects, except that its head is covered with very beautiful red and bright brown laminæ, reſembling the fineſt marble. The Rev. Edward Terry ſaw a criminal put to death at Ameedabad, in Hindooſtan, by inflicting upon him the bite of one of theſe vipers. The deleterious effect of their venom is always moſt violent when they are recently taken. As they inhabit only hot, dry, ſandy, and rocky, places, and live on toads, efts, and inſects, full of ſaline and acrimonious particles, the virus muſt then be naturally found in its moſt poiſonous ſtate.

109. Coluber Sibon, the viper of Sibon; a native of Africa, of a ferruginous brown intermixed with white; the under part white ſpotted with brown; the head likewiſe white. It has 180 abdominal ſcuta, 85 ſub-caudal ſquamæ; total 265.

110. Coluber nebulatus, the clouded viper; a native of America, entwining itſelf round people's legs; but it is perfectly harmleſs. It is generally about two feet five inches long, clouded or ſhaded with brown and grey, the under part variegated with brown and white. Abdominal ſcuta 185, ſub-caudal ſquamæ 88; making 273.

111. Coluber fuſcus, the brown viper; a native of Aſia, about four feet long, of a cinereous brown, reſembling the ahatulla; having an oblong brown ſpot behind the eyes. Abdominal ſcuta 149, ſub-caudal ſquamæ 109, total 258; or 155, and 109, making 264.

112. Coluber brunneus, the orange-brown viper. The ground colour is orange brown, with white narrow belts, and the abdomen white; deſcribed by Seba as the cobella of America. It has 191 abdominal ſcuta, and 75 ſub-caudal ſquamæ; total 266.

113. Coluber ſaturninus, the lead-coloured viper; a native of South America and India, 21 inches and a half long, of a livid ground, clouded with lead-coloured grey; the head livid, oblong, the roſtrum obtuſely quadrated, the eyes remarkably full and large, the body gradually tapering to the tail. Abdominal ſcuta 147, ſub caudal ſquamæ 120, total 267; or 157, and 114, making 271.

114. Coluber candidus, the gliſtening viper; a native of South America and India, of a ſhining white, with glittering variegated ſtripes. It has 220 abdominal ſcuta, and 50 ſub-caudal ſquamæ; total 270.

115. Coluber niveus, the ſnow-white viper; a large ſpecies, and very poiſonous. It is a native of Africa, entirely

entirely white and spotless. It has 209 abdominal scuta, and 61 sub-caudal squamæ; total 271.

116. Coluber scaber, the rough viper; a native of South America and India, ornamented with brown and black rough or raised spots; the back of the crown of the head divided by a black line; the scales carinated. It has 228 abdominal scuta, and 44 sub-caudal squamæ; total 272.

117. Coluber carinatus, the carinated viper. The ground colour is between a black and a blue, with white round spots on the sides; the back carinated, or raised like the keel of a ship. It is a native of South America and India; more than six feet long; the scuta white; the head obtuse; the eyes large, and rather prominent; the scales pale at the edges, the tail round and tapering by degrees, with a pale line in the middle. It is said to be innocuous. It is furnished with 157 abdominal scuta, and 115 sub-caudal squamæ, total 272; or 167, and 125, making 292.

118. Coluber corallinus, the coralline viper; a native of Asia, of the colour of white coral, with three brown fillets; the scales are distant from each other; the sides are decorated with rows of round white spots like strings of pearl. It feeds on toads, frogs, and lizards, and has a surprising faculty of distending its thorax. It kills by poison, and like the boa it slavers over its victim with a gelatinous matter previous to deglutition. It has 193 abdominal scuta, and 82 sub-caudal squamæ; total 275.

119. Coluber ovivorus, the egg-devouring viper; a native of America. It preys on birds, and has the faculty of finding out their nests, and sucking their eggs, on which it principally feeds during the summer months; afterwards on the young birds. It is otherwise innocuous; and has 203 abdominal scuta, and 73 sub-caudal squamæ; making 276.

120. Coluber saurita, the lizard viper; it is long, and very slender, a native of Carolina, of a bright lizard green, the upper part brown, with three bright green longitudinal fillets. It feeds, like the lizard, on frogs and insects, and is harmless. It has 156 abdominal scuta, and 21 sub-caudal squamæ; total 177.

121. Coluber constrictor, the writhing viper; a species very common in North America. It creeps with extraordinary speed; bites, but without poison; attacks men about their feet and legs, writhing and twisting round them as it does round trees. It is remarkably smooth and narrow; for the most part black, the under part of a pale blue, and the throat white. It has 186 abdominal scuta, and 29 sub-caudal squamæ; in all 215.

122. Coluber exoletus, the obsolete viper; a native of South America and India, very long and taper, like the thong of a whip. It is of a cinereous green, with a few large obtuse scales, white at the tips. It has 147 abdominal scuta, and 132 sub-caudal squamæ; total 279.

123. Coluber situla, the water-sucking viper; quite harmless, a native of Egypt, grey on the back, with fillets edged on each side with a black longitudinal line. It has 236 abdominal scuta, and 45 sub-caudal squamæ; amounting to 281.

124. Coluber triscalis, or three-ladder viper; a native of South America and India. The ground colour is a beautiful sea green, with three small brown longitudinal lines on the back, uniting at the nape of the neck, and the middle one breaking off at the top; likewise a brown line on each of its sides, running equi-distant with the two former to the point of the tail; and being crossed with fine transverse lines, forms the device of three ladders on its back. It is furnished with 195 abdominal scuta, and 86 sub-caudal squamæ; total 281.

125. Coluber guttatus, the mottled viper; a native of Carolina. It is of a livid colour, the back mottled with bright red and black spots; the sides with black streaks; the abdomen with alternate quadrangular black spots. It has 227 abdominal scuta, and 60 sub-caudal squamæ; total 287.

126. Coluber lemniscatus, the wreathed viper; a native of Asia, about three feet in length, remarkably smooth, shining, and taper; the ground colour is white, bound round with ferruginous or black transverse bands forming wreaths, three of which are close together; the dorsal scales are ferruginous at the edges. The scuta and squamæ often vary; but the most usual number is, abdominal scuta 250, sub-caudal squamæ 35, making 285.

127. Coluber annulatus, the annulated viper; a native of America, from nineteen inches to three feet long. The under part is white; the back cinereous grey, annulated with bright brown, or sometimes with black, red, or azure, rings, placed at equal distances round the body from head to tail. It has 190 abdominal scuta, and 96 squamæ, making 286; but these differ extremely in the different varieties of this serpent.

128. Coluber dipsas, the thirst-causing viper. Its bite is productive of a raging fever; whence arises insatiable thirst, and afterwards delirium. It is a native of India, America, and Ceylon. It is of a blue green colour; the scales white at the edges; the tail of a sky-blue, with a kind of seam beneath; abdominal scuta 152, sub-caudal squamæ 135, total 287; or 155 and 123, making 278.

129. Coluber Dhara, the Dhara viper. This species is found round Dhara, in the Malva country in Hindoostan, and in the province of Yeman in Arabia. It is more than a cubit in length, though less than the little finger in thickness. It is without spots; the upper part is of a copper-colour, the edges of the scales of a shining white; the under part white: the head round and obtuse, the laminæ on the top large and strong; and one in the middle between the eyes larger and stronger than the others. It has 235 abdominal scuta, 48 sub-caudal squamæ; total 283.

130. Coluber Pelias, the Pelian viper; a native of South America, and India. It is brown at the back of the head and eyes; the under part green, with a yellow fillet on each side, edged with black. It has 187 abdominal scuta, 130 sub-caudal squamæ; making 317.

131. Coluber Tyria, the Tyrian viper; a native of Egypt, white, with a triple longitudinal row of rhombiated spots. It has 218 abdominal scuta, 83 sub-caudal squamæ; amounting to 293.

132. Coluber jugularis, the blood-throated viper; a native of Egypt and Ethiopia. It is black, with a blood-coloured throat, appearing like fresh blood issuing from a wound. It has 195 abdominal scuta, 102 sub-caudal squamæ; total 297.

133. Coluber Caspius, the Caspian viper; a species which frequents the woody and low swampy marshes near the shores of the Caspian sea. When irritated it will attack a man with much fierceness, but otherwise it avoids him. It gives notice of its approach by a hissing noise, and approaches with its head erect, and its mouth open. It is more than five feet in length, the upper part alternately striped with brown and yellow; the under part, pale yellow. The eyes are prominent and globose, and of a faint brown; the jaws armed with two rows of small sharp teeth; the back and sides covered with eighteen rows of scales, yellow in the middle, and black at the edges. It has 198 abdominal scuta, 100 sub-caudal squamæ; making 298.

134. Coluber orientalis, the oriental viper; Linnæus is very concise in his description of this species, as he merely says it is a native of the East, and is called by Seba, the real oriental viper. It is a very elegant reptile, laterally compressed or carinated from head to tail; of a blue grey colour, decorated with shining black irregular spots. It has 202 abdominal scuta, 96 sub-caudal squamæ; total 298; or 202, and 74; making 294.

135. Coluber pethola, the viper pethola, or shielded serpent. Of this coluber there are many varieties; that described by Linnæus is a native of Africa; of a lead-colour, with testaceous stripes, the body resembling that of the natrix; the head is defended in the middle of the forehead between the eyes by a bright round shield, con-

sisting

COLUBER.

The [illegible] Viper; and the Cobra de Capelli, or Spectacle-headed Viper.

The Atrox, or Fierce Viper.

fiſting of large and ſtrong laminæ of various forms. The ſides, and the back of the head, are covered with imbricated ſcales; the roſtrum or noſe acute. Seba mentions it as an African ſerpent, called Petola; by others as the Petola Coronella, having tranſverſe ſtripes on the back and ſides. Under the title Coronella, there are eight deſcriptions: 1. The African Coronella, white, with roundiſh ſpots on the back, gradually rhomboid, and ſomewhat red at the edge. 2. Coronella ocellata, or ſpeckled, of a ſky-blue, with a quadruple longitudinal row of black ſpecks, blue in the middle. 3. Coronella faſciata, or ſtriped, of a cinereous grey, with black and brown ſtripes, and two broken longitudinal lines. 4. Coronella latiroſtra, or broad-noſed, of a bright brown, with a few indiſtinct ſtripes, the noſe flat. 5. Coronella latiroſtra, with bright ſtripes meeting near the abdomen. 6. Coronella ceraſtoides, or horn-like of a light bright brown with faint brown ſpots, two longitudinal at the back of the head, elliptical on the back, arranged in one row. 7. Coronella tæmieta, or banded, a brown band down the middle of the back, the abdomen and ſides of a light clear brown, the edges tinged with pale brown. 8. Coronella anguiformis, or ſnake-like, with entire circular brown ſtripes running obliquely underneath. Theſe are all beautiful ſerpents, and quite harmleſs. It has in general 209 abdominal ſcuta, and 90 ſub-caudal ſquamæ; total 299: but they vary in different individuals.

136. Coluber ocellatus, the ſpeckled viper; the ground-colour is reddiſh, with bright crimſon ſpecks: a ſhield or helmet on the head, of red and yellow laminæ. It is a native of Ceylon and China, and much reſembles the pethola.

137. Coluber Hitambocia, or viper Hitambocia; it is yellow, with two longitudinal ſtripes of a deeper colour. The head is red, and defended by ſtrong laminæ. It is a native of India, and like the pethola.

138. Coluber tigrinus, the tiger-like viper; entirely covered with tawny ſpots, and a ſhield on its head of the pureſt white. It is a native of Amboyna, and much reſembles the pethola, called alſo coronella tygrina, by Laurentius. It has a ſtriking reſemblance to the maſtiff, as well as tiger, the mouth being particularly large, and full of ſharp teeth; the cheeks are ſhort and broad, the noſtrils very much expanded, and as it were divided into two. The ſhield on the forehead has a croſs, marked in the middle with a round ſpot, indented upon a plain, large, white, glittering lamina. The whole external appearance of the body is reſplendent with oblong ſcales of a cinereous yellow, or tan-colour, fringed at the edges with a deep brown, and variegated here and there with other ſmaller brown ſpots, ornamented in a wonderfully curious manner.

139. Coluber catus, the cat-viper; of a colour reſembling a tabby cat. It is a native of America and the Indies. This name was firſt given by the Portugueſe ſettlers, becauſe they are fond of lying in wait under the walls of their houſes to catch rats, mice, dor-mice, lizards, &c. performing the office of our cats; and as they are entirely harmleſs, they are on that account ſuffered to remain unmoleſted. They are covered with very beautiful ſcales, four or five of which form plots or ſquares; the azure ſpots which mark the ſpaces have a very elegant effect. The lower part of the tail is ſpotted; two rough teſticles are ſeen near the hiatus ani, which are often obſerved at certain ſeaſons. It is likewiſe called Jalieboebot, taking its name from a certain kind of root which creeps along the ground like the folds of a ſerpent, and extends itſelf to the ſize of a man's arm in half an hour. This root being very full of fibres, and tenacious, fiſhing-nets are made from it in America.

140. Coluber cervinus, the deer-coloured viper; white, ſpotted with black in the middle, and ſtreaked with black and white at each end. It is a native of America, and much like the pethola.

141. Coluber Virginicus, the Virginian viper. The ground colour is brown, with yellow ſtripes, the forehead armed with a ſhield; a native of Virginia in North America.

142. Coluber ruber, the ruddy viper; the under part white, the upper of a very full deep red, with ſpots alternately uniting; a native of America, and marked like the pethola.

143. Coluber Auſtriacus, the Auſtrian viper; of a red and cinereous ſky-colour with alternate diſtinct ſpots on the back, the forehead armed with a ſhield; found in great abundance about Vienna, very ſimilar to the pethola.

144. Coluber teſſelatus, the teſſelated viper; the upper part teſſelated with black and brown alternately; the under part black only; the head is rather long, and armed with a ſhield in the front, with unequal white lines on each ſide: a native of Japidia. It has great affinity with the pethola: called alſo the coronella teſſelata.

145. Coluber æſtivus, the ſummer-loving viper; a native of Carolina, remarkably ſmooth and ſhining; the upper part of a ſky-blue colour, with black ſtriæ; the under of a pale grey. It has 155 abdominal ſcuta, 144 ſub-caudal ſquamæ; total 299.

146. Coluber Cahirinus, the viper of Cairo; a native of Egypt, and particularly round Cairo. It is about the thickneſs of a man's thumb, four feet and a half in length, very ſlender, the upper part grey, with large brown oval ſpots on the back, and ſmall ſquare ones at the edges on the ſides; the under part entirely of a ſilky whiteneſs, reſembling the Tyria: the head is rather ſmooth, ſomewhat chordated, the crown mailed with two pale oblong laminæ, much longer than the others. It has 230 abdominal ſcuta, and 82 ſub-caudal ſquamæ; total 312.

147. Coluber flaveſcens, the bright yellow viper; a native of the Tyroleſe, tripedal, covered with elliptical ſcales, brown, the under part of a bright yellow. It has 225 abdominal ſcuta, and 78 ſub-caudal ſquamæ; making 303.

148. Coluber molurus, the locuſt viper; a native of South America and India, very nearly reſembling the boa; but the ſcuta, the ſquamæ, and the ſhape of the head, are like the coluber genus. It has 248 abdominal ſcuta, 59 ſub-caudal ſquamæ; total 307.

149. Coluber Schokari, the viper Schokari; a native of Arabia, particularly of the mountainous woods about Yemen; it is only half a cubit long, and the thickneſs of a man's finger. The upper part of a cinereous brown, a double white longitudinal fillet on each ſide, and a ſmall fillet in the middle of the back, formed by white ſpots; the under part of a clear white, inclining to yellow towards the throat, ſpotted with brown; the head oval obtuſe; the crown ſmooth, with large laminæ; the tail about as long as half the body. It has 180 abdomidal ſcuta, and 114 ſub-caudal ſquamæ, in all 294; or 183 and 144, making 327.

150. Coluber Baetaen, the viper Baetaen, ſpotted with black and white; a native of Arabia; only a foot long, and about two inches thick; yet the bite is rank poiſon, and produces inſtant death, cauſing a general ſwelling of the body.

151. Colluber Hoelleik, the viper Hoelleik; entirely red; a native of Arabia; a foot long. The bite cauſes a burning ſwelling, but it is not fatal; it is ſaid to have the power of thawing ice with its breath.

152. Coluber Hannaſch, the viper Hannaſch; of a ſhining black; a native of Arabia, a cubit in length, and as thick as a man's finger. The bite cauſes a ſwelling, but is not dangerous.

153. Coluber purpuraſcens, the purple-blue viper; all over of a ſhining violet colour; with 189 abdominal ſcuta, and 122 ſub-caudal ſquamæ; total 311.

154. Coluber Ahætulla, the viper Ahætulla; a native of Aſia, and of America; four feet two inches long, tapered like the thong of a whip, of a golden-green colour, the ſkin is black and ſometimes conſpicuous between the ſcales; the head is long and narrow, with a black ſtripe over the eyes. It is alſo deſcribed as a coluber with the head,

head, neck, and upper part of the back, of a sky-blue, the rest of the body of the clearest white, vying with the colours of the rainbow, and called by some the natrix ahætulla; by others, the long green Borneo snake; and by Seba, a most beautiful serpent of Amboyna named bonguatrera. It has 163 abdominal scuta, 150 sub-caudal squamæ; total 313. But in this respect the varieties differ extremely.

155. Coluber petalarius, the petalled viper; a native of South America and India; from a foot and a half to two feet in length. It is brown, with white stripes; the under part white. It has 212 abdominal scuta, 102 sub-caudal squamæ; total 314; but these vary, as in the preceding species.

156. Coluber pictus, the painted viper; so named from the variety and resplendency of its colours. The whole body appears as if painted in irregular compartments of red, yellow, white, and black; the red and black scales all edged with white. The head is of an oblong oval form, very little wider than the neck; the cheeks are inflated, and the eyes yellow, scarcely distinguishable from the bright colours of the face, which are most elegantly variegated; the crown of the head terminated with large upright pointed scales. The abdominal scuta are arranged in alternate bands or lines of red, black, and white; and their termination on the sides forms an even line from head to tail, the squamæ of which partake of the painted colours of the back.

157. Coluber caracaras, the caracara viper; a coluber variegated by bright vivid colours. Seba describes it as the singular serpent caracaras. It has 190 abdominal scuta, 125 sub-caudal squamæ; total 315.

158. Coluber Haje, the viper Haje; a native of Lower Egypt, of a great size, black, with oblique stripes, and the scales edged with white. When irritated and intending to bite, it fiercely erects its head, and stretches out the neck. Its bite is deadly; but the Egyptian conjurors make it harmless by taking out the fangs; abdominal scuta 207, sub-caudal squamæ 109, making 316; or 206 and 60, in all 266.

159. Coluber filiformis, the thread-formed viper; a native of South America and India. It is black, with lines remarkably small, like threads running down the back; the under part white; the head is thicker than the body. A variety called filiformis natrix, is of a livid colour in the upper part; a brown line proceeds on each side behind the eyes, which is soon formed into small oblique points, which become at last imperceptible. It has 165 abdominal scuta, 158 sub-scaudal squamæ, amounting to 323.

160. Coluber pullatus, the mourning viper; a native of Asia, twenty-two inches long, ornamented with black stripes and white specks; the temples white, with black spots; the nose round and obtuse. Boddært describes it as a black coluber with white spots, and the under part white with black spots. It has 217 abdominal scuta, and 108 sub-caudal squamæ, total 325; or 215, and 104, making 319.

161. Coluber hippocrepis, the viper hippocrepis; a native of America, of a livid colour, with brown spots; brown stripes between the eyes, and arched ones at the back of the head. It has 232 abdominal scuta, and 94 sub-caudal squamæ; total 326.

162. Coluber Minervæ, the viper of Minerva; a native of South America and of the East Indies. It is grey, with a fillet on the back, and three brown stripes on the head. It has 238 abdominal scuta, and 90 sub-caudal squamæ; making 328.

163. Coluber cinereus, the cinereous viper; a native of South America and India; of a cinereous grey colour; the abdomen white, angulated; the scales of the tail ferruginous at the edges. It has 200 abdominal scuta, and 137 sub-caudal squamæ; total 337.

164. Coluber viridissimus, the greenest viper; a native of Surinam, of a very deep green; the scuta of the abdomen dilated in the middle. It has 217 abdominal scuta, and 122 sub-caudal squamæ; making 339.

165. Coluber mucosus, the slimy viper; a native of the East Indies, and of America. The specimen described by Linnæus was of a grey colour, and but little more than a foot in length. Dr. Russell has favoured us with the following description of one of a different colour, and larger size, which he examined in Bengal: The head is proportionally small, scarcely broader than the neck, ovate, depressed, but towards the rostrum compressed. Besides the usual laminæ, there are eight or ten, of various shapes, on each side of the hind head. The first pair, orbicular, between the nostrils; the next pair, irregularly square. The shield-form laminæ, between the eyes, rather broad above; the lateral laminæ, conical; the two posterior laminæ, irregular hexagons; the mouth, wide; the jaws nearly of equal length; the upper jaw a little divided. The teeth numerous, small, reflex; two palatal rows in the upper jaw, and one marginal. The eyes lateral, large, orbicular, prominent. The nostrils near the point of the rostrum, small, but gaping. The neck covered with scales, small, oval, smooth, imbricate; the back, carinated; the sides, a little compressed; the scales sub-rhomboidal; but four rows on the upper part of the back, are either carinated or striated. The length, five feet four inches. The tail, taper, small, sharp-pointed. The cheeks, and sides of the throat, are of a pale flesh, or whitish, colour, streaked transversely with black lines. The jugular scuta are of a yellowish-white, each having a blackish spot on the sides. The head, neck, and part of the trunk, are of a dull yellowish-olive, variegated by transverse black lines and spots, joined together, which become blacker, or more conspicuous, as they approach the tail. Half the abdominal scuta are of a dull white, strewed with dusky spots; but the inferior edge of each scale is of a purplish black. The edges of the scales on the tail being black, make it appear as if regularly checkered: the sub-caudal squamæ have the like appearance, but they are of a greenish yellow. It had 199 abdominal scuta, and 121 sub-caudal squamæ, making 320; and, by the natives in India, is called *jeri potoo*. Chickens bitten by this snake shewed no signs of poison; they suffered pain, but the parts about the bite did not change colour, and the birds were not visibly disordered. It is a common snake at Vizagapatam; and is sometimes found of a much larger size than the subject here described.

166. Coluber domesticus, the domestic viper; a species which infests the houses in Barbary, creeping through the thatch, and hiding in cellars, and under the beds. It resembles the hippocrepis, but is distinguished by strokes cut in two between the eyes, or by a double black spot. It is innocuous; and has 245 abdominal scuta, and 94 sub-caudal squamæ; making 339.

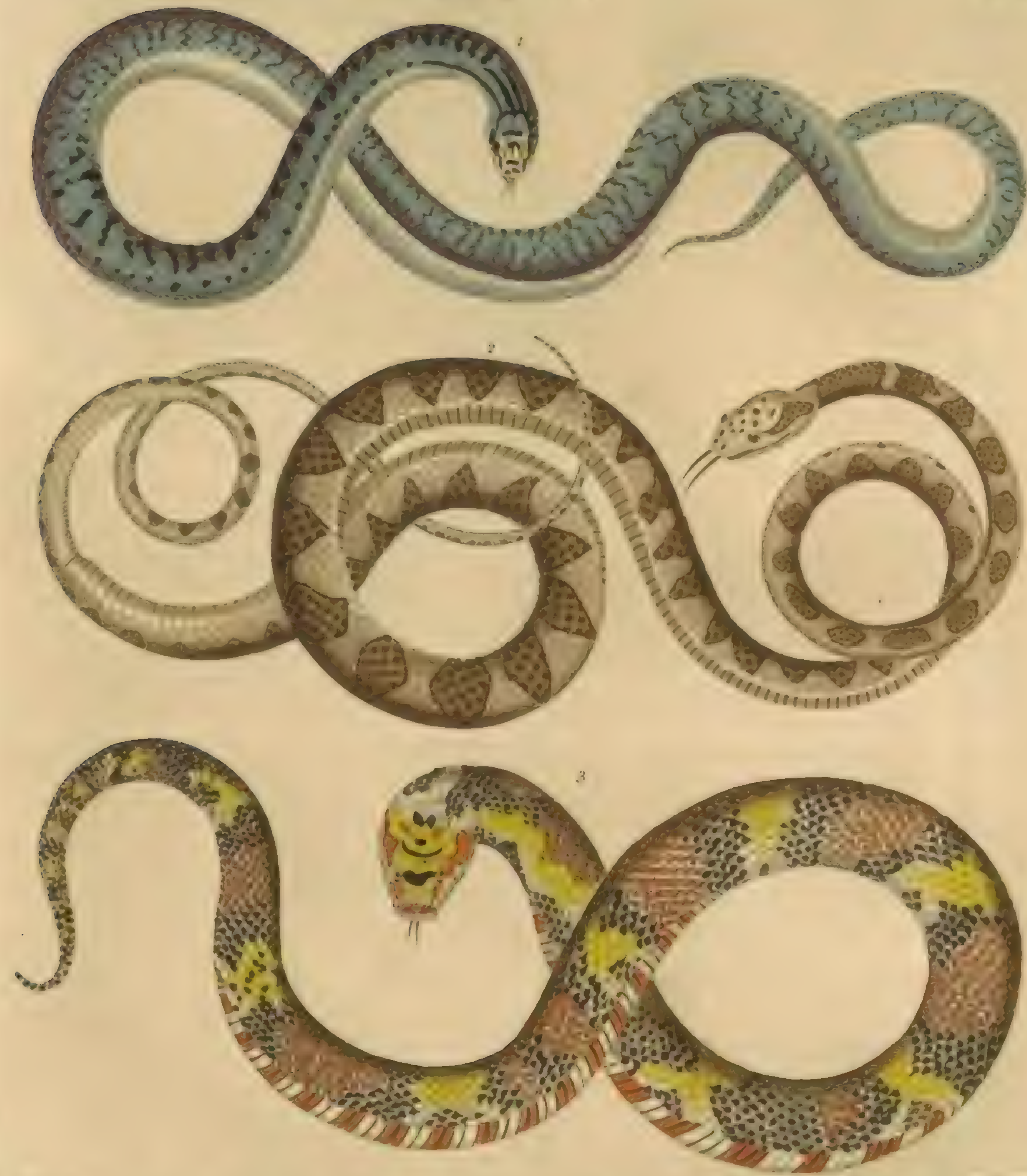
167. Coluber Sebæ, or Seba's viper; a very large and elegant clouded coluber, with 271 abdominal scuta, and 70 sub-caudal squamæ; total 341. It is a harmless species, and takes its name from Seba, who first discovered it.

168. Coluber cenchoa, or viper cenchoa. It is a native of America; the ground colour brown, with faint spots and some white stripes; the head globular. It has 220 abdominal scuta, and 124 sub-caudal squamæ; total 344. The male of this species is of an astonishing length, and very slender and elegant considering its size. The head is small and short, the eyes are large, and situated very near the nostrils. It affords a subject for a most beautiful plate; a pale yellow tinges the scales with a mixture of cinereous, which is covered the whole length of the back by something resembling a brown veil, hanging like a fringe near the sides. The lower scales are tinged with a dirty yellow.

169. Coluber mycterizans, the mocking viper; a native of America and the East Indies. It is very thin and long, resembling the thong of a coach-whip. The head is angular; the nose extended on four sides; the sides of a pale colour, with a lineal fillet; the tail has five pentaedron

COLUBER.

1. The Cat-like Viper. 2 The Tyger-like Viper.



1. The Summer loving Viper. 2. The Pethola Viper. 3. The painted Viper.

taedron sides. Besides this description of Linnæus, are the following varieties: 1. A coluber inclining to blue, with lineated sides. 2. The natrix mycterizans of Laurentius. 3. The natrix flagelliformis, or brown coach-whip-snake. 4. Anguis viridis, or deep green mycterizans. It has 192 abdominal scuta, and 167 sub-caudal squamæ, total 359; or 187, and 148, making 335. Dr. Russell also saw an individual of this species, on the coast of Coromandel, which he describes as follows: The head much broader than the neck, oblong, depressed above, rounded on the sides, then compressed, and contracted at the eyes, protruding into a long, straight, angular, pointed rostrum, which resembles the beak of a bird, with a small, soft, obtuse, reflex, process, at the extremity. The occiput is covered with sub-orbicular, imbricate, scales; the crown and rostrum with eleven laminæ: the two anterior of which are pyramidal, rounded at the base; the next pair nearly of the same form, but larger; next, a small pair triangular: the central lamina between the eyes spatula-form, those on the sides conical; the posterior pair semi-cordate. The mouth wide, the upper jaw a little longer than the lower, the scale in front not emarginate. The teeth reflex, slender, sharp; the anterior in both jaws less close, thicker, and longer; a marginal and two palatal rows in the upper jaw. The eyes lateral, large, oval, prominent; of a golden colour. The nostrils small; on the side of the rostrum near the apex. The trunk somewhat triangular, the back being slightly carinated, the sides declining, the abdomen flattish. The scales linear-lanceolate, loosely set on the neck and fore part of the trunk, but on the rest closely imbricate. The scales on the ridge of the back, and those next the scuta, are rounder, or ovate. The length four feet six inches, of which the tail comprehended one foot ten inches. The circumference of the neck three-fourths of an inch, the thickest part of the trunk little exceeding an inch and a half. The tail round, remarkably long and slender, covered with ovate, imbricate, scales, sharp-pointed, and so small near the end, that it is difficult to count the sub-caudal squamæ. The colour. The head has the appearance of being covered with green velvet, with a yellow streak on each cheek; the rest, including the neck, the trunk, and the tail, is of a yellowish grass-green, when the animal is at rest; but when provoked, the neck and part of the trunk swells; and the scales, which there lie looser, separating from each other, discover the white interstitial skin, and some very dark scales, hardly observed before, which, together with the white and black edges of some of the other scales, produce a beautiful variegation: the green, however, predominating. When the inflation ceases, or the animal dies, the scales fall again close together, and the uniform green colour takes place. From the throat to the anus, on each side of the belly, runs a yellowish white fillet, which, becoming of a deeper yellow, is continued along part of the tail; two narrower fillets, of a bright yellow colour, run along the middle of the abdominal scuta, but are not continued on the tail. The scuta and squamæ are of a light yellowish green. This snake is very common about Vizagapatam, and in the circars, as well as in the Carnatic. It is often found on trees; and is said to attack passengers, aiming particularly at the eyes. Its bite on chickens, tried repeatedly by Dr. Russell, produced no other effect than pain. The number of sub-caudal squamæ in this snake varies considerably in different subjects: the number of scuta is more constant. It may further be remarked, that, from its extreme slenderness, the tail is often found mutilated. The coluber mycterizans was marked by Linnæus as venomous; a mistake which has very justly been corrected by Dr. Gray, in his ingenious paper on the subject of Amphibia, read before the royal society. *Phil. Trans.* vol. 79.

170. Coluber cærulescens, or bright sky coloured viper; a native of South America and India; smooth, and of a bright azure blue. The head is of a lead colour, and pointed; called natrix cærulescens by Laurentius. It has 215 abdominal scuta, and 170 sub-caudal squamæ; making 385.

171. Coluber Argus, the eye-spotted viper; a native of Africa, the upper part remarkably smooth and brown, reticulated with the viscous of the squamæ more diluted, the under part tessellated, the back of the head two-lobed, and gibbous.

To the preceding species we shall now add the individuals lately discovered by Dr. Russell on the coast of Coromandel; and which, not having any specific names, we shall put down in the language of the country, as they are called by the natives, and described by the above ingenious writer.

172. *Katuka rekula poda.*—The head is large, much broader than the neck, gibbous, or swelling behind, depressed above, compressed on the sides, and, narrowing from the eyes, terminates in an obtuse snout, faced with a pyramidal emarginate lamina: the labial and sub-jugular squamæ are large and smooth; but the rest of the head is covered with small, ovate, highly carinated, scales, without any of the usual large laminæ. The mouth is very large, the jaws nearly of equal length; the anterior teeth in the lower jaw, long, slender, almost upright; the others, shorter, few, reflex; the two palatal rows in the upper jaw, small, reflex, thick-set; no marginal row; the fangs conspicuous, longer than those of the cobra de capello, thicker and stouter; two generally emergent from the sac on each side, one smaller than the other. The eyes are lateral, forward, large, oval, not prominent. The nostrils on the same line with the eyes, close to the point of the snout, very wide and open. The trunk round, thick, beautifully spotted, and covered with oblong-oval carinated scales, those excepted lying close to the scuta, which are smooth, broad-ovate, larger, and not carinated. The length four feet two inches; the middle of the trunk two inches in circumference. The tail tapers to a sharp point; the scales carinated. The colour of the head and trunk a yellowish brown; the back variegated with above twenty two large, oblong-oval, spots, brown in the middle, with black borders edged with white. Of these spots some are separate, but most of them are joined by a narrow neck, or run waving into each other: small black dots, single, or two or three in a cluster, are sometimes interspersed. A second row of spots adorn the sides, similar in colour to the first, but smaller, and in form more orbicular, each of those on the trunk having a short stem tending obliquely to the abdomen, made up of smooth black scales; and in the interstices, angular black spots are disposed along the verge of the scuta. The scuta are white and glossy, with a membranous striated margin, and many of them are marked with one or two dusky semicircular spots, but which are hardly visible near the tail. The sub-caudal squamæ are of a dusky yellow, and not spotted. The colour in different subjects varies considerably: in captivity it becomes of a dark brown, and the spots are less brilliant. They vary little in form, but are more or less joined on the back. It is not less commonly met with, in a wild state, than the cobra de capello; but from its not being, like the cobra and some other snakes, exhibited as a public show, it is not so universally known, either among the natives or Europeans. Nevertheless it is doubtful whether its poison is not equally deleterious with that of the cobra de capello: it may at least claim a second place. Its bite proved mortal to chickens in thirty-six seconds; and to a dog in twenty-six minutes. Abdominal scuta 168, sub-caudal squamæ 59; total 227.

173. *Bodroo pam.*—The head is much broader than the neck, sub-trigonal, gibbous behind, above depressed, the rostrum obtuse, compressed; the crown covered with very small, smooth, orbicular, scales, except a small lamina above each eye: the scales on the rest of the head small, but slightly carinated. The sub-jugular squamæ linear and truncate. The mouth large; the jaws nearly equal. The teeth small, regular, reflex; two palatal rows, but no

no marginal row above. Two fangs, remarkably long, emergent from the jaws on each side. The eyes lateral, large, oval, prominent. The nostrils near the eyes very wide, open. The trunk; the back somewhat carinated, the sides compressed or sub-declining. The scales acute-ovate, carinated, imbricate. The length two feet six inches; the circumference of the neck an inch and a half; of the thickest part of the trunk, two inches one-third. The tail round, slender, obtuse: measured five inches. The colour, the head, trunk, and tail, of a fresh green; the last row of squamæ on the belly yellow. The scuta of a pale straw-colour, and some of them have a small green spot on each side. This snake, which had been caught two days before on the hills in the vicinity of Vizagapatam, looked fresh and lively, was very alert, hissed, and snapped at every thing opposed to it, yet did not offer to touch a chicken which was walking about in the same room. The remarkably long slender fangs, exposed on opening the mouth, betokened its being highly noxious; but the peasants who brought it, affirmed that its power of killing extended only to the smaller animals, not to dogs or sheep; and that to man its bite caused various disorders, but never death. Abdominal scuta 170, sub-caudal squamæ 58; total 228.

174. *Botla passeriki.*—This snake agrees exactly in most circumstances with the mycterizans. The head, considerably thicker than the neck, oblong, depressed above, rounded on the sides, and contracting at the eyes, is lengthened into a long, straight, angular, pointed, rostrum, which resembles the beak of a bird, with a small, soft, obtuse, reflex, process, at the extremity. The occiput is covered with sub-orbicular, imbricate, scales; the crown and rostrum with eleven laminæ; of which the two anterior are pyramidal, rounded at the base; the next pair nearly of the same form, but larger; next a small pair sub-triangular; the central lamina between the eyes spatulate, those on the side conical; the posterior pair semi-cordate. The mouth wide; the upper jaw a little longer than the lower, the scale in front not emarginate. The teeth reflex, slender, sharp; the anterior, in both jaws, less close, thicker, and longer; a marginal row, in the upper jaw, and two palatal rows. The eyes lateral, large, oval, prominent, of a golden colour. The nostrils small, on the side of the rostrum near the apex. The trunk somewhat triangular; the scales linear-lanceolate, except on the carina of the back, and in the row on each side of the scuta, where they are broad-oval. On the neck and fore part of the trunk they are loose, and only contiguous; on the rest close, imbricate. The length four feet one inch; the circumference of the neck one inch and a quarter; that of the trunk, where thickest, two and a half. The tail round, very slender, covered with ovate imbricate scales, tapers to a sharp point. The head seems as if covered with green velvet; the lips and sides of the throat of a deep yellow. The trunk and tail of a fresh grass-green, with a white fillet intersected by orange lines, running along the edge of the scuta, on each side of the anus, and down half the tail along the edge of the sub-caudal squamæ. The scuta and squamæ are of a cineritious colour, blended with a faint pink, freckled elegantly with minute black and dusky-yellow dots, while the inferior margins of the scuta, tinged with a dark yellow, form a succession of transverse convex fillets. This snake is very ferocious, elevating its head and neck like the cobra de capello, opening the mouth wide, hissing furiously, and snapping at every thing opposed to it. Its bite, however, on chickens, produced no other bad effect than pain, which soon ceased; and though the upper fore teeth may sometimes be mistaken for fangs, it certainly possesses no poisonous organs. Abdominal scuta 174, sub-caudal squamæ 148; total 322.

175. *Jara potoo.*—The head is a little broader than the neck, small, ovate, depressed, obtuse, with nine plates, or laminæ; the occiput covered with small, yellowish, imbricate scales. The two anterior plates, between the nostrils, small, orbicular; the next two larger, irregularly angular; the two lateral between the eyes, conical; the middle one shield-form, acute; the two posterior semi-cordate. The mouth middle size; the jaws nearly equal. The teeth a marginal and two palatal rows above, the anterior teeth in the marginal row being somewhat longer than the others. The eyes lateral, globular, prominent. The nostrils, at the edge of the rostrum, large, open. The trunk round, polished, covered with small, ovate, close, imbricate, scales. Length one foot three or four inches. Thickness, near the head, of a goose-quill; in the middle of the trunk somewhat more than a swan-quill. The tail very short, tapering suddenly, and terminating in a blunt point. The colour of the laminæ on the head is black; the occiput, the sides of the mouth, and the throat, yellowish-white. The back and the tail black, elegantly variegated with two minute white lines, or rows of dots, on each scale. The scuta or sub-caudal squamæ are of the same colour with the throat. Abdominal scuta 175, sub-caudal squamæ 56; total 231.

176. *Tar tutta.*—The head much broader than the neck, small, round, ovate, obtuse, depressed, covered with nine laminæ; the two smallest, between the nostrils, angular; the next two irregular square-form; of the three between the eyes the middle one largest, and broad shield-form, the lateral crescent-shape; the posterior pair cordate. The mouth wide; teeth small, numerous, reflex; a marginal and two palatal rows in the upper jaw. The eyes near the nose, very large, orbicular, protuberant. Nostrils small, open, near the point of the rostrum. The trunk, the back slightly carinated; the scales close, oval, polished. The length one foot eleven inches; circumference of the neck three-fourths of an inch; thickest part of the trunk two inches three-fourths. The tail thin, round, tapering to a very small point, which renders it difficult near the tip to count the sub-caudal scales; in length five inches. The colour is a light bay, variegated remarkably on the back and sides, with a waving chain of triangular spots, composed of oblique, short, black, lines, intermixed with white or yellowish lines. The abdominal scuta are of a yellowish white, with a black or dusky dot on each side; the sub-caudal squamæ have no dots. On comparing a male and female of this species, the principal difference observed was, that the trunk of the female, near the anus, being much thicker than in the male, made the tail to appear to taper more rapidly. This is one of the most common snakes at Vizagapatam. Half a dozen have been found in a night, crossing the road to the chief's country house. Its bite is said by some to be mortal, but the snake catchers affirm the contrary, and that it only produces biles and eruptions a month or two after the bite. A vigorous subject of this species was made to bite a chicken, which he did very fiercely and repeatedly in different parts. The chicken suffered pain, but shewed no signs of poison. The snake, unperceivedly, had wreathed its tail round the chicken's neck, and the bird, had it not been rescued, would inevitably have been strangled. Soon after being disengaged, it recovered perfectly. A second chicken was bitten in like manner, without any consequence; care having been taken to prevent the snake twisting its tail round the bird's neck; a mode by which they not only seem to kill, but also to hold, their prey. Abdominal scuta 229, and sub-caudal squamæ 87, making 316; or 235, and 85, making 320; or 237, and 97, making 334.

177. *Gajoo tutta.*—The head broader than the neck, ovate, depressed, obtuse. The first pair of laminæ between the nostrils, small, sub-orbicular; the next pentagonal; the middlemost lamina between the eyes broad-lanceolate; the last pair semi-cordate. The mouth small; the teeth below numerous, close, reflex; two palatal rows above, close also, and numerous, but the anterior in the marginal row longer than usual. The eyes, lateral, small, orbicular. Nostrils close to the rostrum, gaping. The trunk round. The scales broad-ovate, imbricate. Length fourteen

1. The Mycterizans, or Couch whip Viper. 2. The Conchoa Viper.

fourteen inches. Circumference near the head one inch and a quarter; the thickest part of the trunk about two inches, and diminishes inconsiderably till near the tail. The tail very small, tapers suddenly, sharp-pointed; length two inches. The colour on the head a very dark obscure green, without spot. The trunk almost black, with a dark-greenish cast. The ridge of the back variegated with about twenty narrow spots, composed of longitudinal, short, dusky yellow, white, and black, lines. Along the sides, and half down the tail, are interrupted rows of short white lines; and from the head to the anus, on each side close to the scuta, there is a regular row of black dots. The scuta and squamæ are of a bluish-white colour. The long fore teeth in the upper jaw, on a transient view, might be mistaken for fangs, particularly if the subject has been kept some time in spirits; but, from the want of poisoning organs, it may be inferred that it is not so formidable as represented by the natives. Abdominal scuta 174, sub-caudal squamæ 40; total 214.

178, *Karoo bokadam*.—The head somewhat broader than the neck, a little convex above, compressed on the sides, and projecting into a short, obtuse, or subtruncate, snout, on which the eyes and nostrils are situated. The mouth not large, the jaws nearly of equal length. The teeth close set, regular, small, reflex; a marginal and two palatal rows in the upper jaw. The eyes vertical, small, orbicular, protuberant, each situated in the centre of a remarkable circle of small triangular laminæ. The nostrils very small, vertical, near to each other, and close to the apex of the rostrum. The trunk thick, round, covered with large, carinated, broad-oval, imbricate, scales. The length, three feet four inches and a half; thickness, near the head, about three inches; the middle of the trunk, four inches and a half. Part of the head is almost black; the colour of the trunk and tail a very dark grey; the the throat, belly, and under part of the tail, are of a dusky yellow. Notwithstanding the suspicious appearance of this ugly snake, the want of poison organs shews he is not formidable. Abdominal scuta 144, sub-caudal squamæ 59; total 203.

179. *Wanapa pam*.—The head a little broader than the neck, oblong-ovate, sub-convex, obtuse, covered with various laminæ. The first lamina triangular, slightly emarginate; the first pair oblong, the margins perforated by the nostrils; the next pair similar in form, but rather smaller; the middlemost of the three laminæ between the eyes bell-shape, the others conical; the posterior pair semi-cordate. The mouth wide, the upper jaw projecting beyond the lower. The teeth numerous, small, reflex; two palatal rows, and one marginal, in the upper jaw. The eyes distant, orbicular; the nostrils also distant, small, on the margins of the laminæ. The trunk round; the scales smooth, ovate, imbricate; the neck about as thick as a goose-quill; the body nearly equal, (tapering only a little near the tail,) hardly exceeds the size of a swan-quill. The whole measures fourteen inches; the tail only one inch and a half, round, very small, and sharp-pointed. Between the eyes are two bent black bands, and a third divides the semi-cordate laminæ of the head. The predominant colour of the trunk is a light chesnut; but the trunk, as well as the tail, are elegantly variegated. From the head to the end of the tail runs a yellowish, white, dotted, fillet; parallel to which, on each side, are two broader fillets, the one of a grey or ash-colour, the other a bay; between the grey fillets are a number of transverse bands, formed of small, distinct, oblique, black, lines. The scuta are of a dull pearl-colour. This snake was found at Vizagapatam; it is not common, and appears to be perfectly harmless. Upon repeated trials, it could not be provoked to bite a chicken. Abdominal scuta 182, sub-caudal squamæ 38; total 220.

180. *Paragoodoo*.—The head broader than the neck, oblong, ovate, depressed above, compressed on the sides, covered with laminæ of unusual forms; the pair between the nostrils small, oblong, curve, rounded in front; the next pair purse-form; of the three between the eyes, the lateral laminæ, truncate cones, the middle, oblong square, acuminated; the two larger behind sub-cordate; several small laminæ on the occiput. The mouth large; the jaws protracted, and nearly of equal length. The teeth numerous, regular, small, reflex; a marginal and two palatal rows in the upper jaw. The eyes sub-oval, protuberant. The nostrils near the point of the rostrum open. The trunk round, swelling, and diminishing regularly, covered with oblong-oval, carinated, scales; length two feet two inches. The colour a yellowish brown; the back and sides thick set with rhomboidal spots, brown in the middle, with black borders; the spots growing fainter towards the tail. The scuta are of a bright mother-of-pearl; the tail is not spotted, and the sub-caudal squamæ are of a reddish white. This snake is common; and is not by the natives reckoned pernicious. It usually frequents damp grounds, or the borders of tanks; and grows to a much larger size than the one now described. Abdominal scuta 140, sub-caudal squamæ 49; total 189.

181. *Nooni paragoodoo*.—The head broader than the neck, oblong-ovate, depressed. The anterior pair of laminæ between the nostrils roundish; the next larger, pentagonal; of the three between the eyes, the lateral conical, the middle one shield-form, acuminate; the posterior pair obtuse, semi-cordate. The mouth large; the labial scales with yellow rounded margins. The upper jaw emarginate. The teeth very small, reflex, sharp, numerous; two palatal rows above, and one marginal. The eyes lateral, middle size, orbicular, prominent. The nostrils near the rostrum, very small. The trunk covered with smooth, imbricate, orbicular, and ovate, scales. The length two feet. The colour cineritious-grey, with an obscure cast of reddish brown, particularly about the head and neck. The back variegated by black and white, or black and yellowish, narrow bands; and on the sides are two or three rows of short, separate, oblique, lines, formed by the yellow or white edges of the lateral scales; but in general these bands and lines are not visible on the tail. The scuta and squamæ are of a dusky pearl colour. The bite of this snake, according to the natives, is not mortal; but they pretend that, after a certain time, it produces ill effects. Trial was repeatedly made on chickens, without any bad consequences; and the absence of poisoning organs, renders the popular notion of its ill qualities highly improbable. Abdominal scuta 192, sub-caudal squamæ 62; total 254.

182. *Pedda poda*, var. 1.—The head broader than the neck, oblong-ovate, obtuse, depressed, but from the eyes to the rostrum compressed, covered with twelve principal laminæ, besides a number of smaller, irregular in shape, and disposed star-fashion round the posterior, small, rude, semi-cordate, laminæ. The central lamina between the eyes is the largest; but, contrary to what is observed in most other snakes, it is divided in the middle; the occiput is covered with very small, orbicular, smooth, scales. The mouth wide, the jaws of equal length, the lips thickish, covered with oblong transverse scales. The teeth regular, reflex, sharp; a marginal and two palatal rows in the upper jaw. The eyes lateral, orbicular, not large. The nostrils, near the edge of the rostrum, round, open in a backward direction. The trunk round, gradually swelling from the neck, and decreasing towards the tail, closely set, with minute, smooth, round, imbricate, scales; but three rows next to the scuta consist of larger scales, oval, acuminate. The length two feet nine inches. The tail round, and tapering rapidly, ends in a sharp point. The upper part of the head is flesh-colour; the rostrum cineritious; a broad streak of flesh-colour runs obliquely on each side of the neck, and a narrow short stripe of the same divides a large brown mark on the occiput. The colour of the trunk and tail cineritious, variegated with about thirty large, broad, brown, maculæ, edged with black, of various magnitude, and irregular forms. The sides are spotted with smaller but similar

fimilar maculæ, moft of which are whitifh in the middle. The fcuta are remarkably fmall and narrow, of a white colour, with reddifh margins; round the pofterior edge of the anus, a femicircle of fmall fcales is obfervable. The fquamæ alfo are fmall, and the under part of the tail is fingularly variegated white and black, the black in long broadifh ftreaks. This fnake poffeffed great ftrength in its body and tail, and often wreathed in fuch a manner round the arm of the man who held it by the neck, as to numb his hand. But though very active and lively, it was with difficulty made to bite fowls, and then no other confequence followed the bite than temporary pain. Upon forcing into the open mouth of the fnake the thigh (ftripped of the feathers) of a living chicken, the fnake, inftead of wounding with his teeth, feemed more difpofed to fwallow the bird entire, and, if at liberty, would probably have done it, after fecuring his prey with his tail; for in the prefent cafe he exerted much force on the arm of the fnakeman, which otherwife would have been employed in crufhing the bird. It is a common practice with thofe who go about the country exhibiting fnakes for a fhow, to prefent a large fowl to one of thofe called *rock fnakes*, which the reptile deliberately fecures by wreathing round the bird's body, and then very flowly fwallows the whole, feathers and all. Abdominal fcuta 252, fub-caudal fquamæ 62; total 314.

183. *Pedda poda*, var. 2.—The head a little broader than the neck, oblong, rounded at the extremity; above, depreffed; towards the roftrum fub-compreffed, covered partly with numerous laminæ, diffimilar in fize, and of various forms; but the occiput is covered with fmooth ovate fcales. The largeft of the laminæ is fituated behind the noftrils, of a broad fhield-form, and feparated from them by two minute, orbicular laminæ at each corner. The mouth wide, the jaws nearly of equal length, the lips thickifh. The teeth regular, reflex, flender; fome of the anterior in the lower jaw thicker and longer than the others; a marginal and two palatal rows in the upper jaw. The eyes large, oval, prominent, diftant from each other; the noftrils fmall, round, feparated by a pair of fmall triangular laminæ. The trunk round, the fcales fmall, fmooth, ovate, imbricate; but two or three rows neareft the fcuta, are larger and orbicular. The length feven feet two inches and a half; the circumference of the thickeft part of the trunk eight inches. The tail round, fhort, and tapers to a fharp point. The colour of the head is dark cineritious, with a deep brown, oblique ftreak behind each eye; and a large, dark, fpade-form fpot, with a narrow ftreak in the middle, on the hind head. The neck, trunk, and tail, covered univerfally with large dark fpots, of various irregular forms, edged with black, on a light-brownifh ground, which is the prevalent colour. The fpots on the tail are fomewhat lighter than thofe on the trunk. The fcuta and fquamæ are of a dufky yellow hue. He hiffes furioufly when provoked, but without fnapping. When forced to bite fowls, the wounds were attended with no confequence; and when left at liberty with pigeons or chickens, the fnake feems intent only on making his efcape. Abdominal fcuta 252, fub-caudal fquamæ 64; total 316.

184. *Pedda poda*, var. 3.—The head broader than the neck, oblong, depreffed above; from the eyes, contracted, fub-compreffed, very obtufe, or fub-truncate; covered anteriorly, with numerous laminæ, various in fhape and fize; but the occiput covered with ovate fmooth fcales. The mouth very wide, the jaws nearly of equal length, the lips thickifh. The teeth difpofed regularly, reflex, fharp; fome of the foremoft, in the lower jaw, longer than the others; in the upper jaw, a marginal and two palatal rows. The eyes proportionally of middle fize, lateral, partly covered by the laminæ of the orbit, oval protuberant. The noftrils on the fide of the roftrum fmall, gaping. The trunk covered with fmooth, ovate, imbricate fcales, two rows excepted on the belly, which are orbicular. The fcuta are narrow, oblong, acuminate at each end: the fub-caudal fquamæ are oval, but likewife pointed. Above the aperture of the anus, on each fide, on a line with the laft fcuta but one, is a fmall crooked horn or fpur pointing outwards. The length fix feet; the circumference, where thickeft, feven inches. The tail tapered to a fharp point. The colour univerfally whitifh, variegated with large, broad, irregularly fhaped brown or dufky fpots, edged with black. A remarkable brown ftreak behind each eye, and a large dark macula on the hind head, with a whitifh ftreak in the middle. Abdominal fcuta 256, and fub-caudal fquamæ 69; total 325. This fnake was killed in a gentleman's ftable at Vizagapatam, in 1787. The three laft defcribed, under the name of pedda poda, belong to thofe commonly, by the Europeans in India, called rock fnakes, and are not, by the natives, faid to be venomous. They grow to a much larger fize; many being above ten feet long. There is a general refemblance between all three; but the principal difference is in this one having the fpur, or claw, near the anus. The bora, from Bengal, furnifhes another inftance of claws fituated near the anus; and the phyfician general of Madras wrote, in 1788, "that he had feen a fnake, named Duffery Pamboo, which had a claw on each fide of the anus, refembling the fpur of a cock partridge; and that the man who fhowed it, affirmed the claws were occafionally employed as weapons of offence, which fometimes rendered it neceffary to cut them."* It feems more confonant to reafon, however, that thefe claws are deftined by nature to perform the office of holders, during the fexual congrefs; which is found to be the cafe with fome fifhes, where fecundation is performed by intromiffion of the virile member. See the article CHIMÆRA, p. 432, of this volume.

185. *Dameen*.—The head is broader than the neck, broad-ovate, depreffed; towards the roftrum compreffed, covered entirely with feventeen large and feveral fmaller laminæ. The anterior pair are perforated by the noftrils, between which is interpofed a pair broad oval; behind thefe a pair confiderably larger, forming together part of a circle: the three laminæ between the eyes, large, and of equal fize: the lateral utricular; the middle fhield-form, acuminate: the next pair (in the ufual place of the femi-cordate laminæ) refemble together a pair of woman's ftays; the others are moftly fquare-form. The mouth is wide; the jaws nearly equal in length; the teeth fmall, numerous, reflex; a marginal and two palatal rows in the upper jaw. The eyes lateral, diftant, remarkably large. The noftrils on the margin of the roftrum very fmall. The trunk round, imbricated with large rhomboidal fcales; the tail round, taper, pointed. The colour a dark brown; and the pofterior edge of each fcale, being marked with a pencil of black lines, the whole appears variegated with numerous triangular black fpots, regularly difpofed. The fcuta and fquamæ were of a dufky yellow, with ciliated margins of a dull lead-colour forming fo many tranfverfe dufky bands. It is inoffenfive and harmlefs. Sub-caudal fquamæ 120.

186. *Karetta*.—This fnake, which is not venomous, was found at Hyderabad; but the defcription of it having been loft, we can only enumerate it as an additional fpecies. Abdominal fcuta 171, fub-caudal fquamæ 41; total 212.

187. *Naugealled keaka*.—The head broader than the neck, ovate, depreffed, covered with eleven laminæ, befides feveral fmall, fmooth, fcales. The firft lamina, emarginate; the pair between the noftrils fmall, fquare-form; the next pair roundifh, and angular; the lateral of the three between the eyes, long-oval; the middle one, long, fhield-form; the two pofterior, fub-femi-cordate. The mouth fmall; the lower jaw fhorter than the upper. Teeth fmall, fharp, reflex; a marginal, and two palatal rows, above. The eyes fmall, orbicular; the noftrils clofe to the roftrum, fmall, linear. The trunk round, nearly of equal thicknefs to within four inches of the anus, covered with clofe, ovate, carinated fcales. Length,

from the nose to the anus, fourteen inches. The tail taper; a leaden or bluish cast, with many small, sagittate, spots, composed of greyish, dusky-yellow, and blackish, scales. The scuta yellowish-white. This snake was represented as venomous; but its want of poisoning organs, shows the assertion to be a vulgar error; abdominal scuta 138.

188. *Patza tutta.*—The head small, broader than the neck, ovate, depressed, covered with various laminæ, of which the principal are one pair between the nostrils; a second somewhat larger, but similar in form; three between the eyes, the lateral purse-shape, the middle one bell-form; the posterior laminæ semi-cordate, truncate. The mouth wide; the jaws unequal, the lower being considerably shorter. The teeth small, sharp, reflex; two palatal rows, and one marginal, in the upper jaw. The eyes distant, lateral, large, orbicular. The nostrils likewise lateral, large, gaping. The trunk round, closely set with very small, smooth, ovate scales, those excepted near the scuta, which are orbicular. The length of the snake, one foot eleven inches. The tail very taper and sharp pointed. The colour of the head, trunk, and tail, brown; but the neck and upper part of the trunk, are decorated with about a score of narrow, cross, bands, composed of short, black, and white, lines; behind these, a few other more obscure bands are discernible, of reddish brown, interspersed with white; but the white in these is only the interstitial skin, whereas in the former, the scales were white. The latter bands become less and less visible in approaching the tail. The orbicular scales nearest the scuta, are yellow; and the scuta have a pale-yellowish cast. The bite of this snake on the breast of a chicken, produced no discolouration of the skin, nor did the bird show any symptoms of indisposition. To another snake of the same species, which appeared very active and lively, a pigeon and a chicken being presented successively, he could not be provoked to bite either, but coiled himself very quietly between them. Abdominal scuta 202, sub-caudal squamæ 91; total 293.

189. *Mutta pam*, or *ally pam.*—The head small, a little broader than the neck, ovate, obtuse, depressed, covered with ten laminæ. The first two perforated by the nostrils; next a solitary, oval, lamina; the second pair orbicular; the two lateral, between the eyes, conical; the central shield-form, with a point; the last pair semi-cordate. The mouth middle size; the jaws nearly equal. The teeth small, reflex; a marginal and two palatal rows above. The eyes large, oval. The nostrils small, not distant. The trunk round; the scales ovate, ciliate, imbricate; but on the belly orbicular. The length one foot eight inches; the circumference of the neck, near the head, hardly exceeds one inch and a quarter; of the thickest part of the trunk, seldom more than two inches and a quarter. The tail very short and small, tapers to a sharp point, somewhat carinated on the back, and compressed on the sides. The colour a very dark changeable blue, without spots. The three orders of squamæ nearest the belly, together with the scuta, are of a whitish yellow; the scuta and squamæ are divided in the middle by a dark bluish line. This snake was caught in the lake of Ankapilly, in one of the traps employed for catching eels. It is regarded by the natives as harmless. Abdominal scuta 159, sub-caudal squamæ 52; total 211.

190. *Goobra,*—The head broader than the neck, depressed, covered with nine laminæ; the pair between the nostrils oblong, truncate; the next pair larger, roundish; the central lamina, between the eyes, very narrow, shield-form, acuminate, the lateral sub conical; the posterior pair sub-conical, obverted, truncate, with four smaller oblong laminæ on each side. The hind head covered with small orbicular scales. The mouth large; the upper jaw a little longer than the under. The teeth small, reflex; two palatal rows and one marginal in the upper jaw. The eyes large and oval. The nostrils large, open. The trunk covered with small linear-oval scales; but the middle of the back is somewhat depressed, and the scales covering it are obovate; on the sides of the scuta there are two rows of oval scales. The length three feet two inches; the tail very slender, particularly towards its sharp point. The colour of the head and trunk a very dark brown, but the scales on the middle of the back of a somewhat lighter brown; towards the scuta the abdominal oval scales are whitish, spotted with black, nearly to the middle of the trunk; on the remainder of the trunk these scales are of the same cineritious colour with the scuta. It is said to grow to a much larger size, and chiefly to frequent trees. It had been killed on a tree in the ambassador's garden at Hyderabad Abdominal scuta 181, sub-caudal squamæ 130; total 311.

191. *Mega rekula poda.*—The head small, broader than the neck, ovate, depressed, and covered with twelve principal laminæ, besides seven of smaller size. The scales under the eye are white. The mouth moderate size; the jaws of nearly equal length. The teeth small, numerous, reflex; two palatal rows and one marginal in the upper jaw. The eyes high, not large, orbicular, prominent; the nostrils near each other, very small. The trunk round, swelling gradually from the neck to two inches and a half circumference, then tapering to the tail; the scales ovate, close, imbricate. The length two feet three inches and a half. The tail very taper, terminates in a sharp point. The colour of the head an olive yellow, with a short, oblique, bluish-black streak behind each eye; two long streaks of the same colour, with two or three ovate rings between, adorn the neck, while two other streaks cross the throat obliquely. On the rest of the neck, and part of the trunk, a faint pink is blended with the olive-yellow; and a narrow thread of dark blue, with white spots at the angles, runs waving along the back. But neither the pencil, nor verbal description, can convey an adequate idea of the elegant colouring of this snake, when provoked and swelling with rage; the colours incessantly sliding into each other, and varying in brilliancy. The scuta and squamæ are of a pearl colour. This snake was found at Vizagapatam. It appeared singularly alert in its movements, and snapped at every thing presented to it. In preparing to attack, it wreathed its neck, and part of the trunk, into close folds; and at the same time retracting its head, presented at a distance something of the appearance of a hooded snake. When it snapped, the body being more raised by assistance of the tail, the wreaths were rapidly unwreathed, and the head darted obliquely forward, with a motion so rapid, that the animal, without rising from the ground, seemed to fly on his prey. In this manner it could unexpectedly seize an object which in appearance lay far beyond its reach. A chicken intended for experiment having made its escape, was accidentally pursued into the chamber where the snake had been left at liberty, and was no sooner perceived than the snake flew furiously at him, snapped several times as he passed, and soon seized and secured him, by wreathing round the body. In two minutes the bird was found dead, having been strangled by the snake's tail. A second chicken was attacked in like manner, and, had he not been relieved in time, would have suffered the same fate. He was bitten in several places, but without any consequence. It was remarkable that, ferocious as this snake appeared to be, he could not, when held in the hand, be provoked to bite a chicken repeatedly presented to him. Abdominal scuta 222, sub-caudal squamæ 95; total 315.

192. *Neeli kosa.*—The head broader than the neck, broad-ovate, depressed; compressed on the sides towards the rostrum; covered with various laminæ; the first pair trigonal, small, between the nostrils; the next pair quadrangular, somewhat larger; the shield-form lamina, between the eyes, is pointed, the lateral sub-oval; the semi-cordate pair are very large; and on each side is an oblong narrow lamina. The mouth wide; the teeth numerous, small, sharp, reflex; a marginal and two palatal rows in the upper jaw. The eyes lateral, very forward, large, orbicular. The nostrils close to the point of the rostrum, small, open. The trunk round, clumsily shaped; the

the scales on the back oval, carinated, imbricate; on the sides not carinated, and two rows next to the scuta larger, roundish, smooth. The length two feet nine inches and a half; the circumference three inches and a half. The tail slightly carinated, tapers very gradually to within four inches of its sharp point. The colour on the head is darker than the rest; two unequal black streaks behind each eye, with a yellow spot between them. The neck, trunk, and tail, of a yellowish brown, with numerous round black spots, joined by narrow black fillets, regularly disposed in oblique rows, a few scales of lighter yellow being interspersed. On the tail the spots are not joined, and towards the point disappear. The scuta and squamæ are of a yellowish white. From its frequenting the wet fields, this is commonly reckoned a water-snake. It moves swiftly, and carries its head high, with a menacing air in its progression; but, when provoked, it neither hissed, nor did it snap at a stick which was opposed to it. It seemed rather to avoid a chicken which was set down before it; and could not be provoked to bite, though pecked several times by the chicken. While it lay coiled up, a chicken, properly secured, was laid upon it, but it continued quiet, without attempting to wreath round the chicken, or otherwise to annoy it; and, when the bird fluttered and struggled to get loose, the snake, as if afraid, crept away. It should be remarked, however, that, in the course of this last experiment, the snake threw up a large fish, which appeared to have been but a short time in the stomach; so that its forbearance might, in some measure, be owing to not being hungry; a circumstance that suggested caution against hasty decision. But the neeli koea certainly is not venomous, and does not appear to be very irascible. Abdominal scuta 152, sub-caudal squamæ 80; total 232.

193. *Katla Tutta.*—The head broader than the neck, ovate, depressed, covered with ten laminæ: the anterior emarginate; the first pair perforated by the nostrils; the next larger and roundish; the lateral laminæ of the three between the eyes conical, the middle lamina broad shield-form; the occipital pair semi-cordate. The mouth small; the jaws nearly equal. The teeth small, regular; two palatal rows, and one marginal, in the upper jaw; some of the hinder teeth on each side longer than the others. The eyes small, orbicular, prominent. The trunk round, about the size of a large goose-quill, and nearly of equal thickness. The scales smooth, sub-orbicular, imbricate. The length eight inches. The tail very taper, and sharp pointed. The colour approaches to an olive yellow. The head is singularly marked with three triangular black fillets, with waving white margins; the first, pointing to the nostrils, extends to the eyes; the second, springing from the shield-form lamina, crosses the semi-cordate, and is continued diverging to the throat; the third, broader than either of the other two, touches the semi-cordate laminæ, and diverges on the neck. Along the whole of the trunk and tail are about thirty-four transverse fillets, with waving white margins, which continue to the end of the tail. The scuta of a pearl colour. The above description was made from a living subject found at Vizagapatam in 1788, which afforded an opportunity of attempting to make it bite chickens and pigeons; but, though fresh caught, and very lively, it could never be provoked to bite either; from the absence, however, of poisoning organs, it may safely be pronounced harmless. Dr. Russell was more particular in respect to this snake, as it frequently passes for the cobra monil; under which name it had been sent to him in spirits from Ganjam, Masulipatam, and other places, before he met with it alive. Abdominal scuta 188, sub-caudal squamæ 55; total 243.

194. *Katla vyrien.*—The head broader than the neck, oblong-ovate, depressed, covered with ten laminæ, including that in front of the rostrum: the anterior pair between the nostrils roundish; the next pair larger, angular; the shield-form lamina short, obtuse; the lateral semi-conical; the posterior pair, inverted cones. The mouth middling size; the lower jaw shorter than the upper. The teeth small, reflex; two palatal rows, and one marginal, in the upper jaw. The eyes lateral, orbicular, prominent. The nostrils very small, close on the margin of the rostrum. The back is carinated, the belly flat; the scales sub-orbicular, smooth, close, imbricate. The length one foot five inches. The tail is very small, and terminates in a sharp point. There is a yellow spot on the occiput, or beginning of the neck, but the rest of the head, the neck, and part of the back, are of a dark brown colour, which gradually growing lighter, becomes, in approaching the tail, of a yellowish brown. From the head to the extremity of the tail there are about thirty-six transverse bands, in shape resembling a dice-box; they are of a dusky yellowish white, sprinkled with brown dots. This snake was sent from Vellore, and supposed to be the cobra monil; but the want of poisoning organs shewed it was not. Abdominal scuta 234, sub-caudal squamæ 87; total 321.

195. *Katla vyrien*, var.—Head broader than the neck, roundish, short, obtuse, covered with nine laminæ; the first two pair nearly equal in size, oblong-square, transverse; the middle lamina between the eyes square; the two posterior laminæ truncate. The mouth middling size; the jaws nearly of equal length. The teeth sharp, reflex, and (as usual where there are no fangs) a marginal and two palatal rows in the upper jaw. The eyes lateral, round, prominent. The nostrils small, round near the rostrum. The trunk covered with ovate, close, smooth, imbricate, scales; the back carinated; the belly flat. The length nine inches; thickness at the neck about that of a crow-quill; and, about the middle, hardly exceeds the size of a goose quill: it tapers towards the tail, which measures one inch eight lines, and is exceedingly slender and sharp pointed. The colour of the head pure yellow; the trunk and the tail a dark brown, and, as in the preceding, decorated the whole length by transverse bands, of the shape of dice-boxes, but of a pale yellow, without intermixture of dark dots, except one middle dot on each scale next the scuta. The scuta are yellow like the bands. This snake approaches, in many circumstances, so near to the one last described, that it may possibly be only a variety of the same species. This also was sent under the name of *cobra monil*, to which it is no more entitled than any of the preceding harmless snakes so named erroneously. Abdominal scuta 243, and sub-caudal squamæ 82; total 325.

196. *Bora.*—The head broader than the neck, oblong, depressed, the rostrum sub-compressed, very obtuse. The hind-head covered with very small ovate scales; the rest with a number of laminæ. The mouth wide, the jaws equal. The teeth in the lower jaw large, reflex, sharp; in the upper jaw a marginal row and two palatal rows, as in all serpents that have no fangs. The eyes lateral, orbicular, large. The nostrils very near the point of the rostrum. The trunk round, covered with small, smooth, oval, scales, closely imbricate: but there are two rows of larger scales on each side of the belly. The scuta are remarkably short; and a little above the anus, on each side, is a small spur, about the fourth of an inch in length, of a horny texture, curved, with the sharp point turned outwards. The length four feet ten inches. The tail round, short, taper pointed. The sub-caudal squamæ, thirty-six in number, are followed by twenty-eight complete scuta, between which and the point are three pair of squamæ. The predominant colour is brown. All along the back are large roundish spots, of a light brown in the middle, the edges of a yellowish brown; the sides are variegated by brown spots on a whitish ground, which brightens in approaching the belly. The scuta are of a pearl white. It is pretended, that though the bite of the bora does not prove mortal in less than ten or twelve days, it is very soon followed with eruptions on different parts of the body.

197. *Hurriah.*—The head scarcely broader than the neck, ovate, obtuse, depressed; towards the rostrum compressed. The laminæ, in number ten, vary from the usual forms. The first triangular; the first pair perforated by the

the noftrils; the fecond oblong-oval; the central lamina, between the eyes, obverfe-ovate; the lateral fomewhat like crefcents; the pofterior pair roundifh, acuminate at top: fome fmaller laminæ on each fide. The mouth not wide; the jaws nearly equal. The teeth very fmall, reflex; a marginal row in the upper jaw, and two palatal rows. The eyes lateral, orbicular. The noftrils fmall, round, near each other. The trunk round, nearly of equal thicknefs from the neck to the anus, covered with very fmall ovate fcales. The length fourteen inches; the tail meafures three inches, and is remarkable for the combination of fcuta and fquamæ like the bora. From the anus to the commencement of the fquamæ it diminifhes gradually; after which it tapers rapidly, and ends in a fharp point. The colour black, with a brownifh yellow fillet on each fide the whole length. The fcuta of a pearl white. Abdominal fcuta 145, fub-caudal fcuta 21, and fub-caudal fquamæ 28; in all 194.

The other three fpecies of the coluber difcovered by Dr. Ruffell, not having any name as yet given them, we have forborn to defcribe. We muft therefore refer the inquifitive reader to that elegant and valuable work; obferving, with refpect to the venom of thefe reptiles, that it is in general more pernicious and deftructive, and more fatally rapid, in proportion as the heat abounds in thofe countries where they are produced; allowance being alfo made for the mature age and vigour of the animal. Upon comparing the effects of the poifons of five Eaft-Indian vipers on brute animals, with thofe produced by the poifons of the rattle-fnake, and the European viper, Dr. Ruffell in general remarked, that they all produce morbid fymptoms nearly fimilar, however much they may differ in the degree of their deleterious power, or in the rapidity of its operation. The bite of a rattle-fnake in England killed a dog in two minutes; the bite of the moft pernicious ferpent employed in Dr. Ruffell's experiments, was never obferved to kill a dog in lefs than twenty-feven minutes. For the natural hiftory and reprefentation of the rattle-fnake, fee the article CROTALUS, in vol. v.

CO'LUBRINE, *adj.* [*colubrinus*, Lat.] Relating to a viper. Cunning; wily.

COLUBRI'NUS LAPIS, *f.* The ferpent-ftone, fo called from the coluber, from which it was thought to be taken; but it is now known to be an artificial compofition. It is made of hartfhorn, luted up in an earthen pot, where it burns to a blacknefs, and is afterwards polifhed. The Moors fay it is made of a kind of clay. It is fabled to be a cure for the bites of ferpents, by applying it to the wound.

CO'LUMB MAGNA. See SAINT COLUMB'S.

CO'LUMBA, *f.* [from κολυμβαω, to fwim.] In ornithology, the PIGEON, or DOVE; fo named from its fwimming motion in the air. In Greek it is named περιστερα; in Italian, *colombo*, or *colomba*; in Spanifh, *colont*, or *paloma*; in German, *taube*, or *tauben*; in Saxon, *duve*; in Swedifh, *duwa*; and in Polifh, *golab*. This genus belongs to the Linnæan order of pafferes; and there are no lefs than feventy-one fpecies now known, befides numerous varieties. The generic characters are as follow:—Bill ftraight, finking at the tip: noftrils oblong, half covered with a foft fwelling membrane: tongue entire. Thefe birds are remarkable for the delicacy of their bill, and fhort legs; their toes are generally red, and divided to their origin. They inhabit only the temperate and hot regions; are monogamous, and difplay tendernefs and fenfibility in their courtfhips, and in the rearing and education of their young. The fpecies are as follow:

1. Columba oenas, the ftock-pigeon, which is fuppofed to be the only original of all the domeftic kinds; whence its name. It is in length fourteen inches: the bill pale red; head afh coloured; hind part of the neck, and fides, green gold gloffed with copper in different lights; the upper part of the back and wings are dull afh-colour; the fore part of the neck afh-colour; the lower part of it, and the breaft, vinaceous; the four or five outer quills are black, with the exterior edges white; the reft afh-colour, with the ends black: on each wing are two tranfverfe bars of black; the tail one-third of the end black; two of the outer tail feathers white; legs red. Multitudes of ftock-pigeons breed in the rabbit burrows on the downs of Suffolk; and the young are every year fold by the fhepherds. They are frequent in the fouth of Ruffia, and breed in turrets, and on the high and fteep banks of rivers. In winter vaft numbers refort to the clefts of the Orkneys, Hebrides, and frefh-water rocks at the back of the Ifle of Wight.

2. Columba domeftica, the domeftic or common pigeon. The ancients found it eafy to domefticate the heavy birds, fuch as the common fowl, the turkey, and the peacock; but to tame thofe which fly on rapid wing, required attention and art. A low hut, rudely conftructed, is fufficient for lodging and raifing our poultry; but to induce the pigeons to fettle, we muft erect a lofty building, well covered, and fitted up with numerous cells. Yet they are not domeftics, but rather voluntary captives, or tranfient guefts, who continue to refide in the dwelling affigned them, only becaufe they are pleafed with a fituation which affords them abundance of food and comfort. It is certain that the ftock-pigeon and the common pigeon breed together when paired; fo that in this fpecies we can trace all the gradations between the wild and the domeftic ftate. The ftock-pigeon is imitated, in a way that cannot be mifunderftood, by thofe deferters which leave our pigeon-houfes; they perch on trees, which is the firft and ftrongeft fhade in their return to the ftate of nature: thefe pigeons, though bred domeftics, and apparently reconciled to a fixed abode, often abandon their dwelling, renounce fociety, and feek a fettlement in the woods; and thus, impelled by inftinct alone, refume their native manners. Others feemingly lefs courageous and lefs intrepid, fly from our pigeon-houfes, and feek a folitary lodgment in the holes of old walls, or, forming a fmall body, they haunt fome unfrequented towers; and in fpite of the hardfhips to which their fituation expofes them, and the multiplied dangers that affail them from all fides, they ftill prefer thefe uncomfortable dwellings to the convenience and plenty of their former manfion: this is the fecond gradation to the ftate of nature. The wall-pigeons do not completely adopt their native habits, and do not perch like the former, yet they enjoy a much larger fhare of freedom than thofe which remain in the domeftic condition. The third gradation is the inhabitants of our pigeon-houfes, which never leave their dwelling but to fettle in one more comfortable, and which roam abroad only to feek amufement, or to procure fubfiftence. And as even among thefe there are fome deferters, it would feem that the traces of their primæval inftincts are not entirely effaced. The fourth and fifth gradations have totally changed their nature. Their tribes, varieties, and intermixtures, are innumerable, being completely domeftic from many generations; and man, while he has improved their external forms, has changed their internal qualities, and extinguifhed in them every fentiment of freedom. Thefe birds, the offspring of inceffant attention in the pigeon-fancier, are for the moft part larger and more beautiful than the common dove-houfe pigeons; they are more prolific, fatter, and finer flavoured, and on thefe accounts more pains have been beftowed upon them; for they are inactive helplefs creatures, and require our utmoft care, fince the greateft hunger cannot in them call forth thofe little arts in which animals are ufually fo prompt. Thefe are, therefore, the completely domefticated fancy-pigeons, and muft be entirely dependent on their breeders for their food.

In its wild ftate the pigeon has two broods in a-year, but in its firft ftate of confinement in the dove-houfe generally three: and fo on in proportion, to their almoft total confinement, or perfect domefticated ftate; for in this laft circumftance they lay often ten, and even twelve, times in a-year. This, on confideration, will be found to hold good in feveral kinds of poultry. Nor is this all; for to a ftate of domeftication, if we may fo term

term it, we are indebted for the endless varieties of the finest fruits, luxuriant vegetables for the table, and variety, without end, of the flowering part of the creation; wholly occasioned by culture; all of which will again degenerate, as well as those of the animal creation, on their return to a state of nature. Pigeons seldom, if ever, lay more than two eggs at a time; they sit from fourteen to seventeen days before the young are hatched; and it is for the most part observed, that one proves a male, the other a female. Trifling as this number of eggs may appear, yet, on supposition that we allow pigeons to breed nine times in the year, the produce from a single pair, at the end of four years, may amount to the number of fourteen thousand seven hundred and sixty-two: Linnæus makes the number amount to more than eighteen thousand. Besides their being esteemed a delicacy for the table, they are valued on other accounts. Their dung is said to be excellent manure; it is also used for tanning the upper leathers of shoes, as well as applied for a cataplasm. Formerly saltpetre was collected from it. The greatest use of pigeons is at Ispahan, in Persia, where there are recorded to be above three thousand pigeon-houses kept by the Turks alone; for there Christians are not allowed to keep them.

Linnæus enumerates twenty varieties of the domestic pigeon, which are as follow: 1. The Biset, *Columba Livia*. 2. The Rock-Pigeon, *Columba Saxatilis*. 3. The Roman Pigeon, *Columba Hispanica*. 4. The Rough-footed Pigeon. *Columba Dasypus*. 5. The Crested Pigeon, *Columba Cristata*. 6. The Norway Pigeon, *Columba Norwegica*. 7. The Barbary Pigeon, *Columba Barbarica*. 8. The Jacobine, *Columba Cucullata*. 9. The Frizzled Pigeon, *Columba Crispa*. 10. The Turbit Pigeon, *Columba Turbita*. 11. The Peacock Pigeon, *Columba Laticauda*. 12. The Tumbler Pigeon, *Columba Gyratrix*. 13. The Helmet Pigeon, *Columba Galeata*. 14. The Turkish Pigeon, *Columba Turcica*. 15. The Carrier Pigeon, *Columba Tabellaria* 16. The Cropper Pigeon, *Columba Gutturosa*. 17. The Horseman Pigeon, *Columba Eques*. 18. The Smiter Pigeon, *Columba Percussor*. 19. The Turner Pigeon, *Columba Jubata*. 20. The Spot Pigeon, *Columba Maculata*. Besides these, the following are noticed by the connoisseurs in fancy-pigeons, though not by the usual ornithologists: such as the ruff, nun, laugher, trumpeter, &c. and of all or each of which there are again numerous varieties. Some of the above are common in the southern parts of Russia, and in Sweden; but are always observed to migrate southward as the winter approaches. None are seen in Siberia, till we pass the lake Baikal, where the white-rump breed are found in great plenty among the rocks. Not a single species is found in Kamtschatka.

3. Columba montana, the mountain or partridge pigeon; inhabits South America and the West Indies. It is in length eight inches and a half: bill red, with a black tip; irides red, surrounded with a warty skin of the same colour; the upper parts of the body are rufous, with a purplish cast; the under, as far as the breast, flesh colour; the belly, sides, thighs, and vent, inclining to rufous; the under wing coverts, quills, and tail, rufous; legs red. It is found at Cayenne, and in St. Helena. They build in trees which have low boughs, and line their nests with hair and cotton: they have greatly the appearance of a partridge.

4. Columba tetraoides, the tetraoid pigeon. The only description we have of this bird is, that it equals the red-legged partridge in size: the head and neck black, encompassed with a white margin, as in that bird. Dr. Gmelin does not inform us from whence it came, but that it was living in a menagery. From the name we may conclude it to have somewhat the appearance of the red-legged partridge.

5. Columba leucocephalæ, the white-headed pigeon; length ten inches and a half; the bill red, with a white tip; the eyes surrounded with a white skin, the irides yellow; the top of the head white; beneath of a changeable purple; the neck is of a green and blue, varied with a gloss of copper; the upper and under parts of the body are of a bluish grey brown; the greater and lesser quills and tail brown; the legs red. It inhabits Jamaica, St. Domingo, and the Bahama Islands, where it breeds in vast numbers, making its nest in the rocks. They are bitter or sweet to the taste according to the time of year, or aliment they feed on; when they meet with plenty of sweet berries, they are certainly good food.

6. Columba leucoptera, the white-winged pigeon; in length from eight to nine inches; the bill dusky black; a fine blue skin surrounds the eyes; irides crimson; the forehead, cheeks, fore part of the neck and breast, pale rufous brown; the hind part of the head and neck dullish brown; under the ears, on each side, a transverse black stripe, which does not appear except the bird stretches the neck, under this mark the feathers have a green gold gloss; the upper part of the body is dark brown, with a mixture of blue in some lights; the greater wing coverts the same, but the outer margins and tips white; the lower part of the back and rump dull ash-colour; the belly, sides, thighs, and under tail coverts, bluish; greater quills black, with pale margins; the tail feathers, are dull ash-colour tipped with white; the legs red. Inhabits the East Indies.

7. Columba Martinica, the Martinico pigeon; length nine inches and a quarter; the bill red; the eyes surrounded with crimson tubercles, and the irides are of the same colour; the head, neck, and upper parts of the body, are chesnut, with a gloss of violet; the under parts rufous; the tail feathers chesnut on both margins; the legs red. Native of Martinico. There is a larger variety of the Martinico pigeon, in which the feathers surrounding the lower part of the neck have a gilded violet gloss, forming a kind of collar.

8. Columba Jamaicensis, the Jamaica pigeon; nine inches in length; the nostrils much elevated, forming two tubercles at the base of the bill; the irides white; the top of the head, and all the under parts of the neck and body, white; the hind part of the neck varied with blue and purple; the back, rump, and upper tail coverts, purplish brown; the tail blue, terminated by a small band of white. Found in the savannas of Jamaica, in the month of January, perhaps in its passage to some other parts. It feeds on berries, and is accounted good food. It makes a mournful noise on the trees through the whole island, sometimes very loud and disagreeable.

9. Columba coronata, the great crowned pigeon; by far the largest bird in the whole genus, being nearly the size of a turkey; the bill is black, and two inches long; from the base of this passes a streak of black through the eyes; the irides are red; the head, neck, breast, belly, and under tail coverts, cinereous blue; the head is crested, and the feathers which compose it are four inches and three quarters in length, and of the same colour; the back, rump, scapulars, and upper tail coverts, are of a deep ash-colour, with a mixture of purplish chesnut on the upper part of the back and scapulars; the lesser coverts of the wings are also deep ash-colour, tipped with purplish chesnut; white on the outside, and tipped as the others, this last colour occupying more space on the outside than on the inner; the greater wing coverts, farthest from the body, are ash-coloured within, and purplish chesnut on the outside and tip; quills deep blackish ash-colour; tail the same, but of a light ash-colour at the tip; the legs whitish, spotted with red; but Scopoli says they are ash-coloured. We may suppose, therefore, that they vary in different birds. This species inhabits the Molucca Isles and New Guinea; and has been brought to France and England alive. Though in size it far exceeds any of the pigeon tribe, yet its form and manners tell us that it can belong to no other. Brisson has placed it with the pheasants; but whoever has observed it, cannot doubt in the least to which it belongs. Its note is cooing and plaintive, like that of other pigeons, only more loud.

The

The great Crowned Indian Pigeon.

The mournful notes of this bird greatly alarmed the crew of Bougainville, when in the neighbourhood of them, thinking they were the cries of the human ſpecies. In France they were never obſerved to lay eggs, nor in Holland, though they were kept for ſome time; but Scopoli aſſures us, that the male approaches the female with the head bent into the breaſt, making a noiſe more like lowing than cooing, and that they not only made a neſt on trees, in the menagery where they were kept, but laid eggs as large as thoſe of a hen. The neſt was compoſed of hay and ſtalks. The female never ſat, but ſtood upon the eggs; and he ſuppoſed it was from this cauſe alone that there was no produce. They are ſaid to be kept in the Eaſt Indies, in their court-yards, as domeſtic poultry. The Dutch at the Moluccas call them *crown-vogel.* M. Sonnerat, as well as Dampier, found them in plenty at New Guinea; and it is probable that they were originally tranſported from that place into Banda, from whence the Dutch have been in the habit of procuring them.

10. Columba chriſtata, the creſted pigeon; ſize of the common pigeon; the bill is conical, black, and the under mandible yellow at the baſe; irides yellow; the head and neck black; on the forehead are ſix very long black briſtly hairs, which ſtand upright, or may be lowered at will; at the back part of the head is a creſt of a gilded red colour; the feathers which compoſe it are hard and ſtiff, and the webs not united with each other; between the two creſts the ſpace is white, forming a band acroſs the head; the eyes are encircled with white ſtiff feathers; the breaſt and belly of a beautiful deep violet; the leſſer wing-coverts are brown; the others, and leſſer quills, rufous white, croſſed with undulated black lines; the greater quills are rufous, marked acroſs as the others; the back, rump, and tail, are deep green; the legs yellow; the toes ſeparated to the origin. There is a variety of the creſted pigeon, not much differing, and probably the female; length ten inches; bill yellowiſh, with a black tip; hind part of the head creſted, as in the other, which is ſuppoſed to be the male.

11. Columba albicapilla, the grey-headed pigeon; ſize of the common pigeon; the bill of a dull red; the irides yellow; upper part of the head dirty white; hind part and ſides of the neck reddiſh brown, gloſſed with gold; the leſſer quills are of a bright green, with a metalline gloſs, changeable in different lights; the greater quills and tail black; between the bend of the wing and the body is a ſemicircular ſpot, compoſed of feathers half green half grey; the reſt of the body green; legs a dull red. Native of the iſle of Panay.

12. Columba pompadora, the pompadour pigeon; leſs than the common pigeon; bill bluiſh; cheeks and chin pale yellow; back, breaſt, and belly, pale green; wing-coverts of a fine pompadour colour; quills black, edged with yellow; tail of a light green, and long; legs red. In the female the colours are paler. Inhabit Ceylon, and are common in the country about Bengal, and other parts of India, where they are called *coucla.* They are always ſeen on trees, never on the ground; moſtly on thoſe known by the name of *waringin grotbebria*, on the berries of which they delight to feed. They have a whiſtling note, very different from that of other pigeons; are good food, and are ſhot by the Europeans for table.

13. Columba erythroptera, the garnet pigeon; length nine inches and a half; bill of a duſky yellow, in ſome black; the forehead white; from thence paſſes a ſtreak of the ſame over each eye; the lower part of the neck, the ſhoulders, and wing-coverts, are of a beautiful deep garnet colour; the back between the wings, the quills, tail, lower part of the breaſt, belly, and vent, are all black; the tail is two inches and a half long, and even at the end; legs brown. Native of the iſland of Eimeo. There is a variety of this ſpecies, about an inch longer; found at Otaheite. Another variety, brought by our late voyagers from the iſland of Tanna, ſeems between both the above.

14. Columba Indica, the Amboyna pigeon; ſmaller than the common pigeon; bill ſcarlet; noſtrils bluiſh; eyes of a dark colour; forehead white, and through the eye a ſtreak of the ſame; top of the head bluiſh; ſides of the head, neck, and breaſt, reddiſh; the upper part of the back, and wing-coverts, green gold, gloſſed with copper; ridge of the wing ſpotted with white; lower part of the back, rump, and upper tail coverts, aſh-colour; belly, thighs, and under tail coverts, reddiſh brown; legs red: inhabits Amboyna in the Eaſt Indies. Of this ſpecies there is a variety, with the quills and tail feathers green; wing-coverts violet; and the rump and vent blue.

15. Columba purpurata, the purple-crowned pigeon; length nine inches; bill yellowiſh; irides of a pale yellow; forehead, to the middle of the crown, purple; the head, neck, and under parts of the body, pale green, inclining to aſh-colour; vent, and under tail coverts, yellow; all the upper parts of the body of a beautiful deep green, and very gloſſy; quills black, the two outer ones wholly ſo; the others edged with green; the ſecondaries fringed with yellow on the outer margins; the tail is three inches and a half long; the feathers ſomewhat pointed at the end; legs very rough, and of a duſky black. Of this ſpecies there are ſeveral varieties, according to the different iſlands from which they are brought, for they inhabit the whole of the Pacific Ocean within the tropics. In Otaheite the crown is of a very faint purple, at Ulatea, and ſome other iſlands, deeper; but the ſpecimens found at Tongataboo, have the top of the head of an exceeding deep and vivid purple, ſurrounded with yellow; the bill duſky, irides yellow, vent almoſt orange, and legs of a deep red. Among the others there are ſome which have not the leaſt veſtige of red on the crown; but whether theſe are of a different ſex, young birds, or owing to difference of place, we are not informed. The beautiful green turtle dove, mentioned by Bougainville, is, perhaps, the ſame bird with this. He alſo mentions pigeons of a green gold plumage, neck and belly of a greyiſh white, and having a little creſt on their heads, as inhabiting ſome of theſe iſlands.

16. Columba Jambu, the Jamboo pigeon; of a ſmall ſize; bill yellow; fore part of the head of a deep pink; back, wings, and tail, green; breaſt white, having green on one ſide and pink on the other, half round the eye, which is large and yellow. It inhabits the iſland of Java; feeds on the berries of the rum-pooni, but will alſo live on boiled rice and padda.

17. Columba rubricapilla, the red-crowned pigeon; ſize of the jacobin pigeon; bill grey; from the baſe of the upper mandible is a fleſhy membrane of a bright red colour, which wholly encircles the eyes; the irides have two circles, a large one of red, and a leſſer one of grey; the top of the head is covered with ſlender feathers of a fine red colour, forming a kind of hood; the neck, upper parts of the back, and breaſt, bluiſh grey; the reſt of the body, and tail, of a velvety black, changing into violet and blue in different reflections of light; legs grey. This was found at Antigue, in the iſle of Panay, by M. Sonnerat.

18. Columba purpurea, the purple pigeon; ſize of the Engliſh wood-pigeon; front pale green, head and neck fine light purple; breaſt orange; back, ſcapulars, and belly, light green; vent ſcarlet; quills duſky. It inhabits the iſland of Java, where it is called *jovan*, from *joo*, which ſignifies green in the Javan and Malayan languages. Mr. Loten mentions, that he has known more than eighteen or twenty varieties of theſe wood-pigeons on the iſlands of Java, Celebes, and Ceylon; ſome as big as a ſmall hen, of a beautiful white, with black wings and tail; ſome bluiſh green; ſome entirely of a dark beautiful red, between ſcarlet and carmine; and ſome alſo like our European turtles.

19. Columba Eimeenſis, the purple breaſted pigeon; a ſmall ſpecies, in length only fourteen inches; bill black; ſides of the head beneath the eyes duſky; the forehead, throat, and fore part of the neck, of a pale vinaceous colour;

lour; the crown, and hind part of the neck, dusky brown, with a greenish tinge, sides of the neck brown, changing into a glossy purple or lake colour as it advances downwards, uniting on both sides to form a bar of the same colour on the breast; the wing-coverts are of the same beautiful colour as the bar on the breast. Native of the island of Eimeo.

20. Columba vernans, the parrot pigeon; size of the common pigeon; bill blackish, with a yellow tip; the head and throat are olive green; irides composed of two circles; the outer red, the inner blue; neck pale chesnut, inclining to vinaceous; back, rump, sides, and upper tail coverts, olive green; wing-coverts the same, but the greater ones are tipped with brimstone colour, making a spot on the wing; the breast is orange; belly and thighs pale olive green, inclining to yellow, growing paler towards the vent, where it is yellow; the under tail coverts are rufous; the quills are blackish above, and ash-coloured beneath, edged with yellow; legs red. In the female, the head, neck, and upper parts of the body, are of a greyish green; the breast and belly yellowish green; the tail black. They inhabit the islands of Manilla and Panay.

21. Columba aromatica, the aromatic pigeon; length ten inches and a half; bill greenish; the upper part of the head is light grey before, deeper behind: the sides, throat, neck, breast, belly, rump, upper tail coverts, and tail, are olive green, inclining to yellow on the neck and breast; the under part of the tail is black at the base, and dirty white at the end, the under tail coverts yellowish white; back, and wing-coverts, fine chesnut; the tips of some of them yellowish, forming a band on the wing; quills black, edged with yellow. Native of Amboyna.

22. Columba St. Thomæ, the St. Thomas's pigeon; upper bill hooked, the foremost half of a blue colour, mixed with a little white and yellow, the hindmost of a sanguine; eyes black, with a circle of blue; the whole body is covered with green feathers like a parrot; the prime feathers of the wings are duskish, as is also the end of the tail; under the vent it hath yellow feathers; legs and feet of an elegant saffron colour. Inhabits the island of St. Thomas.

23. Columba curvirostra, the hook-billed pigeon; length seven inches and a half; the bill sharply carinated on the top, and incurvated at the end; the base of it red, the rest yellow; the general colour of the bird is green; on the wings are two yellow bars; the back and shoulders fine reddish chesnut; the under tail coverts ferruginous; the vent white; the tail is rounded, and the two middle feathers green; the others dark ash-colour, with a bar of black near the end. A variety, supposed to be the female, differs in having the back and shoulders green; and the under tail coverts white, as well as the vent. These birds were met with, by our late voyagers, in the island of Tanna, in the South Seas.

24. Columba Pacifica, the pigeon of the Friendly Isles; length thirteen inches and a half; bill black; the head and neck of a light ash-colour; chin nearly white; the upper parts of the body brown, with a gloss of green; the breast buff, with a vinaceous tinge; the belly ash-colour, verging to brown down the middle; quills dark brown, with greenish edges; the tail black, with a greenish gloss; legs red; in some brown or dusky. Native of the Friendly Isles, in the South Seas.

25. Columba Mexicana, the Mexican pigeon. All we know of this bird is, that the eyes are surrounded with crimson; the irides black; the whole plumage brown, except the breast and tips of the wings, which are white; the legs red. Native of Mexico.

26. Columba nævia, the black-spotted pigeon; size of the common pigeon; bill black; the head, neck, and upper parts, brown, spotted with black; breast, belly, and thighs, pale fulvous; under tail coverts, and under the wings, cinereous; quills and tail brown; legs red. Native of New Spain in South America, where it is a constant inhabitant of the woods.

27. Columba hoilotl, the white-shouldered pigeon; bill and legs scarlet, and the plumage of a purplish rufous colour, except the lesser wing-coverts, which are white. Other varieties are of a pale fulvous, with the lesser wing-coverts white; the bill and legs reddish. This is also a native of Mexico.

28. Columba cœrulea, the blue pigeon; size of the domestic pigeon: the bill, irides, and legs, red; the head, neck, upper parts, and thighs, are blue; on the head and neck is a mixture of red, especially on the fore part; the breast, belly, sides, wing-coverts, and under the tail, red; quills and tail blue. This species likewise inhabits Mexico.

29. Columba palumbus, the ring-pigeon; a large species, in length seventeen inches and a half. The bill is of a yellowish colour; the nostrils covered with a mealy red fleshy membrane; the irides pale yellow; the head, back, and wing-coverts, blueish ash-colour; the upper part of the back inclines to brown; the lower part, rump, and fore part of the neck, pale ash-colour; the rest of the neck, and the breast, vinaceous; the belly, thighs, and vent, dirty white; the hind part and sides of the neck are green gold, in some lights changing to blue with a copper gloss; and on each side of the neck is a white crescent; the greater quills are dusky; all of them, except the outermost, have the exterior edges white; the secondaries are greyish brown; at the base of the bastard wing is a dash of white; the tail is ash-coloured above, with the end blackish, but beneath the base and ends they are black; the middle hoary; the legs are covered with feathers almost to the toes, of a red colour; and the claws black. This bird is found throughout Europe; the major part of them, in respect to this kingdom, are emigrants, departing at the end of the year, and returning early in the spring. They inhabit the woods, and build on the tops of trees. This species is called in some parts of England by the names of *queest* and *cushat*.

30. Columba aenea, the nutmeg-pigeon; size of the ring-pigeon; the bill almost green; the head, neck, and under parts of the body, dirty white, with a tinge of vinaceous; the back, rump, upper tail-coverts, and tail, green, glossed with gold and copper; under tail-coverts purplish chesnut; quills ash-coloured; the tail is even at the end; the legs are covered half way down with feathers; the colour of them, and the claws, greenish. This inhabits the Molucca islands, where it feeds on nutmegs. There is a variety of this species with the head blue grey; the bill grey; irides and legs pale carmine; upper parts of the body green, glossed with gold and copper; the neck, breast, and belly, reddish grey; under tail-coverts yellowish, quills and tail black. One variety similar to the above came from New Zealand; and another from Amsterdam isle, where it is called *oroeba ya*.

31. Columba alba, the white nutmeg-pigeon; of a middle size; the bill light grey; irides yellowish; the plumage wholly white, except the quills, and one-third of the tail next the end, which are black; legs light grey. This inhabits New Guinea, and, with the last, feeds on nutmegs; and serves to propagate that useful spice. We are informed by Sonnerat, that it is most likely the outer skin alone serves them for nourishment: as to the nut itself, it is voided whole, and so little altered, that after having passed the organs of digestion, it is not rendered the less fit for vegetation; from hence it comes that these birds, flying from one island to another, sow and spread the nutmeg in all of them which they frequent. A pigeon was found by Forster, in his voyage with captain Cook, with two nutmegs in its mouth and craw, still surrounded with their scarlet covering or mace, at the isle of Rotterdam. By this means likewise is the cinnamon-tree propagated at Ceylon, by the wild doves, called from thence *cinnamon-eaters*; and occasion the rise of so many young trees along the road, that they look like a forest. Pigeons are said also to be the propagators of the loranthus stelis, *Linn.* "feeding on the berries, and

The Nicobar Pigeon

and voiding the stones on the trunks of trees, whereon it grows."

32. Columba Guinea, the triangular-spotted Guinea pigeon. This is a very beautiful bird; the bill is blackish; the eyes surrounded by a red skin, like a pheasant; the irides bright yellow; the head, neck, and under parts, rich ash-colour; belly and vent white; the feathers on the neck are pointed, of an ash-colour, with vinaceous margins; the upper part of the back purplish brown, glossed with violet; wing-coverts, and lesser quills, the same, but each feather tipped with a triangular white spot, the point upwards; the greater quills black, with grey edges; lower part of the back and rump white; the tail dull ash-colour, tipped with black; legs pale red; claws brown. Inhabits Guinea, in the southern parts; the rocky parts of Africa; and is common about the Cape of Good Hope.

33. Columba Caribæa, the ring-tailed pigeon; size of the ring-pigeon; length fifteen inches; the bill of a greenish red; the membrane which covers the nostrils is gibbous; irides crimson; space round the eyes pale yellow; the head, fore part of the neck, and breast, purplish; the hind part of the neck greenish purple, with a silky gloss; back, rump, and upper tail-coverts, pale blue; the wings are brownish; the belly white; the tail crossed with a band of black. It is a native of the Caribbee islands, and of Jamaica, where it is frequently called the *mountain pigeon*. It is often found in the savannas or swampy woods, in January.

34. Columba Novæ Seelandiæ, the New-Zealand pigeon; length eighteen inches; bill red; irides, and round the eyes, red; the upper parts of the body are of a ruby red, glossed with green on the fore part of the neck; quills dusky; rump blue; tail black; under parts from the breast white, inclining to blue towards the vent; legs red. Inhabits Dusky Bay in New Zealand; called *hagarrèroo*.

35. Columba Madagascariensis, the Madagascar pigeon; size of our common pigeon; the bill red; the eyes placed in a bare red skin; the plumage is wholly of a blue black, and very glossy; the feathers on the neck narrower than the others, and have a mixture of ash-colour; the tail violet purple; legs red. This species inhabits Madagascar, where it is called *founingomean-rabou*. There is a variety of it near twelve inches in length; the bill ash-colour, with a reddish cere; the head, neck, breast, belly, and sides, olive green; near the bend of the wing is a small reddish spot; the quills blackish above, and ash-coloured beneath; the outer edges brimstone colour. This likewise is a native of Madagascar, and is called there by the name of *founingo-maitsou*; it probably only differs in sex.

36. Columba Franciæ, the hackled pigeon; this is much larger than our ring-pigeon; the bill and irides crimson; the feathers of the head, neck, and breast, are long, narrow, and pointed, and of a singular construction, appearing with a polished surface, in the same manner as the appendices of the wing feathers of the Bohemian chatterer, or wild Indian cock; round the eye is a naked deep red skin; the back, wings, and belly, are of a deep blue; rump and tail of a deep crimson; legs black. These inhabit the Isle of France, where tradition informs us that the flesh is poisonous.

37. Columba maculata, the green-spotted pigeon; length twelve inches; bill black, tipped with pale yellow; general colour of the plumage dark green, and glossy; the head and neck are darker than the rest, and of one plain colour; the feathers of the neck long and narrow, like the hackles of a cock; the feathers of the wings and scapulars are tipped with a spot of very pale cinereous white, with a point running upwards, somewhat triangular; quills and tail black; belly, thighs, and vent, dusky black; the legs are brown, and the shins covered half way with downy feathers. Native place uncertain.

38. Columba Nicobarica, the Nicobar pigeon; size of our common pigeon; bill dusky; irides hazel; the head, neck, breast, belly, thighs, and under tail-coverts, dark blueish purple; the feathers on the neck are long and pointed, reflecting glosses of blue, red, gold, and copper; the back and upper part of the wings green, changing to copper and gold; some of the outer quills, and the coverts above them, fine blue; the tail, and upper coverts, white; legs reddish. This is the description of Edwards, who drew it from the living bird, and of which the annexed engraving is an exact copy. The female differs only in the colours being less glossy, and the pointed feathers of the neck being shorter. They inhabit the Nicobar isles, on the north of Sumatra, and are justly esteemed the most elegant of the columba genus. The elongated feathers round the neck change into a thousand shades of brilliant colours, by the varying rays of light which fall upon them, and give to many the resplendent effect of burnished gold.

39. Columba speciosa, the scallop-necked pigeon; size of the preceding; bill red, covered with a white cere; the head ferruginous; neck and breast variegated with rufous, white, and purplish blue; each feather being rufous, then white, with blue margins, appearing undulated, and giving a beautiful appearance; the back and wings are ferruginous; quills darker than the rest; tail dusky black, and rounded; legs red. The female is marked in the same manner as the male, but is much duller in colour. Native of Cayenne.

40. Columba Corensis, the grey pigeon; size of the tumbler pigeon: the eyes are red, surrounded with a naked skin spotted with black; general colour of the plumage grey; the feathers on the lower part of the neck appear changeable in different lights, as if scalloped, though really not of different colours. This rare species inhabits Coro, in the district of Venetzuela, in South America. It is prized by the inhabitants as food, particularly when eaten young.

41. Columba phænicoptera, the purple-shouldered pigeon; size of our common pigeon; bill stout and dusky, edges pale; head and neck olive yellow; between the neck and back ash-colour; back and wing coverts olive, the lesser coverts pale purple; greater coverts and secondaries striped longitudinally with black and white; breast and belly pale ash-colour; lower part of the tail olive green, the end dusky; legs pale yellow. Native of India, brought home by lady Impey. There is a variety of this Indian pigeon, somewhat larger; bill blueish at the base; towards the tip white; head ash-colour; neck pale yellowish green; lower part of the neck, middle of the wing, and all the under parts, white; the whole of the outer edge of the wing, and the quills, black, with whitish edges; body above, and tail, greenish ash-colour; legs blue. This was brought from India by Mr. Middleton.

42. Columba fusca, the brown Carthagenian pigeon; about the size of the common turtle; the head is chesnut brown; the eyes black; the neck and breast undulated, or scalloped with black and white; the rest of the plumage a lively brown. Native of the province of Carthagena, in South America.

43. Columba turtur, the common turtle dove. This complacent bird was well known to the ancients, and is accurately described by Aristotle. In Greek it is named *τρυγων*, from *τριζω*, or *τρυζω*, to murmur: the Latin name *turtur*, is evidently formed in imitation of the turtle's notes, *tur*, *tur*; in Italian, *tortora*, *tortorella*; in Spanish, *tortola*, or *tortora*; in German, *turtel*, *turtel taube*; in Swedish, *turtur dufwa*; in Polish, *trukawka*. The turtle, more perhaps than any other bird, loves coolness in summer, and gentle warmth in winter. It arrives in our climate very late in the spring, and departs about the end of August. All the turtles, without a single exception, assemble in flocks, and perform their journies in a body; they never reside with us more than four or five months, and, during that short space, they pair, build their nest, lay,

lay, and rear their young, which are able to join them in their retreat. They choose the darkest and coolest woods to form their settlement, and they construct their nest, which is nearly flat, on the tallest trees, at a distance from any habitations. In Sweden, Germany, France, Italy, Greece, and perhaps in countries still cooler or hotter than these, they likewise remain only during summer, and depart before autumn; only Aristotle informs us, that in Greece a few stay behind in the most sheltered situations: this seems to prove that they seek very hot climates where to pass the winter. They are found in every part almost of the ancient continent; they occur also in the New World, as far as the South-Sea Islands. They are extremely frequent in the south of Russia, and in the rocky country beyond the lake Baikal. This bird is highly favoured in the Turkish dominions, where it is extremely plentiful, the government allowing a certain rate per cent. in respect to the duty on corn, on their account. A crowd of these birds constantly alight on the corn-vessels which cross the port of Constantinople, where they carry this commodity uncovered, either to the magazine or mills, and the boatmen never oppose their depredations. This permission given the turtle to feast on the grain, brings them in great numbers, and familiarizes them to such a degree, that they are seen standing on the shoulders of the rowers, watching for a vacant place where they might fill their crops in turn. The turtles, like the pigeons, are subject to varieties; and, though naturally more wild, they can be raised in the same manner, and multiplied in the domestic state. The length of the common turtle dove is about twelve inches: the bill is brown; the irides yellow; the eyes surrounded with crimson; the top of the head cinereous olive; the forehead and chin nearly white; on each side of the neck is a patch of black feathers with white tips; the back is ash-coloured, margined with reddish brown; scapulars and wing-coverts reddish brown, each feather black in the middle; quills brown, with pale edges and tip; the fore part of the neck and breast vinaceous, but pale; the lower part of the breast and sides dusky grey; the belly, thighs, and vent, white; the two middle feathers of the tail are brown, the others darker, tipped with white; and the outer one white on the outer edge; the legs reddish. They are very common in the west of England, and also in Kent, where it is often seen in woods during the summer, and frequents the pea-fields in flocks of twenty or more, as soon as the pease begin to ripen, of which it sometimes destroys too many. They lay two eggs, like the other species, and are supposed to breed but once in the season; which is the more probable, as their stay in this country is at least two months shorter than the other species which frequent us. Mr. Pennant, as well as Scopoli, are both scrupulous of adding the synonym of Linnæus to this bird; but there is no doubt of this being the identical species meant by him, though he particularises his as Indian. Brisson mentions a drawing of one sent from China, no way differing from the bird by him described, except the whole of the under parts being vinaceous: it is his opinion likewise, that the car dove, of Sloane, is the same bird; and in the Indian Zoology, the European turtle is mentioned as an inhabitant of Java. A variety of this bird was shot in Buckinghamshire, which differs from the common one, in having almost the whole side of the neck black, instead of a patch only; and, instead of each feather being tipped with white, there is a round spot of white on each very near the end, giving the sides of the neck a most beautiful appearance. And among some birds which came from the last expedition to the South Seas, was one of these; but, as it was in a parcel wherein were some others which belonged to the Cape of Good Hope, it is possible that this may have been brought from that place, and serves to shew that neither this nor the former variety are confined to the European regions. The Portugal dove is a variety of this, and is rather larger than our turtle: th. bill is black; irides saffron-colour; the whole of the body deep brown; on each side of the neck, about the middle, are two or three shining black feathers tipped with white; the lesser wing-coverts are black, edged with yellow; tail feathers deep ash colour, tipped with white; legs red. The Luzonian turtle is also a variety of this species, and is about the common size: bill and irides the colour of carmine; head and neck light grey ash-colour; on each side of the neck six or seven of the feathers are tipped with black; the breast and belly vinaceous grey; quills black; inhabits Manilla. The Chinese turtle is likewise a variety of the common dove, and is nearly of the same size: bill and irides red; head, neck, breast, and back, brownish grey, palest on the breast; on each side of the neck are some black feathers, with pale cinereous grey ends; wings brown, crossed with a band of yellow; tail deep cinereous grey; legs red.

44. Columba Surinamensis, the Surinam turtle dove; ten inches in length; bill of a deep blue without, and red within; the head and back are ash-colour; throat mixed green and black; the exterior wing feathers brown, and those of the middle ash-colour; the breast and belly whitish; the legs red. This is Fermin's description, who speaks of it as a bird common at Surinam, and says that it lays twice in a year, making its nest in the woods, distant from habitations, on the highest trees; in this imitating our species, to which it bears some resemblance, though smaller by two inches. The flesh, he observes, is juicy and delicious.

45. Columba risoria, the collared turtle dove; larger than the preceding; bill blackish; irides fine red; the upper parts of the head and neck, the back, and wing-coverts, are nearly cream-colour; the fore part of the neck and breast white, with a vinaceous tinge; the rest of the under parts white; the rump is greyish brown; the quills the same, with whitish edges; tail cinereous, the two middle feathers plain, the others tipped with white; the hind part of the neck is marked with a collar of black feathers; legs red. The female differs from the male in having the colours less vivid, and inclines more to grey. This inhabits India; but is a bird common to France, and other parts of the European continent; but it is not found in England except in cages. The Chinese grey turtle is a variety of this species, and nearly the same size: bill black; irides red; top of the head grey; the back part of it deep vinaceous grey; round the eyes the feathers are white; fore part of the neck, breast, and belly, very pale red vinaceous grey. The Hybridal turtle, mentioned by Brisson, is a mixed variety, between the common and collared turtles. The head, neck, and breast, are vinaceous; back dull reddish ash-colour; quills brown; legs blood red.

46. Columba Sinica, the striated Chinese turtle; size of the common pigeon: bill blueish ash-colour; irides white; the top of the head ash-colour; cheeks and sides of the neck yellow, the tips of the feathers on the last red, which colour is separated from the upper part of the neck by a longitudinal band of blue; the hind part of the head, the upper part of the neck, the back, rump, and upper tail-coverts, are brown, transversely marked with narrow black arcuated bands; the breast, belly, sides, and thighs, are rose-colour; the lesser wing-coverts are pale brown, varied with a black and white transverse mark near the tip of each feather; tail a palish brown; legs red.

47. Columba striata, the barred turtle; smaller than the common turtle: bill of a pale horn-colour; nostrils pale blue; irides blue grey; the eyes are placed in a bare white skin, which passes to the nostrils; the forehead, cheeks, and throat, are pale blue; the top of the head, and hind-head, incline to rufous; the upper part of the neck, the back, and wing-coverts, are brownish ash-colour, marked with transverse arcuated black bars; fore part of the neck, breast, belly, and thighs, tinged with rose-colour; the under tail-coverts white; legs pale red. Inhabits the East Indies and China, and called by the

Chinese *fouvat*. It is found at Malacca, and in the island of St. Helena; also in the province of Venetzuela, in South America.

48. Columba cyanocephala, the blue-headed turtle; size of the common pigeon; the bill red at the base, and ash-coloured at the point; the crown of the head and the throat are blue; this colour descends a little way down the middle of the fore part of the neck, beneath which the feathers are black, and on some of them is a transverse stripe of white; from the lower jaw to the hind part of the head is a stripe of white, passing under the eye; the back, rump, wing and tail coverts, vinaceous brown; the belly, thighs, and under tail-coverts, inclining to rufous; the tail dusky ash-colour above, and blackish beneath; the legs and claws red. This bird inhabits Jamaica, and the warmer parts of the American continent. It is very common in the island of Cuba, where it is caught in great quantities, and brought to the markets for eating. It has been kept in a tame state, but will not breed.

49. Columba Suratensis, the turtle-dove of Surat; size of the collared turtle: bill black; irides red; head and fore part of the neck vinous grey; breast, belly, and thighs, the same, but paler; the feathers on the top of the neck behind are black, tipped by a white band; on the lower part black, tipped by a rufous band; wing-coverts pale grey, each feather streaked with black down the shaft, and widens as it approaches the tip; back, rump, and tail, deep grey; under tail-coverts white; legs red. Native of Surat in the East Indies.

50. Columba Cambayensis, the Cambayan turtle; bill black; irides red; head pale vinaceous grey; the feathers on the fore part of the neck are black for two-thirds of their length, and of a pale rufous the rest; the hind part of the neck and back grey; the wing-coverts cinereous, the quills black; the two middle tail-feathers are grey, the others half black half grey; the belly, thighs, and under tail-coverts, white; legs red. Inhabits Surat and other parts of the province of Cambaya.

51. Columba Malabarica, the Malabar turtle; size of the collared turtle: bill and irides red; the head, back, and wings, are of a pale cinereous grey; the neck and breast light vinaceous; the middle wing-coverts marked with oval spots; the two middle tail-feathers grey; the others black for two thirds of their length, and from thence to the end white; the belly is white; the legs red: found on the coast of Malabar.

52. Columba viridis, the green turtle; length seven inches and three-quarters: bill red; fore part of the head, and throat, ash-coloured; the hind part of the head and neck, the back, rump, upper tail and wing coverts, breast, belly, sides, and thighs, green gold, glossed with copper; the fore part of the neck a beautiful violet purple; the greater wing-coverts above have the outer edges at the tip brimstone-colour, the under wing-coverts ash-colour; the quills are blackish, with the outer edges and tips of the same colour as the body; the tail is blue green, glossed with copper, the two middle feathers are plain, and verge to blackish on the inner webs, the others are all tipped with yellow; legs red, and half covered with feathers. Native of the island of Amboyna.

53. Columba melanocephala, the black-capped turtle; length nine inches and a half; bill black, short, and yellow at the tip; the head of a pale blueish ash-colour; chin and throat fine deep yellow; neck, and body in general, of a fine deep green; vent orange yellow; tail cuneiform, with six of the middle feathers green; the three outer ones on each side of a most beautiful crimson; legs red: native of the island of Java.

54. Columba Javanica, the Javan turtle; size of the common turtle; bill pale red, covered with a white cere; head, neck, and breast, vinaceous red; forehead and sides of the head palest; back and wings deep green; greater quills brown; belly dusky, growing very pale towards the tail, which is dusky beneath; legs red. This is likewise a native of Java, where it is found in great abundance.

55. Columba cyanocephala, the blue-crowned turtle; bill red; crown of the head blue; the upper parts of the neck and body green; neck and under parts reddish: quills and tail blue black; legs red: native of China, where it is called *yaupuan*.

56. Columba Senegalensis, the Senegal turtle; about the size of a blackbird; bill blackish; the head, neck, and breast, vinaceous: the fore part of the neck spotted with black; the upper part of the back brown, with the end of each feather inclining to rufous; the wing-coverts nearest the body the same; the others ash-coloured, as are the lower parts of the back and rump; the belly, sides, thighs, and under tail-coverts, white; quills outwardly ash-coloured, within and beneath brown; the tail has the six middle feathers cinereous brown; and the three others, on each side, of a dark ash-colour; legs red. It inhabits the warm regions of Senegal in Africa.

57. Columba vinacea, the collared Senegal turtle; size of the preceding; bill blackish; the head, neck, and breast, vinaceous, darkest on the upper parts; back, rump, and wing-coverts, grey brown; belly, sides, thighs, and under tail-coverts, dirty white; quills blackish brown, edged with white; tail three inches long; the two middle feathers grey brown; the others black for two-thirds, the rest of the length grey; on the back part of the neck is a black collar, which rises upward on the sides of the neck; the legs reddish. This likewise inhabits Senegal, and is principally distinguished by the crescent on its neck.

58. Columba Afra, the African turtle; not larger than a thrush; bill reddish; the top of the head ash-coloured: the hind part of the neck, back, wing-coverts, and rump, grey brown; the fore part of the neck and breast pale vinaceous; belly, sides, thighs, and under tail-coverts, dirty white; the upper tail-coverts grey brown, with black tips; on each wing are some spots of a green gold colour, glossed with violet; legs red. It abounds in several parts of Africa.

59. Columba cricenta, the Manilla turtle; size of the preceding; bill black; irides ferruginous; top of the head whitish grey; hind part of the neck violet, glossed with green; on the breast is a blood-coloured spot, deepest on the middle, and paler on the edges; the belly grey, with a reddish tinge; across each wing are three transverse grey bands; and between these are two bands of black; the quills are black; the tail grey at the base, and black at the end; legs reddish violet. Native of the Manilla islands.

60. Columba sanguinea, the sanguine turtle; size of the common turtle; bill red; irides reddish purple; the whole plumage white, except the lower part of the neck and breast, which are blood red, in the manner of the last, as if a sword had been stuck into that part, and the blood had soiled the feathers; legs red. This species likewise inhabits Manilla.

61. Columba Canadensis, the Canada turtle; about the size of the tumbler pigeon; bill blackish; upper parts of the head, neck, back, and wings, grey brown; the lower part of the back, rump, and upper tail-coverts, ash-colour; the throat and breast, grey brown tinged with yellow; the sides greyish; belly and thighs dirty white; under tail-coverts pure white; the wing-coverts are marked with blackish brown spots; all the feathers of the tail are ash-coloured, tipped with white, except the two middle ones, which have a large rufous spot on the inner web towards the base, under which is another of a blackish brown; the legs red. In the female the feathers of the head, neck, breast, and upper part of the back and wing-coverts, are tipped with white, which gives those parts a striated appearance. Native of Upper and Lower Canada.

62. Columba passerina, the passerine turtle. This species scarcely exceeds the size of a lark; bill pale red, with a blackish tip; irides orange; the upper part of the head and neck ash-colour; the back, rump, and upper tail-coverts, the same, but deeper; the forehead, throat, fore part of the neck, breast, sides, the belly, and under tail-coverts, vinaceous, spotted with brown on the fore part of

of the neck and breast; some of the wing-coverts are of a deep ash-colour; others vinaceous, marked with glossy green spots; the two middle tail feathers are deep ash-colour; the others blackish; legs red. The female differs in being every way more dilute in colour. These inhabit the warmer parts of America, and the islands contiguous thereto; chiefly between the tropics, though sometimes found in Carolina. Willughby says it is very common in Mexico, where it inhabits mountainous places, and is thought excellent eating. Bancroft observes, that this is the only dove met with in Guiana. It is also common in Jamaica; where Sloane mentions that they feed on the ground like partridges, and spring as they do, rising and flying for a short flight, and then light again on the ground. They are taken in traps made of reeds, baited with the seeds of the wild cassada.

63. Columba minuta, the minute dove; which is still less than the preceding, being only five inches and a half in length. The upper parts of the body are brown; the under parts more or less rufous white; wing-coverts rufous brown, with seven small spots of the colour of polished steel, three on the lesser and four on the greater wing-coverts; the two middle tail-feathers are brown; the others ash coloured at the base, then black, with brown tips; the bill and legs are brown. Native of St. Domingo.

64. Columba Malaccensis, the Malacca turtle; about the size of a house-sparrow, but longer. The bill is black, tinged with yellow at the tip and base; irides yellow; the forehead and throat are light cinereous grey; the hind part of the head the same, crossed with black lines; the back, rump, and lesser wing-coverts, are pale cinereous grey, tipped with a black band: sides of the neck white, crossed with numerous lines of black; breast and belly pale vinous grey; the sides undulated with black lines; quills brown; the middle tail-feathers the same; the others are brown for two-thirds of their length, and from thence to the end white; thighs and under tail-coverts are also white; legs yellow. Inhabits Malacca in the East Indies, and is a beautiful species; the flesh is said to be extremely delicate. It has been transported into the Isle of France, where it has multiplied exceedingly.

PIGEONS WITH LONG TAILS.

65. Columba migrator, the migratory or passenger pigeon; larger than the common pigeon; bill black; round the eyes crimson; irides orange; the head, throat, hind part of the neck, back, rump, and upper tail-coverts, cinereous; the wing-coverts the same, but marked with black spots; sides of the neck of a glossy variable purple colour; the fore part of the neck and breast vinaceous; quills dark brown, with whitish edges; the tail very long; the two middle feathers blackish brown; the rest hoary; legs red. The passenger pigeons breed in the northern parts of the American continent: they nestle on trees, and lay two eggs. During incubation, they live on the seeds of the red maple, and afterwards on those of the elm. As soon as their provisions fail, they gather in vast bodies, and advance towards the southern provinces. In hard winters the air is darkened by their flight: one flock succeeds to another, and this passage lasts several days. When they roost in trees, the branches are sometimes broken down by their weight, and the ground beneath is covered to a considerable depth with their dung. They are plentiful in all the Caribbee islands, where they are common at every table, and much esteemed. The Indians used to kill vast numbers, and collected their fat to serve as butter. In the state of New York, the passenger pigeons are observed in their progress to the southern or western settlements about the beginning of August, and in their return about the beginning of March; they fly in mornings and evenings. The people at Philadelphia shoot them from the tops of their houses; and in New England they are knocked down from their roosts in great numbers, which it is not difficult to do, as they are either very tame at the time, or much fatigued; and the common people there chiefly subsist on them. They have also another way of catching them in Louisiana. A party of five or six go in the evening into the woods, and, taking with them several flat vessels, they set brimstone on fire in these, under such trees as the birds roost on, the smoke of which so stupifies them, that they fall to the ground, when no more remains than to fill their sacks with them. In this they are often accompanied by the ladies, who esteem it an agreeable amusement. Another method of taking these birds in nets is described under BIRD-CATCHING, vol. iii. p. 54.

66. Columba Carolinensis, the Carolina pigeon; size of the common pigeon: bill blackish; eyes surrounded with a bare blue skin; irides black; the forehead, fore part of the neck, and breast, incline to reddish, with a green gold and violet gloss; the hind part of the head and neck are of a brownish ash-colour; the back, rump, and upper tail and wing coverts, the same, but irregularly mixed with rufous; belly, sides, thighs, and under tail-coverts, inclining to rufous; on each wing, near the tip, are black spots; quills dark ash-colour, with whitish edges; tail-feathers unequal, the two middle ones are four inches and a half in length, the outer ones very short; the two middle ones are wholly of ash-coloured brown; the next two on each side are ash-coloured, marked with black in the middle, and the others are of a lighter ash-colour, whitish at the end, with a black spot between the two colours; legs red. The female differs in wanting the glossy violet colour on the breast. They inhabit Carolina, Brasil, St. Domingo, and other places. In the first they are found throughout the whole year, and consequently breed there.

67. Columba marginata, the marginated long-tailed dove; nearly the size of the common turtle: the bill is horn-colour, dark at the tip; irides dull rufous; from the corners of the mouth to the eyes is a white streak; the fore part of the head and throat are rufous brown; the hind head blueish ash-colour; between these two colours, under the ears, is a black spot about the size of a tare; the hind part of the neck, the back, scapulars, and wing-coverts, are brown; but the scapulars, and greater coverts nearest the body, are marked with oval black spots of different sizes; the lower part of the back, the rump, and upper tail-coverts, incline to ash-colour; the fore part of the neck and breast are of a rose-colour, growing paler by degrees as it approaches the sides; the belly, thighs, and under tail-coverts, are brown, mixed with ash-colour; quills deep brown, with the outer edges rufous; tail-feathers of unequal lengths: the two middle are blackish; the others are ash-colour, with white tips; between which two colours is a band of black; the legs are red. This species inhabits America. That from which our engraving was taken, came from the West Indies.

68. Columba Amboinensis, the Amboyna turtle; larger than the preceding: length fourteen inches, of which the tail alone is eight inches; the bill is red; the head, neck, breast, belly, sides, thighs, and under tail-coverts, rufous; the feathers on the top of the head, the neck, and breast, have each of them a blackish transverse band near the tip; the upper part of the back, and wing-coverts, are deep brown, tipped with rufous; quills deep brown; the tail very unequal, the outer feathers being very short, and wholly of a rufous brown colour; legs red. The female is much of the same colour, but not so bright as the male: natives of the island of Amboyna.

69. Columba Capensis, the Cape pigeon; a very small species, not bigger than a lark; the length indeed is nine inches and a half, but the tail alone measures five inches and a quarter. The bill is red; the throat, and fore part of the neck, are of a very fine black; the rest of the head, neck, breast, back, rump, upper wing and tail coverts, are grey brown; greater wing-coverts tipped with black; the belly, sides, thighs, and under tail-coverts, are dirty white; on each wing is a bright spot like polished steel; the greater quills are rufous within and brown on the

1. The triangular Spotted Guinea Pigeon. 2. The marginated long-tailed Dove.

outer webs and tips, the second quills are brown, with the outer edges grey; the tail is very unequal, the outer feathers being very short; the two middle feathers are blackish brown, tinged with rufous, and those on the sides grey brown at the base, and blackish at the ends; beneath they are all black, except the outer one, which has the outside and tip white; legs are red. The female differs in having the throat and fore part of the neck of the same colour as the rest of the head, and the greater wing-coverts not tipped with black. This bird is found in Africa; it has been brought from the Cape of Good Hope and Senegal, and no doubt is to be found in all the southern parts of that continent. There are several varieties of this species; in some the forehead is black, in others not; in one there is a stripe of white across the head, and down each side of the neck, a bar of white across the rump, and the spots of the wings are of a blue green instead of black; in another there is a crescent of very pale ash-colour on the breast; and the sides, beneath the eye, mottled with cinereous and black.

70. Columba macroura, the great-tailed dove; in length twelve inches; bill red, base of it covered with a white cere; head, neck, and upper parts of the body, reddish cinnamon colour; breast, belly, and thighs, dusky white; tail very long, occupying half the length of the bird; it is cuneiform in shape, and white at the tip; legs red. This inhabits Senegal, and is said to carry the tail like the crested curassow.

71. Columba melanoptera, the black-winged turtle; about the size of a thrush, very lively and active; the wings and quill feathers black; general plumage of the body a dusky lead colour; tail very long. Native of Chili, in South America.

Of FANCY PIGEONS.

The English Powter.—This pigeon derives its name from being originally bred in England, and is of a cross breed between a horseman and a cropper; and by frequently pairing their young, it has added great beauty to the stock, and raised its reputation among the fancy breeders. According to the rules laid down, this bird ought to measure, from the point of the beak to the end of the tail, eighteen inches; to have a fine shape and hollow back, sloping off taper from the shoulders; for, when it has a rise on the back, it is termed hog-backed; the legs from the toe-nail to the upper joint in the thigh should be seven inches; the crop ought to be large and circular towards the beak, rising behind the neck, so as to cover and run neatly off at the shoulders, with a smart girt, while their variety of plumage gives a fine symmetry to the whole bird. Of the plumage, those composed of different colours are most esteemed, as the blue-pied, black-pied, red-pied, and yellow-pied. All these properties rise in value according as they agree with the above description: for example, if the blue-pied and black-pied are possessed of the other qualities, the black-pied, on account of the plumage, will be the most valuable of the two; but, if the yellow-pied has these marks, it will be far preferable to the others. The beauties and properties of the male powter are thus described by the ablest breeders: the front of the crop should be white, encircled with a shining green, interspersed with the same colour with which he is pied; but the white should not reach the back of the head, for then he is ring-headed. There should be a patch, in the shape of a crescent, falling under the lower mandible, of the same colour with which he is pied; and, when this is wanting, he is called swallow-throated. The head, neck, back, and tail, should preserve an uniformity of colour; and, if a blue-pied pigeon, he should have two black bars near the end of both wings; but, if these chance to be of a brown colour, it greatly diminishes the value of the bird, and he is then kite-barred, as the fanciers term it. When the pinion of the wing is speckled with white, in the form of a rose, it is called a rose-pinion, and is highly esteemed, though it is a great rarity to find any one complete in this property; when the pinion has a large dash of white on the external edge of the wing, he is said to be lawn-sleeved. They must not be naked about the thighs, nor spindle-legged, as some of the powters formerly were before the breed was improved; but their legs and thighs should be stout and straight, and well covered with white soft downy feathers: but whenever it happens that the joints of the knees, or any other part of the thigh, is tinged with another colour, he is foul-thighed. If the nine flight feathers of the wing are not white, he is foul-flighted; and, when only the extreme feather of the wing is of the same colour with the body, he is called sword-flighted. The crop of the powter ought to be filled so as to shew its full extent with ease and freedom; for it is a great fault when a bird overcharges his crop with wind, and strains himself so much that he sometimes falls backward, because he is not able to give a quick vent to the confined air, which makes him unquiet and heavy, and many a fine bird has, by this ill habit, either fallen into the street, or become a prey to the cats. The reverse of this is being loose winded, so that he exhibits too small a crop. A powter should stand erect, with a fine well-spread tail, which must not touch the ground, nor sink between his legs, neither must it rest upon his rump, which is a great deformity, called rumping. He should draw the shoulders of his wings close to his body, display his limbs, and walk almost upon his toes, without jumping or kicking, but moving with an easy majestic air. The powter that approaches nearest to these properties is a valuable bird; and some fanciers, by a patient perseverance, have bred them so near the standard prescribed, as to sell them for twenty guineas a pair. In breeding and rearing powters, every single bird, cock as well as hen, must be parted during the winter season, and placed in a separate pen or coop; each of them must be supplied with meat and water, and care taken that the coop be lofty and spacious, that they may not get an ill habit of stooping, which is so great an imperfection, that it should be prevented by all possible means. In the spring, when they are to be matched, prepare two pair of dragoons to every pair of powters, for feeders or nurses; for those who are curious in the breed, never suffer powters to hatch their own eggs, they being such unfeeling parents, if left to themselves, as frequently to starve their young. The dragoons must be kept in a loft separate from the powters, for fear they should degenerate and bastardize the breed; but, when the hen-powter has laid her egg, it should be shifted under a dragoon that has also lately laid an egg, and the egg of the dragoon put under the powter, it being very proper the powter should have an egg or eggs to sit upon, or she will quickly lay again; and this often repeated will be the cause of her death. Great caution must also be observed to prevent these birds from gorging, which the large cropped ones are apt to do, and is often the occasion of their death. To make them tame and familiar, the powter should be used to company, and frequently attended and talked to, during the winter, in a phrase which fanciers are well acquainted with, or they will become shy, and lose one of their greatest properties, for which they are so much admired, which is called *shewing*.

The Dutch Cropper.—This pigeon was originally bred in Holland, and its make seems to agree with the country from whence it came; the body is thick, clumsy, and short, as are also the legs, which are feathered down to the feet; they have a large pouch or bag hanging under their beak, which they can swell with wind, or depress at pleasure; their crop hangs low, and is very large; they are so loose feathered on the thighs, as to be stiled flag-thighed; they seldom play upright, and stand wide on their legs; they are gravel-eyed, and such bad feeders of their young, that, as soon as they have fed off the soft meat, it is necessary to place the young ones under a pair of small runts, dragoons, or powting-horsemen, who will act the part of nurses better than their natural

tural parents. There are a great variety of feathers in this fancy-pigeon, and the Dutch are careful in the breed of them; for when they are fed off their soft meat, they place the young ones under more tender nurses, and then put the old ones in different coops for a month, feeding them with hemp or rape feed, which soon makes them salacious; and then, turning them together, they breed pigeons with very good properties; but, since the powter has been bred to such perfection, the cropper is but lightly esteemed in England.

The POWTING HORSEMAN.—This is what fanciers term a mongrel pigeon, produced between the horseman and cropper; and, agreeable to the number of times their young ones are crossed over by the cropper, they have the appellation of first, second, or third, breed, and the more frequently this method is practised, the greater is the improvement the crop receives from it. This breed of fancy-pigeons was formerly much encouraged, in order to improve the strain of the powter, by making them close thighed; but, since the strain of powters is brought to perfection, that practice is discontinued. They are a lively pigeon, very active, and, by frequently dashing off in flight, are excellent decoys for stray pigeons. They are fertile breeders, and good nurses, always taking care of their young. Some of these pigeons measure six inches and a half in legs only; they are a spirited bird, and, if well supplied with food, will give very little trouble. There are instances of this bird's coming home at twenty miles distance.

The UPLOPER.—This is a native of Holland, and nearly resembles the English powter in its properties, but is smaller; it has a very round crop, in which it commonly hides its bill; it has small slender legs, with toes short and close together, on which it trips so exactly when walking, as to leave the ball of the foot quite hollow; it plays very upright, is close-thighed; and it is the custom of this pigeon on approaching the hen, to leap to her with its tail spread; from hence the name uploper is derived, from the Dutch *uplopen*, to leap up. It is a great rarity to see any of these pigeons pied, being generally either all white, all black, or blue. Since the English powter has become such a favourite, there is little encouragement to the breed of this pigeon; though in Holland some of these pigeons have been sold for twenty-five guineas a pair.

The PARISIAN POWTER.—This bird, brought into Enland from Brussels, is originally a native of Paris; it partakes of the same properties as the English powter, though it is not so well made; its body and legs are short; it has generally a long, but not a large, crop, and is thick in the girt. It is greatly admired for its plumage, which is very elegant, and peculiar to this species only; every feather being streaked with a variety of colours, the flight excepted, which is white; the more red this bird has interspersed with its other colours, the greater is the value set upon it; they are generally bull-eyed, or gravel-eyed, but it is a matter of indifference amongst the fanciers.

The CARRIER.—The carrier fancy-pigeon is larger than most of the common sorts, some of them measuring from the apex of the beak to the end of the tail fifteen inches, and weigh nineteen or twenty ounces. Their feathers lie very close, even, and smooth; their flesh is naturally firm, and their necks long and straight, so that when they stand upright they shew an elegant shape, far exceeding most other pigeons. From the lower part of the head to the middle of the upper chap, there grows a white, naked, fungous flesh, which is called the wattle, and is generally met by two small protuberances of the same kind, rising on each side of the under mandible; this flesh is always most valued when of a blackish colour. The circle round the black pupil of the eye is commonly of a red brick-dust colour, though they are more esteemed when of a fiery red; the eyes are also encompassed with the same sort of naked membrane, which is very thin, generally of the breadth of a shilling, and the broader this spreads, the greater is the value set upon them. When this membrane round the eye is thick and broad, it denotes the carrier to be a good breeder, and one that will rear very fine young ones. The breeders of fancy-pigeons are unanimous in giving this bird the title of "the king of the pigeons," on account of its graceful appearance and uncommon sagacity. They also attribute to the carrier the following twelve properties: three in the head, three in the eye, three in the wattle, and three in the beak. The properties of the head consist in its flatness, straightness, and length; for instance, when a carrier has a very flat skull, a little indented in the middle, with a long narrow head, it is greatly admired; and if the reverse, it is termed barrel-headed. The eye of the carrier should be broad, circular, and of an uniform appearance, for if one part of the eye appears to be thinner than the other, it is a great imperfection, and is called pinch-eyed; but when the eye is equal and full, and free from irregularities, it is a rose-eye, and is very valuable. The wattle should be broad across the beak, short from the head towards the point of the bill, and leaning a little forward from the head; for if it lies flat, it is in great disrepute, and is said to be peg-wattled. This has caused some artful people, in order to impose upon the less knowing, and increase the price of an imperfect bird, to artfully raise the hinder part of the wattle, fill it up with cork, and bind it in with fine wire, in so neat a manner as not to be easily detected, particularly by those who are unskilled in the breed of fancy-birds. The beak of the carrier should be long, straight, and thick: the straightness of the bill is a great addition to its length, and if it is the least out of shape in this respect, it is termed hook-beaked, and is lightly esteemed. It should also be thick, and of a black colour, which is a great recommendation; but, when it falls short in this particular, it is called spindle-beaked, which decreases its value. The length and thinness of its neck are so eminent a mark of its elegance, as not to be passed over in silence; some call this a property, and, indeed, it greatly increases the beauty of this broad-chested bird, and more especially so when the pigeon carries his head rather backward, as it shews itself to great advantage. The plumage is generally either dun or black, though there are whites, blues, and pieds, of each feather: the dun and black agree best with the above-described properties; yet the blues and blue pieds, being very scarce, are great rarities, consequently of great value.

This kind of fancy-pigeon was originally bred at Bassora, an ancient city of Persia, and from thence transmitted to Europe: they got the name of *carriers*, from having been used to convey intelligence by letters, from one place to another. These birds are first taken from the place where they were bred, to the place from whence they are to return with intelligence; and the desire of food, or, of being with their young, are the incitements which impel their swift return. The letter, which should be on thin paper, must be gently tied round the body, in such a manner as not to incommode the bird's flight; or if the note be small, it may be tied to the leg; and the bird is then set at liberty to return. The winged messenger no sooner finds itself at large, than its love for its progeny and native home influences all its motions. It immediately rises to an almost imperceptible height, and then, with great certainty and exactness, darts itself by some unknown intuitive principle towards its native spot, which is frequently at the distance of many miles, bringing its message home to the person where it was bred. By what means they discover the place, or by what compass they are conducted in the right way, is equally mysterious and unknown, but it has been proved, by experiment, that they will perform a journey of forty miles in the space of one hour and a half; a degree of dispatch three times quicker than the swiftest four-footed animal can perform. This method of sending dispatches was formerly in great vogue in the east; and at Scanderoon till very lately, as Dr. Russell informs us. It was commonly used there on the

the arrival of a ship, to give the merchants at Aleppo a more expeditious notice than could be devised by any other means.

Extraordinary attention was formerly paid to the breeding and training of these pigeons, in order to be sent from governors in a besieged city to generals that were coming to succour it; from princes to their subjects with the news of some important transaction; or from love sick heroes to their distant and desponding fair ones. In this country these aërial messengers have been used to notify to distant friends the exit of some unhappy criminal; like as was a custom among the ancient Romans, to let fly an eagle from the funeral pile, to make his apotheosis complete. In the east, they formerly kept relays of these birds, in constant readiness to carry expresses to all parts of the country, where they had been previously and purposely bred. When the governor of Damietta heard the news of the death of Orillo, he let fly a pigeon, under whose wing he had fastened a letter; this flew to Cairo, from whence a second was dispatched to another place, as was customary; so that the death of Orillo was made known to all Egypt in the space of a few hours. But the native use of these winged messengers was known in much earlier times: Anacreon informs us, that he held a correspondence with his lovely Bathyllus by a dove. Taurosthenes, by means of a pigeon, which he caused to be decked with purple, sent the news to his father, who lived in the isle of Ægina, of his victory in the Olympic games, on the very day he had gained it. When Modena was besieged, Brutus within the walls kept an uninterrupted correspondence with Hirtius without, by the assistance of pigeons; setting at nought every stratagem of the besieger, Antony, to stop or retard these aërial couriers. In the times of the crusades there are many instances of these birds being also made useful in the service of war. Tasso relates one during the siege of Jerusalem; and Joinville another, during the crusade of St. Louis.

To train a pigeon for this purpose, take a strong full-fledged young carrier, and convey it in a basket, or bag, about half a mile from home, and there turn it loose; having repeated this two or three times, then take it two, four, eight, ten, or twenty, miles, and so on, till it will return from the remotest parts of the kingdom. If they are not practised when young, the best of them will fly but insecurely, and stand a great chance of being lost. The pigeon intended to be sent with the letter should be kept in the dark, and without food, for about eight hours before it is let loose, when it will immediately rise, and turning round, as is their custom, will continue on the wing till it has reached its native home.

The HORSEMAN.—It is a matter of dispute whether the horseman be an original pigeon, or only an hybrid strain, got between a tumbler and a carrier, or a powter and a carrier, and so bred over again from a carrier; for it is certain the more frequently this is performed, the stronger and more graceful the horseman becomes. There is a species of this sort brought from Scanderoon, famous for the rapidity of their flight, and the vast distance they will go; which is the only incident that seems to support the opinion that they are an original strain; but this does not obviate the difficulty, for they may be bred after the same manner at Scanderoon, and so imported into Europe. This bird is in shape and make very like the fancy-carrier, only less in all its proportions; its body is smaller, its neck shorter; neither is there so much incrusted flesh upon the beak and round the eye, so that the distance between the wattle and the eye is much more conspicuous in this pigeon than in the carrier. They are also more subject to be barrel headed and pinch-eyed. This species is decorated with a variety of colours; but the most distinguished are the blue and blue pieds, which generally prove the best breeders. These pigeons, especially when young, should be regularly flown twice a-day, and, as they gain strength, should be let loose, and put on the wing, without any others in company, and they will fly four or five miles in a few minutes, sweeping over a very large circuit in an hour or two, and is what the fanciers term going an end.

The DRAGOON.—This fancy-pigeon was originally bred between a tumbler and a horseman, and the ablest fanciers are unanimous in their opinion of its being a hybrid strain, and that by frequently matching their breed to the horseman, they acquire great strength and agility. This pigeon is an excellent breeder, and makes a good nurse; for which reason they are frequently kept as feeders for rearing young powters, Leghorn runts, and some other pigeons, which either breed so fast that they cannot give their young ones due attendance, or are destitute of that natural fondness which is the principal characteristic of this bird. The dragoon is a lighter and smaller pigeon than the horseman, and is said to be more rapid in its flight for ten or twenty miles; nevertheless, if the horseman be well bred, it will always distance the others at a greater number of miles. They should be flown and trained whilst young, in the same manner as the horseman. Amongst the several remarkable instances of the celerity of the flight of this bird, there is one supported by undeniable testimony, of a dragoon that flew from Bury St. Edmunds to London, which is seventy-six miles, in two hours and a half.

The FANCY TUMBLER.—This pigeon derives its name from an intuitive instinct peculiar to its species, which is their extraordinary motions as they are rising in the air, effected by turning themselves over backward, much in the same manner that an expert genius in tumbling performs what is called the back spring. Some fanciers are of opinion that the celebrated almond tumbler cannot perform this manœuvre; but we are assured that they perform this motion with as great alertness as any other tumbler. The most prized fancy tumbler is a very small pigeon, body short, thin neck, full breasted, with a short round head, and small beak, and the irides of the eyes should be of a clear pearl colour; indeed if the tumbler be without any particular blemish, there is no difference between it and the almond tumbler, except in the plumage. These birds by their flight afford great satisfaction to the breeders of fancy pigeons; for, besides the pleasure they give by their tumbling, they will frequently rise to such an amazing height in the air, as to be almost imperceptible to the keenest eye; and there is one peculiar property belonging to them, that they will not ramble like the horseman, but if good birds, and familiarized to each other, will keep such close company, that a flight of a dozen may be almost covered with a handkerchief. At this height, especially if the weather be warm and clear, they will continue upon the wing for four or five hours upon a stretch; it is reported that some well bred tumblers have flown for nine hours successively, when they have been up at their highest pitch; the favourite sort seldom tumble but when they are beginning to rise, or when they are coming down upon a pitch. The Dutch tumbler nearly resembles the English, but is larger, with a more prominent head, and a circle of a thin skin round the eye, like that of a dragoon, and is frequently feather-legged; but the skin round the eye gives great disgust to some fanciers. It is said that they are apt to tumble immoderately, and to lose ground in flying, by sinking too low among the rest of the flight, which is a great fault. The genuine English tumblers are almost always white, blue, or black; for which reason it is the opinion of experienced breeders, that most of the valuable mixed feathers have been introduced by a union with the Dutch. This pigeon displays in its plumage a charming variety of colours, as reds, yellows, duns, blues, blacks, whites, silvers, and in short, a delightful composition of all these colours mixed or interspersed with the white. There is a variety of this pigeon known by the name of bald-pated tumblers, the plumage of which consists of a great diversity of colours; they have a pearl eye, a white head, with a white flight and tail, and are very good flyers. When they are

aloft in the air, in fine clear weather, the contrast of the feather shews, if the distance is not too great, and they make a very pleasing appearance; but the blue ones have gained the greatest reputation for their lofty flight. There are also some called black or blue-bearded, that is, when either of those colours are ornamented with a long dash of white, reaching from the under mandible and cheek, a little way down the throat: when this is well shaped, and they are clean in the flight and tail, they are esteemed very handsome birds.

To raise a flight of tumblers, they should be kept in a loft by themselves, and not be suffered to have any connection with other pigeons; for if they are once familiarized to fly with others, they will by degrees drop their own flight, when they perceive their company scaling in the air beneath them; and by this means lose one of their most valuable qualities. No expence should be spared in the purchase of one or two birds that have been used to lofty flying; for they will be of infinite service in training the young ones to soar aloft. When the pigeons are well acquainted with their habitation, turn them loose, and put them upon the wing once a-day only, and that without any other company; a clear morning, especially for young birds, is the properest time; when after having exercised themselves, and are coming down, strew a little hemp seed, or rape and canary, to invite them in, and then confine them for the rest of the day. According to the observations of some breeders, there are particular times when a tumbler will take a more extraordinary flight than usual, as when she sits upon eggs, and a short time after having fed off her soft meat; and, although there is no specific reason to be assigned for this, yet it has been repeatedly confirmed by occular demonstration. When crows, swallows, or other birds, are seen wantonly sporting at a vast height in the air, is another time when tumblers will make a very extravagant flight, both for height and length of time; but this may be readily accounted for, there being always at such a time something predominant in the temperament of the air, agreeable to the genius of those birds that take pleasure in the upper regions of the atmosphere. The fancier should never let loose his tumblers on a misty morning, or when there appears the least sign of a rising fog; for by these means they are deprived of the sight of their habitation, and many a good flight are broke and lost. High winds are also detrimental to a flight of pigeons, by forcing them too far from home, and causing them to stay out all night, so that, if they are not quite lost, they are exposed to various accidents.

The Almond Tumbler.—This fancy bird is by some called the carmine tumbler, though it is generally known, and called by the name of the almond tumbler, but for what reason the most experienced fanciers are at a loss to explain. It is a very beautiful and valuable species, and derived its origin from the common tumblers, by being judiciously matched so as to sort the feather, viz. yellows, duns, whites, blacks, black-grizzled, black-splashed, &c. but, as these require a length of time, they are not attainable without patience and long perseverance; however when they are brought to perfection, they are esteemed the greatest curiosity in the whole breed of pigeons. Though the ancient fanciers gave the title of king of the pigeons to the carrier, yet so great a favourite is the almond tumbler with the moderns, that many of them are for transferring the title to the latter, on account of the superior beauty of its plumage. It requires good judgment and nice observation to be acquainted with the true qualities and perfections of the tumbler species; their charming variety of feather certainly exceeds every other of the fancy pigeon tribe. Some of these birds are so magnificently elegant in their plumage, that the rump, tail, back, and wings, have been compared to a bed of the finest and best broken tulips, or to a piece of the highest polished Egyptian marble; for the more they are variegated in the wing and tail, especially if the ground be yellow, the greater is the value set upon them. Those of a fine bright yellow ground have always the precedence of other colours, it being the hardest to acquire. To be complete in feather, the rump, back, and breast, must be variegated, and the wings not barred. There are some of these pigeons curiously intermixed with the three colours only, that compose the carmine or almond, as yellow, white, and black; but these are very scarce. The almond tumbler never arrives at its full beauty of feather till it has moulted several times, and what is remarkable, it increases in beauty every year; but in the decline of life, when very old, it changes to a mottled, splashed, or some other colour. Some fanciers pair a yellow, a splashed, or black grizzle, with an almond, and by that means lay a good foundation to heighten the colours; those of a black colour bred from almonds, are generally better shaped in the beak and head than the almonds themselves, and the tail and wings have frequently a strong glow of yellow; this colour paired with an almond promises to produce a fine bird. They often breed a pale yellow, or buff, and this colour is very proper to match with such as are too high grounded; and the less ash-colour or blue they have, the better; but sometimes a slight mixture of these colours will shew, even when they have been most carefully bred. Those that are ash-coloured are lightly esteemed.

The Leghorn Runt.—This, though so oddly named, is a noble large full-bodied pigeon, close feathered, short in the back, very broad chested, and frequently measures seven inches and a quarter in the length of its legs; when it walks it carries its tail raised up in the nature of a duck's, but hangs it down when he plays. It is goose-headed and hollow-eyed, with a longer neck than any other pigeon, which it carries bending in the manner of a goose; the eye is encircled with a thin membrane, broader than that of the Dutch tumbler; the beak is very short, with a small wattle over its nostril, and the upper mandible projects a little beyond the under. The Leghorn runt is a much hardier bird than many breeders imagine, but they are bad nurses, and ought not to be suffered to bring up their own young; therefore it is proper to shift their eggs under a dragoon, or some other attentive nurse, in the same manner as directed for the powter, being careful to give them a young one of the same sort to take off their soft meat, and by this method they will succeed very well. The genuine breed is at present very scarce in this country, and what is remarkable of all the different species of runts, is, that they increase in size till they are three years old. The pairing of them with the Spanish runt greatly improves the size of the breed, and makes them increase the faster; some of this sort when brought to table have appeared as large as a puller. One has been killed that weighed two pounds eight ounces avoirdupoise. As to their plumage, they are frequently of a grizzled colour, carmined round the neck: but those most esteemed are either red, white, or black-mottled. This species of the runt is of greater value than any other kind of runts. It was originally bred at Pisa, in Tuscany, and from thence imported into England.

The Spanish Runt.—This pigeon came originally from a sea-port of Spain, whence the name of Spanish runt; it is a short, thick-legged, loose-feathered, bird, with a remarkable long body, some of them measuring twenty-three inches from the apex of the bill to the end of the tail; and it does not carry itself so upright as the Leghorn runt. The feathers of this are so uncertain, and of such a variety of colours, that a judgment cannot be formed of the sort by the colour, though some of the best are reported to be of a blood-red, or mottled colour. This bird being so very short-legged, is the cause of its breaking its eggs by sitting too heavy on them in the nest; to remedy this misfortune some put a pair of neat chalk or ivory eggs into the nest, and by that means prevent the birds from sitting too heavy on the real eggs.

The Runt of Friesland.—This is a native of the United Provinces. It is somewhat larger than a middle-sized runt; its feathers are all inverted, and stand the wrong way;

way; if this pigeon has its fanciers, it must be because it is uncommon, and makes a frightful appearance; they are at present very scarce in this country. There are several other kinds of runts, as the feather-footed runt of Smyrna: it is a middle-sized pigeon, with so many feathers sprouting from the outside of its feet, as to have the appearance of small wings; some of these feathers measure four inches and a half in length; for this reason these birds ought to be kept very dry and clean, or these long feathers on the feet occasion their dragging their eggs or young ones out of their nest. There is also the large Roman runt, which is so unwieldy that it can scarcely fly; likewise the common domestic runts, which generally compose that medley of pigeons kept on purpose for the table, and are so common in inn-yards and other places as to need no description; these are good feeders, and make very useful nurses for the fancy pigeons.

The TRUMPETER.—This pigeon is nearly as big as a middle-sized runt, and is very like it in shape and make; its legs and feet are covered with feathers; the crown of its head is round like that of the finnikin and nun, only it is larger; and the larger the head, the more it is esteemed, as being usually more melodious; it is in general pearl-eyed, and black-mottled; but the surest mark to distinguish a good trumpeter is the tuft of feathers which sprouts from the root of the beak, and the larger this tuft grows, the greater is the value set upon the bird. The more salacious it is, the more it will trumpet: it derives its name from its imitating the sound of a trumpet after playing, which it always does in the spring of the year, when that genial season returns, which gives as it were new life and vigour to the whole creation; those who are fond of hearing it trumpet at other times, feed it very high with hemp seed, which makes it libidinous, and always has the desired effect. This bird, and the ensuing species of pigeons, are by the pigeon fanciers denominated toys.

The FANCY-SPOT.—From whence this pigeon derived its origin is uncertain, but it was first imported into this country from Holland; it has its name from a spot just above its beak, upon the top of its head; the tail-feathers are for the most part of the same colour with the spot, but the body is generally all white. The tail and spot in some of these birds are either yellow, red, or black; there are some blue, but these are rare; they make an exceeding pretty appearance when they spread their tails to fly, and what is remarkable in this species is, that they always breed their young of the same colour with themselves.

The LAUGHER.—This pigeon is a native of Palestine in Asia, and was brought into Europe by the ships which trade to and from Turkey. In shape and make it very much resembles a middle-sized runt; its plumage is generally red-mottled, but sometimes it is blue; and it has a very bright clear pearl eye, inclining to a white. When the cock seeks for and begins to pursue the hen, he has a kind of rough coo, like the bubbling of water poured from a jug, and then makes a rattling noise, very much like a gentle convulsive laugh, and from this it derives its names.

The NUN.—This is a small pigeon, and from the pleasing contrast in its feathers, greatly attracts the notice of the beholder; the plumage is so remarkable, that its head is almost covered with a veil of feathers, which has given it the name of nun. The plumage of its body is chiefly white; its head, tail, and the six quill-feathers of its wings, should be entirely red, yellow, or black; that is, when its head is red, its quill-feathers and tail should be red also, and, when its head is yellow, its quills and tail shoud be yellow; and, when its head is black, its quills and tail should also be of the same colour; and, agreeable to this, they are called either red-headed, yellow-headed, or black-headed, nuns; and whenever the colour of the feathers differs from these rules, they are termed foul; for example, should a red-headed bird have a black, or any different colour in its head, except red, it would be termed foul-headed; or a white feather in its wing, it is then foul-flighted; and in like manner with the yellow and black-headed ones: it is to be observed that most of them have a few foul feathers, but when this happens in the least degree, it decreases their value, though they often seem to rear as pure feathered as those that are perfect. The nun should have a pearl eye, with a small beak and head; its head should be covered with a hood of white feathers, rising from the back part of the head, and the larger this tuft or hood is, the handsomer is the appearance of the bird.

The HELMETED FANCY PIGEON.—This curious and beautiful bird is in great estimation in Holland, where infinite pains are taken in crossing them, for the purpose of producing elegance and uniformity in their colours. It is a small pigeon, with short red legs, and receives its name from the head being ornamented with a cap or covering of fine soft feathers, terminating in a short tuft behind. The great art of the fancier in raising these birds to a perfect plumage is, to bring the helmet, tips of the wings, and tail, to one uniform correspondent colour, either yellow, red, blue, green, or black; the lower part of the back, rump, and shoulders, are usually mottled with all these colours; but the breast and belly are either a beautiful white, or lovely rose-pink, terminated towards the neck by a collar of green, on a blue azure ground, which dies away on its back, into the marble or mottled plumage above described. Birds thus perfected in their feather by a number of crossings, are of extreme value, and well reward the fancier for his long perseverance and ingenuity. Indeed the elegant plumage of this pigeon baffles all description, and nothing but the eye, or the pencil of an ingenious artist, can appreciate or express its beauty.

The JACOBINE.—This fancy-pigeon is usually called the jack; it is a pretty bird, but the genuine breed has been greatly degenerated by an imprudent mixture with the ruff, with a view of improving the chain by the length of the ruff's feathers; but by this ill-judged practice the chain is almost broken. The bird bred larger is much flimsier in its hood and chain, with an additional length of beak; in a word, it is worsted in all its original properties; for the real jacobine is one of the smallest pigeons, and the less they are the more they are valued. It has a range of inverted feathers on the back of its head, which turns towards the neck, like the cap or cowl of a monk, whence this bird derives its name of jacobine, or capper, as some call it. The upper part of this feathered covering is called the hood, and the more compact and close this ornament grows to the head of the bird, so much the more does it enhance its value among the curious. The Dutch stile the lower part of this range of feathers the cravat, but with us it is called the *chain*. The feathers which compose this chain should be long and thick, so that by laying hold of the bill, and giving the neck a gentle stretch, the two sides should lap over each other, as has been often experienced in some of the best fancy birds of this species; but real good ones are very scarce in this country. But though these have been much neglected with us, our neighbours, the Dutch and French, breed them to great perfection. The real jacobine is possessed of a very small head, with a short bill, and clear pearl eye. As to its plumage, there are yellows, reds, mottled, blues, and blacks; though the yellow birds always claim the precedence; yet of whatever colour they prove to be, they must always have a white tail, white quill feathers, and a clean white head; the legs and feet of some of them are covered with feathers, others are naked; but this is of no signification, as each sort has its admirers. Dealers in pigeons, like dealers in horses, practise various arts to take in the unwary, and impose upon the credulity of the less knowing; and they have a method of artificially raising the chain and hood of this pigeon, which they term coaxing; this they do by clipping the feathers at the

the hinder part of the head and neck, and constantly stroaking the chain and hood towards the head. Besides, when they find it necessary, they cut out a small piece of skin from between the chest and the throat, and immediately sew it up again, by which means the chain becomes closer; and some of the dealers in this art make an indifferent bird fetch a good price.

The RUFF.—There is so great a similarity, both in shape and make, between the jacobine and this bird, that the latter has been frequently sold for the former; but the ruff has a longer beak and larger head; it is also a larger pigeon; the irides are in some of a gravel, in others of a pearl colour; the chain does not flow so near to the shoulders of its wings, though both the hood and chain are longer, but are not so close and compact as the others, and are easily disturbed with every puff of wind; they likewise fall more backward off the head, in a rumpled discomposed form, and from this the pigeon receives its name. The plumage is so similar to that of the jacobine, that it is not at all surprising, that those who are not well acquainted with the properties of the true jacobine, should be put off with a ruff in its place.

The TURBIT.—This fancy pigeon is supposed to derive its name from a corruption of the word *cortbeck*, or *curtbeke*, as it is called by the Dutch; which seems to be derived from the French *court-bec*, and signifies a short bill, for which this pigeon is remarkable. It is a small bird, a little bigger than the jacobine; has a round button head, and the shorter the beak the better: it has a tuft of feathers growing from the breast, which opens and spreads contrary ways, sprouting out like the chitterlin of a shirt: this is called the *purle*; it has also a gullet, which reaches from the beak to the purle; this pigeon is admired according to the largeness of its purle. As to the plumage, there are yellows, duns, reds, blues, blacks, and some that are chequered; the back of its wings and the tail should be of one uniform colour, the yellows and reds excepted, whose tails must be white; and there ought to be bars of black across the wings of the blue coloured ones; but the rest of the body and the flight feathers ought to be white. The fanciers term them yellow-shouldered, red-shouldered, or blue-shouldered, turbits, agreeable to the colour they are of. They are very elegant birds, and make good flyers, if properly trained when young.

The OWL.—This fancy pigeon has a mild, pleasant, insinuating, aspect, and is rather less than a jacobine, with a gravel eye, and a very short hooked bill, much resembling that of an owl; from which circumstance the bird derives its name. The purle in this species is rather larger, and opens and expands itself more like a rose, than that of the turbit; but in every other respect, both in shape, make, and plumage, this is so very like the turbit, the bill excepted, as to render any further description superfluous. Particular care ought to be taken, that the breeding places where these birds sit, are made dark and private, for they are naturally so wild and timid, that the least noise affrights them, and when disturbed they will fly off their eggs. This seems to dispute the palm, in point of beauty, with the jacobine.

The CAPUCHIN.—This, like the jacobine, receives its name from another order of bare-headed monastics: it has a longer bill than the jacobine, and is somewhat larger in its body; it has no chain, but a very pretty hood; and is in plumage and other properties the same as the jacobine. Some fanciers assert it to be a distinct species, others as confidently affirm it to be bred between a jacobine and some other pigeon. It is beyond a doubt that a jacobine and another pigeon will produce a bird so exactly similar, as greatly to embarrass the fancier in distinguishing between it and what they term their separate species. Though all the pigeons of the toy kind have their respective admirers, yet the capuchin is but lightly esteemed in general.

The FINIKIN.—This pigeon in make, shape, and size, differs but little from the common runt; the crown of its head is formed like the head of a snake; it has a gravel-eye, with a tuft of feathers growing on the back part of its crown, which falls down its neck, hanging like a horse's mane; it has a clean leg and foot, and its plumage is always blue or black-pied. This pigeon, when salacious, is addicted to very singular antics; it first rises over its hen, spreading and flapping its wings, and turns round three or four times; it then reverses, and turns as many times the contrary way. Some fanciers are prejudiced against this sort, for their whimsical gestures, as being apt to teach the others ill habits.

The TURNER.—This fancy-pigeon is, in many respects, like the finikin; but it is not snake-headed, and the tuft on the back part of the crown is wanting; and when the sportive fit is on it, and it plays to the female, it turns only one way, whereas the finikin turns both.

The BROAD-TAILED SHAKER.—This pigeon, especially when salacious, has a singular tremulous motion, or shaking in the neck, which, joined to the breadth of its tail when spread, gives it the name of *broad-tailed shaker*. This bird is possessed of a long, taper, handsome, neck, which it erects in a serpentine form, rather leaning towards its back, somewhat like the neck of a swan: it has a very short beak, and is exceedingly full-breasted, with a tail composed of a number of feathers, seldom less than twenty-four, and never exceeding thirty-six, which it spreads like the tail of a turkey-cock, and raises it up to such a degree, that the tail appears joined to the head, in the nature of a squirrel's, and from hence some fanciers give it the name of *fan-tail*; but when it is so crowded with feathers, it occasions it frequently to drop its tail, and hinders it from throwing it up to meet its head, which is an imperfection never to be overlooked, be all its other properties ever so perfect; though a very large tailed bird of this species, which carries its tail according to the rules of the breeders, is deemed a rarity, and of great value. Though the general colour of its plumage is entirely white, yet there are yellow, red, blue, and black-pieds, and some all blue; but the whites are the favourite birds, as they have by far the noblest carriage, both in their tail and head. There is another kind of broad-tailed shaker, which differs in nothing from the above, except in the neck, which is shorter and thicker; but the shaker with the longest neck is by far the handsomest and most valuable bird.

The NARROW-TAILED SHAKER.—Fanciers are divided in opinion concerning this pigeon; some say it is a distinct species, others that it is only a hybrid strain between the broad-tailed shaker and some other pigeon; its back is longer, and its neck shorter and thicker, than that of the last described bird; it has also a less number of feathers in its tail, which it does not spread out so much as the other does, but lets them fall, as it were, double, the one side folding over the other in the nature of a fan when three parts opened, and is apt to fall into the fault of letting its tail droop. The colour of its plumage is usually white, though, like the broad-tailed shaker, there are some of various colours; there are also some almonds of this sort, but they are a great rarity.

The BARB.—This pigeon is originally a native of Barbary in Africa, and receives its name from that country; but the fanciers call it by no other name than the barb. It is rather larger than a jacobine, has a short thick bill, like a bull-finch, incrusted with a small wattle, and a naked circle of a thick spongy red skin round its eyes, like that of the carrier; when the feathers of the pinion are inclinable to a dark colour, the irides are of a pearl colour; but when the pinion feathers are white, the irides are red, as is observable in some other birds; the redder in colour, and the wider the circle of tuberous flesh round the eye, the greater is the value set upon the bird, though this circle is very narrow at first, and does not arrive at its full size till the fourth year. Some of this species are ornamented with a pretty tuft of feathers, sprouting,

ſprouting from the back part of the crown of its head, reſembling that of the finikin; but others are without any. The plumage of the original barb is either dun or black; for though there are pieds of both theſe colours, fanciers in general ſet but little value on them, as they are ſuppoſed to be bred from a barb and a Mahomet.

The MAHOMET.—This bird is of a beautiful cream-colour, with black bars acroſs its wings; its feathers are very remarkable, for though the outſide, or ſurface of them, is of a cream-colour, yet the underſide, or that part next the body, is of a dark ſooty brown, as is alſo its ſkin and down feathers, which is peculiar to this pigeon. It is about the ſize of a turbit, and, inſtead of a frill, has a fine gullet, with a handſome ſeam of feathers; it has a thick ſhort head, with an orange-coloured eye, encompaſſed with a ſmall naked circle of black fleſh; its bill is furniſhed with a ſmall black wattle, and is ſhort and thick. Some are of opinion that this bird is of a hybrid ſtrain, between a turbit and ſome other pigeon. It takes its name, however, from Mahomet the impoſtor, author of the Alcoran. He procured a beautiful young pigeon of this ſpecies, which, from the extraordinary whiteneſs of its plumage, was no degrading ſymbol of the celeſtial dove. He brought it up by hand, making it ſo tame and familiar, that he taught it to take its food out of his ear, which might eaſily be done, eſpecially if he put hemp or rape-ſeed in his ear, which all pigeons are immoderately fond of, till at length the pigeon frequently flew upon his ſhoulder, putting its beak into his ear in ſearch of its food. This bird he perſuaded the Arabians was the viſible appearance of the Holy Ghoſt, whiſpering and dictating the words of the Alcoran, and teaching him the precepts of his new law.

The LACE-PIGEON.—This fancy-pigeon is in great plenty in ſome parts of Holland, where it was originally bred; though at preſent very ſcarce in England. It is about the ſize of a common runt, and not unlike it in make and ſhape, but its colour is always white. It differs from all other pigeons, whoſe plumage is compoſed of a cloſe ſmooth feather; but the web or fibres of the feather in this bird, appear unconnected with each other, and, as it were, diſunited throughout its whole plumage: in ſhort, the make of its feather is very peculiar, and gives the bird a pretty though ſingular appearance, as if covered with lace; and from hence it derives its name.

The FRILL-BACK.—This pigeon, like the laſt deſcribed, is remarkable only for the peculiar turn of its feathers, all of which look as if they had been diſtinctly and purpoſely raiſed at the end with a ſmall round pointed inſtrument, in ſuch a manner as to make a ſmall hollow in each of them; or, as if the bird had been under the hands of ſome modern hair-dreſſer, and had its plumage frizzled and curled at the ends. It is in ſize leſs than the common runt, though very much like it in ſhape; and its plumage is always white.

THE propagation and domeſtication of pigeons, being confeſſedly an uſeful as well as profitable amuſement, it becomes neceſſary that we ſhould give ſome inſtructions for that purpoſe. The pigeon-houſe, or dove-cot, ſhould be erected on a dry and elevated ſituation, and made ſecure againſt vermin of every deſcription. Thoſe of a round form are, on many accounts, preferable to thoſe which are ſquare. The coves or neſting-boxes ſhould be ſo contrived that the pigeons may ſit nearly in the dark, which is a ſituation they much covet. Neſting-places made in the walls of the dove-cot were highly eſteemed, till the invention of earthen pots, or baſkets; for it has ſometimes happened that thoſe built in the walls have had ſome chink or aperture, through which rats or other vermin have found means to intrude; but the pot being of one entire piece, keeps them out, except it be at the mouth. There is another ſort made of round tiles, placed upon each other, in external appearance not unlike the ſhape of a water-pipe; and theſe are ranged about the diſtance of half a foot from each other, fitted upon bricks ſuited to the circular form of the tiles, which ſerve alſo to part the neſts; but as theſe are not ſo convenient as the pots, they are ſeldom uſed. As the pigeon does not always build a neſt, it is neceſſary to have a ſmall cavity ſunk at the bottom of the coves, to prevent the eggs from rolling aſide; for, though the pigeon may ſit well in her neſt, if this accident happens they will certainly be ſpoiled: particular care ſhould alſo be taken, that the coves in the walls be of a ſize ſufficient for the cock and hen to ſtand upright in. The firſt range of neſting-places ſhould be about four feet from the ground, the wall below them being made very ſmooth, and ſheathed with tin, that the rats may not be able to reach them. Theſe neſts, or coves, ſhould be placed chequer-wiſe, and not directly over one another; nor ſhould they be raiſed any higher than within one yard of the top of the wall; and it is cuſtomary to cover the upper row of theſe coves with a board ſet ſloping, and projecting at leaſt a foot and a half from the wall, for fear the rats or ſtoats ſhould find means to get down from the top. Before the mouth of every cove, which muſt be built even with the wall, ſhould be fixed a ſmall flat ſtone, to project out of the wall three or four inches, for the pigeons to reſt upon in going in or coming out from their neſts, or when the weather obliges them to remain priſoners at home. Beſides the dove-cot, there are pigeon-houſes of different forms and ſizes, built of various materials, but moſtly of wood, erected in court-yards, farm-yards, and the yards of inns; but in what manner ſoever they are contructed, the ſame advice is indiſpenſably neceſſary to be complied with, in defending the pigeons from the nocturnal depredations of the weazel, pole-cat, rat, &c.

The months of May and Auguſt are the moſt proper ſeaſons to ſtock the pigeon-houſe; young pigeons being then ſtrong and plenty, and ſoon in a condition to yield profit to the breeder. As to the number neceſſary to ſtock a pigeon-houſe, that depends upon the inclination, ability, or convenience, of the purchaſer; if few pigeons are put in, it will be ſome time before any advantage is reaped, for none muſt be taken out of the pigeon-houſe before it is well ſtocked. The common blue pigeon, being both prolific and hardy, is moſt worthy the attention of country people, as it is generally remarked that the ſmall pigeons rear the greateſt number of young ones; but, when the breed of pigeons becomes too ſmall, it will be proper to intermix a few of the common tame ſort; in the procuring of which, care muſt be had not to ſelect thoſe of glaring colours, for the others will not eaſily aſſociate with them. On farms contiguous to large towns, where feed is ſcarce, though the maintenance is expenſive, it will turn to good account to keep a number of the large tame pigeons; for, as they hatch early in the ſeaſon, the young are always fat and valuable. On farms more remote from cities and towns, where feed is in plenty, the common pigeons are greatly preferable; for, as they increaſe very faſt, and are kept at a ſmall expence, their numbers over-balance the ſuperior ſize of the others.

Pigeons ſhould be kept very clean, for, though they make a great deal of dung, they do not like to live in it; care ſhould be taken to prevent ſtarlings and other birds from viſiting their neſts, as they will ſuck or deſtroy their eggs; alſo that there are not too many cocks in proportion to the hens, for this is a conſtant ſource of miſchief, as the cocks diſagree and drive each other away, which proves detrimental to the ſtock. Pigeons are kept to beſt advantage near thoſe lands which are ſowed with horſe-beans and grey-peaſe; for theſe pulſe being ſown early in the ſeaſon, the bird by feeding on them acquires great vigour, and hatches its young early in the ſeaſon, which is a beneficial circumſtance to the owner. Barley and buck-wheat are very ſtrengthening food, and cauſe them to lay frequently. Tares and white peaſe are alſo very proper for pigeons. Though the common ſort will provide

vide for themselves through the greater part of the year, they must be fed in hard weather; and also towards the end of June, which is stiled by the husbandmen, *benting time*, from the grass called *bent*, the seed of which is then ripe, and is almost the only food the pigeons can get at, as the pease are not sufficiently mature. At this season pigeons in general have many young ones, and as the seed of the bent-grass is not cherishing, it is necessary to supply them with food during the time it lasts, which is while the pulse ripens; and as extreme hard frosts are seldom of long continuance, the keeping of pigeons in the country turns to good account. Pigeons usually take rest at noon, and as it agrees with them, they should not be disturbed; mornings and evenings are the best times for giving them their food; they should be plentifully supplied with water, kept free from vermin, and the pigeon-house frequently strewed with gravel.

The method of supplying the young with food from the crop, in birds of the pigeon kind, differs from all others. The pigeon has the largest crop of any bird of its size, and which is also quite peculiar to the kind. In two that were dissected, it was found, that upon blowing the air into the windpipe, it distended the crop or gullet to an enormous size. Hence the power these birds have of swelling the crop with air; and those called powters and croppers distend it in such a manner, that the bird's breast frequently appears larger than the body. The necessity for this mechanism in these species is pretty clear: pigeons live entirely upon grain and water, these being mixed together in the crop, are digested in proportion as the bird lays in its provision. Young pigeons are very ravenous, which necessitates the old ones to lay in a more plentiful supply than ordinary, and to give it a sort of half maceration in the crop, to fit it for their tender stomachs. The numerous glands, assisted by air, and the heat of the bird's body, form the necessary apparatus for secreting a milky fluid; but as the food macerates, it also swells, and the crop is considerably dilated. If the crop was filled with solid substances, the bird could not contract it; but it is obvious the bird has the power to compress its crop at pleasure, and by discharging the air, can drive the food out also, which is forced up the gullet with great ease. The young usually receive this tribute of affection from the parent's crop three times a-day. The male for the most part feeds the young female, and the old female performs the same office for the young male. While the young are weak, the old ones supply them with food macerated suitably to their tender age; but, as they gain strength, the parents give it less preparation, and at last drive them out, when a craving appetite obliges them to shift for themselves; for, when pigeons have plenty of food, they do not wait for the total dismission of their young; it being a common thing to see young ones fledged, and eggs hatching, at the same time, and in the same nest.

Though the constancy of the turtle-dove is proverbial, the pigeon of the dove house is not so faithful; and, having become subject to man, puts on incontinence among its other domestic qualities. Two males are often seen quarrelling for the same mistress; and, when the female encourages the freedoms of a new gallant, her old companion shews visible marks of his displeasure, quits her company, or if he approaches, it is only to chastise her. Many instances have been known, when two males, being dissatisfied with their respective mates, have thought fit to make an exchange, and have lived in peace and friendship with the new objects of their choice.

Pigeons are very quick of hearing, have a sharp sight, and when pursued by the hawk or kite, and obliged to exert themselves, are exceedingly swift in flight. It is the nature of pigeons to love company and assemble in flocks, to bill in their courtship, and to have a plaintive note. M. Duhamel asserts, "that pigeons do not feed upon the green corn, and that their bills have not strength enough to search for its seeds in the earth; but only to pick up the scattered grains, which would be parched by the heat of the sun, or become the prey of other animals." He further adds, "that from the time of the sprouting of the corn, pigeons live chiefly upon the seeds of wild uncultivated plants, and therefore considerably lessen the quantity of weeds that would otherwise encumber the ground; as is manifestly evident from a just estimate of the quantity of grain necessary to feed all the pigeons of a well-stocked dove-house." They are, however, extremely voracious where opportunity is allowed them; insomuch that an acre sowed with pease, and the wet weather preventing their being harrowed in, almost every pea was taken away in half a day's time by a flock of pigeons. It is to be observed, that where the flock falls, they soon fill themselves, and carry to their young, then return again where they first rose, and so proceed regularly over a whole piece of ground. This gave the hint to steep pease in an infusion of coculus indicus, or some other stupifying drug; which, when thus prepared, and thrown where pigeons are observed to use, they will devour them greedily, until, becoming quickly intoxicated, they lie motionless on the ground, and may be picked up in great numbers. But of this the pigeon in a short time recovers.

Various are the disputes concerning the longevity of pigeons, for it is difficult to know how to distinguish their age, though they seldom live more than eight years, and continue prolific for the first four only; after which they only encumber the house, and deprive the breeder of the advantage he might reap by others that are younger. In order to fatten young pigeons for the table in winter, take them before they can fly, when they are stout birds, and pull the largest quill feathers out of their wings, which will confine them to their nest, and the substance of the nourishment they receive, not being diffused for want of exercise, soon fattens them. Farmers, for their own sakes, should be careful that the pigeon-house is kept clean, and the dung preserved; it being the finest manure in the world, and claims precedence of the dung of all other animals. It is endued with a nitrous quality, and is of a very hot nature, which makes it an excellent soil for cold, moist, damp, grounds. In manuring land, it is frequently sown in the same manner as grain, also harrowed in with it. It is of a nature peculiarly suited to hop-grounds. Tanners make use of it in preparing upper-leathers: and it is of service in medicine.

Many and various are the means made use of by breeders of pigeons to prevent their straying from home, or being enticed away by the arts of others: but as it would be needless to insert more than is necessary, we shall confine ourselves to the most approved and useful methods now in practice. 1. Lay near the pigeon-house a barrow full of loam, reduce it to the consistence of pap, by mixing with it water, but brine is better; add to this a gallon and a half of the coarsest sand, a peck of bay-salt, and a little saltpetre. If the loam is beat up with water, it will require more salt than when brine is used for that purpose. If it is a good sandy loam, less sand will do. Where loam cannot be procured, clay will answer the purpose, but then much more sand will be wanted. The pigeons will be so fond of this little bank, as not easily to desert it. 2. Take the head and feet of a goat, boil them till the flesh parts from the bone; take this flesh and boil it again in the same liquor, till the whole is reduced to a jelly; then put in some clean potters' earth, kneading the whole together to the consistence of dough, which make into small loaves, and dry them in the sun or oven, but be careful they are not burnt; when they are dry, place them in the most convenient parts of the pigeon-house, when the pigeons will soon peck at it, and, liking the taste, will not leave it but with regret. Some make use of a goat's head boiled in urine, with a mixture of salt, cummin, and hemp. Others make a repast of millet, fried in

in honey, with the addition of a little ſalt and water; this compoſition is ſaid to have ſuch an effect on pigeons, that they will never after leave their habitation; and is of uſe in drawing ſtrange pigeons to it. But there is nothing ſuperior to the ſalt-cat, if made as follows: Take ſifted gravel, brick-maker's earth, and the rubbiſh of an old wall, a peck of each; or, if you uſe lime inſtead of rubbiſh, half the quantity will do; add to theſe a pound and a half of cummin-ſeed, a quarter of a pound of bay-ſalt, or ſaltpetre; let theſe ingredients be well mixed together, with as much ſtale urine as will make a ſtiff cement. Let it be put into old tin kettles, or ſtone jars, with large holes in the ſides for the pigeons to peck at it; let them be covered at the top to prevent their dunging upon it. When pigeons are with egg they are generally very fond of lime, and it is of great uſe in hardening the ſhell of their egg; and by this means they are kept from pecking the mortar off the tops of houſes; though the damage they do is trifling, their beak being not long enough to looſen any tile that is properly fixed. The ſalt and urine provoke their thirſt, and they being of a hot nature, it occaſions them to drink often, which is of ſervice to them. The ſtrong ſmell of the cummin-ſeed delights them much, keeps them at home, and allures others that are hovering about. The oily nature of the earth is a great help to them in the diſcharge of their ſoft meat, when they are feeding their young ones; and the gravel ſcours their gizzard, and promotes digeſtion. Pigeons are remarkably fond of ſalt, nor is there a cure for ſcarcely any of the diſorders to which they are ſubject, without the aſſiſtance of this ingredient; which proves that inſtinct the wiſe Creator beſtows on animals for the neceſſary preſervation of their welfare; and accounts for the extraordinary fondneſs pigeons have for the mortar that is found in old walls, which contains a ſalt little inferior to the common ſaltpetre; for which reaſon ſome people place cakes of ſalt, candied, againſt the walls of their pigeon-houſe.

It has always been a matter of ſome difficulty to form a right judgment in diſtinguiſhing the males from the females. In this particular ſome of the ableſt and beſt fanciers have erred; in order, therefore, to aſcertain this point, breeders have given the following rules: The cock has always a longer and ſtouter breaſt-bone than the hen. His head and cheeks are broader and fuller, and he has a bolder look than the hen. The vent in the hen, and the bone near the vent, is always more open than in the cock. In young pigeons, that which ſqueaks longeſt in the neſt generally proves to be a hen; and where there are two in the neſt, the largeſt uſually turns out to be a cock. The coo of the cock is longer, a great deal louder, and more maſculine than that of the hen; and the cock often makes a half round in his playing, which the hen ſeldom does, though a warm lively hen will ſometimes ſhew, and play very like a cock, and when libidinous will even attempt to tread another pigeon.

Though pigeons are very conſtant and faithful birds, ſeldom or never parting when once mated to each other, yet it is ſometimes attended with difficulty to make fancy-birds couple to our liking. In order to effect this, let two coops be built cloſe together, commonly named matching-places by the breeders; let there be a partition made of lath placed between them, that the birds may ſee each other, and it may eaſily be ſo contrived that the birds may feed out of the ſame veſſels; ſupply them well with hemp-ſeed, which will ſoon make them ſalacious, and when the hen is perceived to ſweep her tail and ſhew to the cock, as he plays in the adjoining pen, let her be removed to his pen, and they will immediately pair. Where the above convenience is not to be had, two large wicker-cages, placed ſide by ſide, will anſwer the ſame purpoſe. When the pigeons are thus matched, give them the liberty of the loft, and the privilege of fixing upon what neſt they pleaſe; but, if it be wiſhed to fix them to any particular neſt, make uſe of the following method: Get a machine made of lath, the length of the breeding-places, let this be incloſed with boards both at bottom and top; this machine may project as far as the loft will admit; one of the top boards muſt lift up with hinges, for the purpoſe of ſupplying them with food; this may be placed before any neſt, and the pigeons put in. After they have remained in this ſituation about a week, let the machine be removed, which ought to be done in the night, and they will not leave that neſt.

The diſeaſes to which pigeons are moſtly liable are the following: The wet-roop; in this caſe give them three or four pepper-corns, once in three or four days, and ſteep a handful of green rue in their water, and as this is very wholeſome, all the other pigeons may drink of it. The dry roop is generally known by a dry huſky cough, that always attends it, and is ſuppoſed to proceed from a cold, to which they are very ſubject, particularly during the time of moulting; to remedy this, give them every day three or four cloves of garlic. The canker uſually takes its riſe from the cocks pecking and fighting one another; though ſome fanciers ſay, that giving them water in a metal, or a tin, veſſel, will bring on this diſorder. To remove it, take burnt alum and honey, and rub the affected part every day; but, when this has not its deſired effect, diſſolve five grains of Roman vitriol in half a ſpoonful of white-wine vinegar, mix it with the former medicine, and anoint the part affected. When the fleſh or wattles round the eyes are torn and pecked, bathe them with ſtale urine for ſeveral days; if this does not prove ſucceſſful, diſſolve two drachms of alum in one ounce and a half of water, and waſh the grieved part; but, when the caſe is obſtinate, mix half an ounce of honey with twenty grains of red precipitate, and anoint the part.

Pigeons are infeſted with ſmall inſects, particularly during the ſummer months, which the fanciers call lice; when this happens, fumigate their feathers well with the ſmoke of tobacco. There is another kind of vermin which are very pernicious, and frequently prove fatal to the young ones in the neſt, eſpecially when firſt hatched, by creeping into their ears, and hindering them from thriving; to prevent this, ſprinkle the duſt of tobacco in the neſt, and alſo over the young pigeons, and it will kill theſe vermin: they are called the blacks by ſome, and by others pigeon-bugs.

The vertigo, or, as it is more commonly called, the megrims, is a diſeaſe in which the pigeon flutters about at random, with its head reverted in ſuch a manner that its beak reſts on its back. This malady is pronounced incurable by moſt fanciers, and if it baffles the power of the following medicine it is ſo: Infuſe in half a pint of water one ounce and a half of ſpirit of lavender, and a dram of ſpirit of ſal-ammoniac that has been diſtilled with quicklime; in the courſe of a day force down the bird's throat a ſpoonful and a half of this compoſition, and, if the bird finds benefit, repeat the medicine every third or fourth day, only leſſening the quantity, and in the intermediate days give it a clove of garlic, or three or four pepper-corns; if after a trial there is perceived no amendment, it will be beſt to kill it.

When pigeons do not moult freely, or are at a ſtand in their moulting, ſo that they do not throw their feathers kindly, it is a ſure criterion of a bad ſtate of health; to amend this the following method will be of uſe: Put them in a warm place, and pull out their tail-feathers, mixing a good quantity of hemp-ſeed with their common food, alſo a little clary or ſaffron with their water; though ſome prefer cochineal, or elder-berries, for this uſe. Pigeons are alſo liable to a ſcouring, particularly in moulting time, which makes them weak, faint, and thin; to remedy this, give them pump-water, with a lump of chalk in it, or force the quantity of two horſe-beans down their throat every day; if this fails, give ſome ſmith's forge water, which is very binding. The grit that remains in the trough under a grindſtone, where they grind edge-tools, is very good for a ſcouring, but muſt be uſed in ſmall quantities, it being of a very coſtive nature.

The

The distemper called the small-pox, which breaks out in eruptions or pustules, full of yellow matter, on their bodies, wings, and legs, is cured by opening the pustules, and applying burnt alum and honey, or touching them with Roman vitriol. When pigeons are sick, heavy, or drooping their wings, give them once a-day a couple of spiders rolled up in butter. When they are lame, or the ball of their foot swelled, either from cold, or being cut with glass, or other accident, spread some Venice turpentine on a piece of brown paper, put it to the part affected, and it will heal in a few days.

The flesh-wen is a fleshy tumour which arises on the joints of the legs or wings; this may be either opened or cut off; if opened, take out the kernel and wash it with alum-water; if cut off, the part may be healed with almost any salve. The bone-wen is a hard tumour, growing also upon the joints; but is very rarely cured, and the bird affected with it will not breed. Some attempt to cure it with a mixture of black soap and quicklime; but if this is suffered to lie on too long, or be made too strong, it will eat off the leg, or any other part where it is applied, it being a strong caustic. The core is a malady so called from its resemblance to the core of an apple; it is hard, and usually of a yellow colour, interspersed with red, and is mostly seated in the anus or vent. This must be ripened; to effect which, keep the pigeon open, by giving it a gentle purge of tobacco, a small quantity will do; this will sometimes make them discharge the core; if not, when ripe it must be drawn out.

These birds, particularly the common sort, are frequently afflicted with scabs on the back and breast, which make the old ones so weak that they cannot fly abroad in search of food, so that they absolutely starve the young ones; the following recipe is recommended as a cure: Take a pound of dill-seed, a pound of fennel-seed, and the same quantity of cummin-seed, an ounce and a half of assa foetida, a quarter of a pound of bay-salt, and of common salt the same quantity. Mix these ingredients with some fine clean clay, together with a small quantity of flour. This being prepared, bake it in two pots, and set it on a stand in the pigeon-house, and the birds will continue to pick it till they are cured.

Pigeons are, for the most part, nourishing food, somewhat binding, strengthening, and provoke urine; they are looked upon to be good for cleansing the reins, and to expel the gross matters that stick there. As a pigeon grows old, so proportionably does its flesh become drier and more solid, harder of digestion, and apt to produce gross and melancholy humours; and hence it is that some authors have condemned the use of pigeons, and esteem them as bad food. They agree at all times with any age and constitution; but those that are melancholy, or choleric, ought to make use of them more moderately than other persons.

Of all domestic fowls, pigeons are confessedly the most decorous, pleasing, and vivacious. The wanton dalliances practised by this bird during the time of its courtship, is in a manner very engaging and peculiar to it; whence the poets feigned it to be the symbol of love. The cock, when salacious, will, by a voice at that time exceedingly sweet and plaintive, and by several endearing and pretty gestures, woo the female, and endeavour to gain her affections; she, when complying, soon discovers it by her motions, as spreading her wings, nodding her head, and sweeping her tail; from hence they proceed to billing, that is, the hen puts her beak into the cock's, who appears as if feeding her; after this she will squat, and immediately receives his favour, by which she is rendered prolific; they will then seek for a nest, or some convenient place to deposit their eggs, into which they will carry such necessaries as best suit their purpose; some making a good nest, others hardly any at all. When the hen is near the time of her laying, the cock will follow her from place to place, not allowing her to be at peace any where but in her nest; and, during the whole time of incubation, he takes regularly his turn of sitting. After a pigeon has laid her first egg, she rests a day between, and on the following day lays another: is is customary for them to stand over the first egg, which is termed irregular incubation, till the second is laid, and then sit close, that both young ones may be hatched nearly at once: though some will sit close on the first, and by that means bring one young one two days sooner than the other. At the end of nineteen days the breeder should be careful to observe whether the eggs are hatched or not; for it sometimes happens in cold weather, or when food is scarce, that the old ones do not sit close, and the young ones, for want of a due warmth, have not strength sufficient to extricate themselves out of the shell, and so perish for want of air and proper nourishment; for the sustenance it received from the albumen of the egg, is by this time exhausted, or dried up. Whenever this happens, and the egg appears to be cracked or chipped with the exertion of the young one, break the shell all round, and help the little captive to get free.

In fabulous history we are told, that the pigeon was the favourite bird of Venus. Homer says it was the office of pigeons to provide for the nourishment of Jupiter; this fable takes its rise from the same word, which means, in the Phoenician language, either a priest, or a pigeon; for it is allowed that the curetes, or priests of Cybele, took care of the nourishment of Jupiter. The people of Ascalon had such a veneration for pigeons, that they durst not kill and eat them, lest they should feed on their own gods: and they were particularly careful of all those that were produced in their city. The Assyrians also consecrated pigeons, because they had a notion that the soul of their once famous queen Semiramis had taken its flight to heaven in the shape of a dove. Silius Italicus relates, that two pigeons formerly rested on Thebes, and that one took its passage to Dodona, where it gave the oaks the virtue of delivering oracles; the other, which was white, flew over the sea to Libya, where it perched between the two horns on the head of a ram, and gave oracles to the people of Marmorica. Philostratus says, that the pigeon of Dodona also delivered oracles: that it was of gold, seated on an oak, and attended by a concourse of people who came thither, some to consult the oracle, others to sacrifice. Sophocles also informs us, that Hercules received an oracle from the pigeons of the forest of Dodona, which foretold the period of his life.

The present existing laws for preserving and protecting pigeons are as follow: Every person who shall shoot at, kill, or destroy, a pigeon, may be committed to the common jail for three months, by two or more justices of the peace, or he shall pay twenty shillings to the poor of the parish. 1 *Jac.* c. 27. By 2 Geo. III. c. 29, any person who shall wilfully shoot at, or destroy, any house-dove, or pigeon, belonging to other persons, shall forfeit on conviction twenty shillings to the prosecutor; and if not forthwith paid, the offender may be committed and kept to hard labour for any time not exceeding three months, nor less than one month, unless the forfeiture be sooner paid; the owners of dove-cots, or other places built for the preservation or breeding of pigeons, and those appointed by them, excepted. Offender is liable only to one conviction for the same offence; and prosecutions are to be commenced and carried on with effect, within two months after the offence; and, where persons suffer imprisonment, they are not liable afterwards to pay the penalty. To steal wild pigeons in a pigeon-house, shut up so that the owner may take them, is felony. 1 *Hawk. P. C.* c. 33. A lord of a manor may build a pigeon-house, or dove-cot, upon his land, parcel of the manor; but a tenant of the manor cannot, without the lord's licence. 3 *Salk.* 248. Formerly none but the lord of the manor or the parson might erect a pigeon-house; though it has been since held, that any freeholder may build a pigeon-house on his own ground. *Rep.* 104. *Cro. Eliz.*

COLUM'BA (St.), in allusion to whose name the island of

of Iona (one of the Hebrides) received its name; Iona being derived from a Hebrew word signifying a dove. This holy man, instigated by his zeal, left his native country, Ireland, in the year 565, with the pious design of preaching the gospel to the Picts. It appears that he left his native soil with warm resentment, vowing never to make a settlement within sight of that hated island. He made his first trial at Oransay; and, finding that place too near to Ireland, succeeded to his wish at Hy, for that was the name of Iona at the time of his arrival. He repeated here the experiment on several hills, erecting on each a heap of stones; and that which he last ascended is to this day called *Carnan-chul reb-Eirinn*, or "The eminence of the back turned to Ireland." Columba was soon distinguished by the sanctity of his manners: a miracle that he wrought so operated on the Pictish king Bradeus, that he made him a present of the little isle. As soon as he was in possession of Iona, he founded a cell of monks, borrowing his institutions from a certain oriental monastic order. It is said that the first religious were canons regular, of whom the founder was the first abbot; and that his monks, till the year 716, differed from those of the church of Rome, both in the observation of Easter and in the clerical tonsure. Columba led here an exemplary life, and was highly respected for the sanctity of his manners. He is the first on record who is said to have had the faculty of second sight, for he told the victory of Aidan over the Picts and Saxons on the very instant it happened. He had the honour of burying in his island, Convallius and Kinnatil, two kings of Scotland, and of crowning a third. At length, worn out with age, he died in Iona in the arms of his disciples; was interred there, but (as the Irish pretend) in after times translated to Down; where, according to the epitaph, his remains were deposited with those of St. Bridget and St. Patrick:

Hi tres in Duno tumulo tumulantur in uno;
Brigida, Patricius, atque Columba pius.

But this is totally denied by the Scots; who affirm, that the contrary is shewn in a life of the saint, extracted out of the pope's library, and translated out of the Latin into Erse, by father Caillo Horan.

COLUM'BA NOACHI, Noah's dove, a small constellation in the southern hemisphere, consisting of ten stars.

COLUMBA'NUS, a saint and a poet, born in Ireland, and brought up to a religious life among the disciples of St Columba. He made uncommon progress in learning; and very early in life distinguished himself for poetical abilities, by the composition of a book of psalms, and a number of moral poems, intended also to be set to music. Jonas, a writer of ecclesiastical history, mentions, that Columbanus belonged originally to a monastery of the name of *Benchor*. The same monastery is mentioned by St. Bernard in his life of his friend St. Malachi; and he relates that it sent out a great number of monks, who spread all over Europe. Columbanus passed from Britain into France, and founded the monastery of Luxeville, near Besançon. He had been kindly received and patronized by king Childebert; but he was afterwards expelled out of France by the wicked queen Brunichild. He retired to Lombardy in Italy, and was well received by king Argulphus. In Lombardy he again founded the monastery of Bobio. The *Regula Cœnobialis* and *Penitentialis*, which he established in that monastery, have been published in the *Codex Regularum*, compiled by the learned Holstenius. He was cotemporary with St. Benedict.

COLUMBA'RIA, in ancient geography, an island like a rock on the west of Sicily, opposite to Drepanum; said by Zonaras to have been taken from the Carthaginians by Numerius Fabius the consul; now Columbara, with a very strong and almost impregnable citadel. *Cluverius.*

CO'LUMBARY, *s.* [*columbarium*, Lat.] A dovecot; a pigeon-house.—The earth of *columbaries*, or dovehouses, is much desired in the artifice of saltpetre. *Brown.*

COLUM'BIA, a township of the American States, in Washington county, district of Maine, on Pleasant River. It was incorporated in 1796. The town of Machias lies fifteen miles to the eastward. It is nine miles from Steuben.

COLUM'BIA, a county of the American States, in New York, is bounded north by Rhensselaer, south by Dutchess, east by the state of Massachusetts, and west by Hudson River, which divides it from Albany county. It is thirty-two miles in length and twenty-one in breadth, and is divided into eight towns; of which Hudson, Claverack, and Kinderhook, are the chief. It contained, in 1790, 27,732 inhabitants; and, in 1796, 3560 electors.

COLUM'BIA, territory of. See WASHINGTON, or the federal city.

COLUM'BIA, a post town of the American States, the capital of the Kershaw county, and the seat of government of South Carolina. It is situated in Camden district, on the east side of the Congaree, just below the confluence of Saluda and Broad rivers. The streets are regular and handsome. The public offices have, in some measure, been divided for the accommodation of the inhabitants of the lower counties, and a branch of each retained in Charlestown: 115 miles north-north-west of Charlestown, thirty-five south-west of Camden, eighty-five from Augusta, in Georgia, and 678 south-west of Philadelphia. Lat. 34. 1. N. lon. 80 57. W.

COLUM'BIA, a flourishing post town of the American States, in Goochland county, Virginia, on the north side of James river, at the mouth of the Rivanna. It has a warehouse for the inspection of tobacco: forty-five miles above Richmond, thirty-five from Charlottesville, and 328 south-west of Philadelphia.

COLUM'BIA, a town of the American States, in Lancaster county, Pennsylvania, on the north-east bank of Susquehannah river, at Wright's ferry: ten miles west of Lancaster, and seventy-six west by north of Philadelphia.

COLUM'BIA, a county of the American States, in the upper district of Georgia, bounded by the Savannah east, on the north-east and east, which separates it from the state of South Carolina, north-west of Richmond county.

COLUM'BIA, a town of the American States, in the north-west territory, on the north bank of Ohio river, and on the west side of the mouth of Little Miami river: about six miles south-east of Fort Washington, eight east of Cincinnati, and eighty-seven north by west of Lexington, in Kentucky.

COLUMBIE'RS, a town of France, in the department of the Aveiron, and chief place of a canton, in the district Sauveterre: ten miles west of Rhodes.

CO'LUMBINE, *s.* in botany. See AQUILEGIA.

CO'LUMBINE, *adj.* [*columbine*, Fr. *colombino*, Ital. *columbino*, Span. *columbinus*, of *columbus*, Lat. a pigeon.] Of, like, or pertaining to, a pigeon; a kind of violet colour, or changeable dove-colour. *Bailey.*

COLUM'BO, a town of the island of Ceylon, on the west coast, where the Portuguese had a settlement, from which they were driven by the Dutch. It was taken by the English in 1795, soon after the capture of Trincomale. See the article CEYLON, p. 62, of this volume.

COLUM'BO-ROOT, *s.* A bitter root of great medical virtues, brought from Columbo, in the island of Ceylon, whence its name, and from whence all the East Indies are supplied with it. It is brought into Europe in circular pieces of different sizes, up to three inches diameter; its sides are covered with a thick wrinkled bark, of a dark brown hue externally; when cut transversely, they exhibit a large central disk with brown streaks and yellow points. The root consists of three laminæ, viz. the cortical, which, in the larger pieces, is a quarter of an inch thick; the ligneous, which is about half an inch thick; and the medullary, which forms the middle, and is near an inch in diameter. This last is softer than the other parts, and, when chewed, seems to be very mucilaginous. Many small fibres run longitudinally through it. The cortical and ligneous parts are divided by a circular black line.

line. It has a fine aromatic smell, but is disagreeably bitter, and slightly pungent to the taste. It is almost a specific in the cholera morbus, nausea, vomiting, purging, diarrhœa, dysentery, bilious fever, indigestion, want of appetite, acidity in the primæ viæ, and most disorders of the stomach and bowels. It is powerfully sedative, corroborant, and antiseptic. The bark more powerfully resists the putrefaction of animal flesh, but this root exceeds it in preserving the bile from putridity, and also in correcting its putrescency. It is a good substitute for the bark where an aversion thereto renders the taking of it difficult. As it does not belong to the class of heating bitters, it may be used in hectic fevers. A tincture of this root in brandy is the most useful remedy known for moderating the retchings so commonly attendant on pregnant women during the first months of pregnancy. It may be given in powder from three grains to two drams, but the common dose is from ten to thirty grains, every three or four hours; and in bilious cases, it should be joined with equal part of vitriolated kali. The powder has been applied to ulcers which by common remedies cannot be brought into a healing state; and Mr. Home thinks it next to rhubarb; nay even when rhubarb begins to lose its effect, columbo will frequently renew the healing process, and ultimately be successful. Distilled with spirit, it sends over little or nothing of its taste or smell; but the extract, made by evaporating a decoction of it in rectified spirit of wine, is better than the root itself in powder; about two-thirds of this root is obtained in the spirituous extract.

COLUM'BUS (Christopher), a Genoese by birth, and famous in history for being the discoverer of America, was born in 1442. King Ferdinand of Spain, in reward of his merit, ennobled him and all his posterity, and gave him for arms a sea argent and azure, six islands or, under the cope of Castile and Leon, the world as a crest, and these words:

Por Castilla, y por Leon,
Itala puevo monde halto Colon.

He may be said to have fulfilled that famous prophecy of Seneca, who, in the chorus of his Medea, speaks thus: "Late posterity shall see the time, when the western ocean shall not be the bounds of all things; but a vast continent shall appear, a new world be discovered, nor shall Thule be any longer the remotest region of the earth." He died in May 1506, and was buried, by the king's order, magnificently in the cathedral at Seville; and had this epitaph cut on his tomb: *A Castilla y a Leon nuevo mundo dio Colon.* That is, "Columbus gave Castile and Leon a new world." This great and good man may be proposed as a model to all future discoverers. Brave, intelligent, patient, persevering, and humane, he appears to realize the ideal perfection of that character. His laurels, unlike those of his successors, were never stained with blood, and he appears to have been as anxious for the safety and well-being of those whom he conquered, as of his own people. Reciprocity of benefit seems to have been his constant aim, yet calumny sullied that reputation which it was so much for the interest of virtue to have continued spotless, and ignominious chains shackled those hands which seemed destined by nature to have borne a sceptre. "The hardships and disappointments he suffered on occasion of the conquering of Jamaica, and his sovereign's ingratitude together (for Isabella was then dead)," says an acute and investigating writer, Mr. Bryan Edwards, in his History of the West Indies, "proved too mighty for his generous spirit, and he fell under them on his return to Spain; leaving, however, a name not to be extinguished but with that world whose boundaries he had enlarged."

Columbus thus addresses Ferdinand in a letter dated from Jamaica, 1504: "Diego Mendez and the papers I sent by him will shew your highness what rich mines of gold I have discovered at Veragua; and how I intended to have left my brother at the river Bela, if the judgments of heaven and the greatest misfortunes in the world had not prevented it. However, it is sufficient that your highness and your successors will have the glory and advantage of all, and that the full discovery and settlement are reserved for happier persons than the unfortunate Columbus. May God be so merciful to me as to conduct Mendez to Spain! I doubt not but that he will convince you and my illustrious mistress, that this will not only be a Castile and a Leon, but a discovery of a world of subjects, lands, and wealth, greater than man's unbounded fancy could ever comprehend, or avarice itself covet; but neither he, this paper, nor the tongue of mortal man, can express the anguish and afflictions of my body and mind, nor the miseries and dangers of my son, brother, and friends. Alas! piety and justice have retired to their habitations above, and it is a crime to have undertaken and persevered too much. As my misery makes my life a burden to myself, so I fear the empty titles of vice-roi and admiral render me obnoxious to the hatred of the Spanish nation. It is visible that all methods are taking to cut the thread that is breaking; for I am in my old age oppressed with insupportable pains of the gout, and am now languishing and expiring with that amongst savages, where I have neither medicines nor provisions for the body, priest nor sacrament for the soul. O blessed Father of God, that compassionates the miserable and afflicted, why did not cruel Bovadilli kill me, when he robbed me and my brother of our dearly-purchased gold, and sent us to Spain in chains, without trial, crime, or shadow of misconduct? These chains are all the treasures I have, and they shall be buried with me, if I chance to have a coffin or a grave; for I would have the remembrance of so unjust an action perish with me, and, for the glory of the Spanish name, be utterly forgotten. Let it not bring a further injury on the Castilian name; nor let ages to come know, that there were wretches so vile in this, as to think of recommending themselves to your majesty by destroying the unfortunate and the miserable Christopher Columbus, not for his crimes but for his services, in giving Spain a new world. As it was heaven that inspired and conducted me to it, the heavens will weep for me, and shew pity; let the earth, and every soul in it that loves justice and mercy, weep for me; and oh, ye glorified saints of heaven, that know my innocence, and see my sufferings here, have mercy upon me! for, though this present age is envious and obdurate, surely those that are to come will pity me, when they are told that Christopher Columbus, with his own fortune, at the hazard of his own life, his brother's life, and with little or no expence to the court of Spain, in ten years, and in four voyages, rendered greater services than ever mortal man did to any prince or kingdom, yet was left to perish, without being charged with the least crime, in poverty and misery; all but his chains being taken from him; so that he who gave Spain another world, had neither safety in it, nor yet a cottage for himself and his wretched family. But should heaven still persecute me, and seem displeased with what I have done, as if the discovery of this new may be fatal to the old world; and, as a punishment, bring my life to a period in this miserable place; yet do you, good angels! you that succour the oppressed and innocent, bring this paper to my great mistress! She knows how much I have done, and will give credit to what I have suffered for her glory and service; and will be so just and pious as not to let the children of him that has brought to Spain such immense riches, and added to its dominions vast and unknown kingdoms and empires, want bread, or subsist only upon alms. She (if she lives) will consider that cruelty and ingratitude will bring down the wrath of heaven, so that the world I have discovered shall be the means of stirring up all mankind to revenge and rapine; and the Spanish nation will suffer hereafter for what envious, malicious, and ungrateful, persons do now."

"The

"The common proverb," says Thoret, in his life of this illustrious navigator, "which tells us, that those who promise mountains of gold make promises that can never be accomplished, is brought to shame by the discovery of Columbus; who, having promised such mountains, did indeed make good his promise to that sovereign who was wise enough to attend to what Columbus told him: upon whose name some persons have made a forcible allusion to the dove, which, being sent from the ark of Noah, brought back again some news of a world that had been hidden by the waters." For a biographical sketch of the life of Columbus, see the article AMERICA, vol. i. p. 415.

COLUM'BUS (Bartholomew), brother of Christopher, acquired a reputation by the sea-charts and the spheres, which he made in a superior manner for the time in which he lived. He had passed from Italy into Portugal before his brother, whose tutor he had been in cosmography. Ferdinand Columbus, his nephew, says, that his uncle having embarked for London, was taken by a corsair, who carried him into an unknown country, where he was reduced to the extremity of distress, from which he delivered himself by making charts for navigation; and, having amassed a considerable sum of money, he went to England, presented to the king a map of the world in his own method, explained to him the plan his brother had formed of striking much farther forward on the ocean than had ever yet been done; that the prince entreated him to invite over Christopher, promising to defray the whole expence of the expedition; but that the latter could not come, because he had already entered into an engagement with the crown of Castile. Part of this story, and especially the proposal made to the king of England, seems totally without foundation. However this be, it is certain that Bartholomew had a share in the bounty bestowed on Christopher by the king of Castile; and in 1493 these two brothers, and Diego Columbus, who was the third, were ennobled. Don Bartholomew underwent with Christopher the fatigues and dangers inseparable from such long voyages as those in which they both engaged, and built the town of St. Domingo. He died in 1514, possessed of riches and honours.

COLUM'BUS (Ferdinand), son of Christopher, and writer of his life. He entered into the ecclesiastical state; and founded a library, which he bequeathed to the church of Seville, to this day called the *Columbine library*. He died in 1560.

COLUM'BUS (Realdus), an Italian anatomical author, was a native of Cremona. He flourished about the year 1544, and was intimate with Vesalius, whose public lectures he had frequently an opportunity of hearing. He is charged by some with want of gratitude to Vesalius, from whom he is said to have stolen every thing that is valuable in his own anatomical works; but others maintain, that he had a clearer idea of the parts than Vesalius, and described them more accurately; and it is certain that his Latin is very pure.

COLUMEL'LA, *s.* [dim. of *columna*, a column.] The clitoris; so called from its shape. Also the uvula, and the falling down of the uvula.

COLUMEL'LA (Lucius Junius Moderatus), a native of Gades, who wrote twelve books on agriculture, of which, the tenth, on gardening, is in verse. The style is elegant, and the work displays the genius of a naturalist, and the labours of an accurate observer.

CO'LUMN, *s.* [*columna*, Lat.] A round pillar; such as compose the five architectonical orders. See ARCHITECTURE, vol. ii. p. 67, &c.—Some of the old Greek *columns*, and altars, were brought from the ruins of Apollo's temple at Delos. *Peacham.*—Round broken *columns* clasping ivy twin'd. *Pope.*—Any body of certain dimensions pressing vertically upon its base.—The whole weight of any *column* of the atmosphere, and likewise the specific gravity of its basis, are certainly known by many experiments. *Bentley.*—In the military art, the long file or row of troops, or of baggage, of an army in its march. An army marches in one, two, three, or more, columns, according as the ground will allow. With printers, a column is half a page, when divided into two equal parts, by a line passing through the middle, from the top to the bottom; and, by several parallel lines, pages are often divided into three or four columns.

COLUM'NA (Guy), a native of Messina in Sicily, followed Edward I. into England, on his return from the Holy Land. About the year 1287 he compiled a chronicle in thirty-six books, and wrote several historical tracts in relation to England. Columna's most curious work is, The History of the Siege of Troy, in Latin, printed at Cologne in 1477, quarto, and at Strasbourg 1486, folio. These editions are very scarce, as are the Italian translations of 1481, Venice, folio; Florence 1610, quarto; but the edition of Naples 1655, quarto, is not so rare.

COLUM'NÆ HER'CULIS, a name given to two mountains on the extremest parts of Spain and Africa, at the entrance into the Mediterranean. They were called *Calpe* and *Abyla*, the former on the coast of Spain, and the latter on the side of Africa, at the distance of only eighteen miles. They are reckoned the boundaries of the labours of Hercules, and they were supposed to have been joined, till the hero separated them, and opened a communication between the Mediterranean and Atlantic seas.

COLUM'NAR, or COLUMNA'RIAN, *adj.* Formed in columns.—White *columnar* spar out of a stone-pit. *Woodward.*

COLUMNA'RIUM, *s.* in Roman antiquity, a heavy tribute, demanded for every pillar of a house. It was first laid on by Julius Cæsar, in order to put a stop to the extravagant expences laid out on sumptuous buildings.

COLUMNE'A, *s.* [this name was given by Plumier, in honour of *Fabius Columna*, or *Fabio Colonna*, of the noble family of Colonna in Italy.] In botany, a genus of the class didynamia, order angiospermia, natural order of personatæ. The generic characters are—Calyx: perianthium one-leafed, five-parted, subventricose at the base; divisions erect, equal, lanceolate, permanent. Corolla: one-petalled, ringent, villose; tube long, gibbous above at the base; border two-lipped: upper lip straight, emarginate; lower lip three-parted; lateral divisions lanceolate, the intermediate longer and more deeply separated, lanceolate. Stamina: filaments four, of which the two longer are hid under the upper lip; antheræ simple, connected into a little crown. Pistillum: germ ovate; style filiform, length of the upper lip; stigma bifid, obtuse. Pericarpium: capsule two-celled, ovate. Seeds: numerous, small, lying on a very large receptacle.—*Essential Character.* Calyx, five-parted; corolla ringent, upper lip three-parted, the middle part vaulted, emarginate; gibbous above at the base; antheræ connected; capsule two-celled; seeds nestling.

Species. 1. Columnea scandens, or climbing columnea: leaves ovate, acute, entire, subvillose; leaflets of the calyx entire, corollas and calyxes pubescent, upper lip undivided. Stem scandent, rooting, angular, subquadrangular, striated, succulent, brittle, somewhat hirsute; leaves petioled, opposite, small, scarcely nerved; flowers peduncled, solitary, axillary, blood-red, somewhat villose. Native of the Caribbee islands, Martinico, and Guiana, in moist parts of woods at the foot of the mountains. It is subparasitical. Miller received seeds of this plant with scarlet flowers from Carthagena in New Spain. Plumier's columnea with a yellowish flower is only a seminal variation.

2. Columnea longifolia, or long-leaved columnea: leaves lanceolate, very long, subserrate, smooth. Stem erect, two feet high, four-cornered, the thickness of an eagle's quill, smooth; branches axillary, quite simple, opposite; leaves three inches long, subsessile, the upper surface rugged backwards, the under smooth and paler; flowers in a raceme, all except the lowest axillary ones opposite, solitary, spreading; the floral leaves lanceolate, quite entire.

tire. Vahl has made this a separate genus, adopting Browne's name of *achimenes*. It differs from *columnea* in having the corolla almost regular, not ringent; from *sesamum* in having a two-celled capsule. Native of the East Indies.

3. Columnea hirsuta, or hairy columnea: leaves ovate, acuminate, serrate, roughly hairy on the upper surface, calycine leaflets toothletted, lanceolate; they and the corollas hirsute, the upper lip bifid. This beautiful vegetable is a native of the cooler mountains of Jamaica. It is very succulent, and grows luxuriantly in every rich and shady soil; throwing its branches frequently to the height of four or five feet, and higher, when supported. The stem is pretty thick; the leaves opposite and alternately larger. The flowers are large, beautifully variegated, and hairy on the outside, like the other parts of the plant. The divisions of the calyx are pinnated, somewhat like those of the garden rose. It has an uncommon appearance, and deserves to be cultivated. Introduced in 1780 by the marquis of Rockingham. It flowers in November.

4. Columnea hispida, or rough columnea: leaves ovate, obtuse, toothletted, hispid-hirsute, leaflets of the calyx lanceolate, entire, hairy; stem hairy, rugged. 5. Columnea rutilans, or shining columnea: leaves ovate-lanceolate, villose, toothletted; leaves of the calyx jagged; corollas villose, the upper lip two-parted. Natives of Jamaica.

6. Columnea stellata, or starry columnea: leaves stellate, flowers solitary, stem creeping, herbaceous, perennial, round, slender, whitish; branches suberect, four inches long, very tender. Flowers white striped with red. It is an aquatic plant, of a very pleasant appearance and smell; and, being emollient and cooling, is used as a wash by the women. Native of Cochinchina, and cultivated there in pots and tubs filled with water, having earth at the bottom.

Propagation and Culture. All these plants being natives of hot countries, and most of them of the West Indies, are too tender to live in England, out of a stove. They are propagated by seeds sown in a good hot-bed; and when the plants come up, they must be treated in the same way as other tender exotic plants which are kept in the bark-stove.

COLUMNI'FEROUS, *adj.* [from *columna*, a column, and *fero*, to bear.] Bearing columns or pillars. A natural order of plants.

COLU'PPA, *f.* in botany. See ILLECEBRUM.

COLU'RES, *f.* [*coluri*, Lat. κολουροι, Gr.] Two great circles imagined to intersect at right angles in the poles of the world, and to pass, the one through the equinoctial points Aries and Libra, and the other through the solstitial points Cancer and Capricorn; from whence they are called the *equinoctial* and *solstitial colures*. By thus dividing the ecliptic into four equal parts, they mark the four seasons, or quarters of the year. It is disputed over what part of the back of Aries the equinoctial colure passed in the time of Hipparchus. Newton, in his Chronology, takes it to have been over the middle of the constellation. Father Souciet insists that it passed over the dodecatemorion of Aries, or midway between the rump and first of the tail. There are some observations in the Philosophical Transactions, No. 466, concerning the position of this colure in the ancient sphere, from a draught of the constellation Aries, in the Aratæa published at Leyden and Amsterdam in 1652, which seem to confirm Newton's opinion; but the antiquity and authority of the original draught may still remain in question.

COLU'RI, a little island in the gulf of Engia, in the Archipelago, formerly called *Salamis*. The principal town is of the same name, and seated on the south side, at the bottom of the harbour, which is one of the finest in the world. The famous Grecian hero Ajax, was said to be king of this island. It is now a poor place, yet produces wheat, barley, tar, rosin, pit-coal, sponge, and pot-ash, which they carry to Athens. It is seven miles south from Athens, and is separated from the continent by a strait about a mile over. Lat 38.0.N. lon. 41.22.E. Ferro.

COLU'RIA, *f.* [from κολος, mutilated, and ουρα, a tail.] The tribe of beasts without tails.

COLUTE'A, *f.* [derivation uncertain.] In botany, a genus of the class diadelphia, order decandria, natural order of papilionaceæ, or leguminosæ. The generic characters are—Calyx: perianthium one-leafed, bell-shaped, five-cleft, erect, nearly equal, permanent. Corolla: papilionaceous; standard, wings, and keel, differ in figure and various proportion; wings pressed close together, lanceolate. Stamina: filaments diadelphous, ascending; antheræ simple. Pistillum: germ oblong, compressed, attenuated to each end; style ascending; stigma is a bearded line extended from the middle of the style to its tip, from the upper part. Pericarpium: legume very large, very broad, inflated, transparent and membranaceous, the upper suture erect, the lower gibbous, one-celled, gaping on the upper suture at the base. Seeds: several, kidney-shaped; the fruit constitutes the essence of the genus.—*Essential Character.* Calyx, five-cleft; legume inflated, gaping on the upper suture at the base.

Species. 1. Colutea arborescens, or common bladder-senna: leaflets oval-obcordate, standard gibbous, abbreviated. Most of the coluteas are shrubs, with pinnate leaves, and stipules distinct from the petiole. This has several woody stems, which grow to the height of twelve or fourteen feet, sending out many woody branches, with winged leaves, composed of four or five pairs of oval lobes, placed opposite, terminated by an odd one; these are indented at the top in form of a heart, and are of a greyish colour; the flowers come out from the wings of the leaves upon slender peduncles about two inches long, each sustaining two or three yellow flowers, whose standard is reflexed and large, with a dark-coloured mark on it; seeds twenty, or more. Native of the south of France, Italy, warmer parts of Swisserland, and Carniola. Mr. Ray observed it about Montpellier, and in many parts of Italy, especially on Mount Vesuvius, even in the ascent to the crater, where there were scarcely any other plants: it flowers with us from June to August. The leaves are recommended as answering all the purposes of senna, and Allioni has given particular directions for the preparation of them. A larger dose seems to be required to produce the same effect. The seeds, in a quantity of a dram or two, excite vomiting. It is said to afford food grateful to cattle: cultivated in 1570.

2. Colutea cruenta, or oriental bladder-senna: shrubby: leaflets wedge-form, obcordate; standard gibbous, obtuse, very small. This has a woody stem, which sends out many branches on every side, and do not rise above seven or eight feet high; these are not so strong as those of the first sort, and the leaves are composed of five or six pairs of small heart-shaped leaflets, terminated by an odd one. The flowers proceed from the side of the branches, standing upon peduncles, each sustaining two or three flowers, shaped like those of the first sort, but smaller; they are of a dark red colour, marked with yellow; appear in June, and the seeds ripen in autumn. The oriental bladder-senna, besides that it is never arborescent, differs from the foregoing sort in the shape, size, and number of the leaflets, which are quite smooth, glaucous, and more fleshy; on very short petioles or even subsessile; with scarcely conspicuous stipules. The corolla is not only of a different colour and smaller, but the wings are perceptibly shorter than the keel, whereas, in the common sort, they are nearly equal; the keel also is erect, and cut off at the end; and the marks on the standard are very different. The legume opens below the tip into a wide oval hole. It was discovered by Tournefort in the Levant; cultivated in 1731 by Mr. Miller.

3. Colutea Pocockii, or Pocock's bladder-senna: shrubby; leaflets ovate; standard gibbous, elongated, ascending. This shrub seldom grows more than six or seven feet high in this country; the branches are very slender,

and much more pliant than those of the common sort, and therefore it grows less erect; the leaves are composed of nine pairs of leaflets, and are much smaller. The flowers are of a brighter yellow, appear a month earlier than in the common sort, and there is a succession of them till late in the autumn, which renders this much more valuable; and the branches not shooting so luxuriantly, nor so upright, this is in less danger of being broken by strong winds in summer. Native of the Levant; the seeds were brought to England first by the reverend Dr. Pocock, who gathered them in Turkey; Dr. Russell, who resided many years at Aleppo, reports that this shrub is very common about that city.

4. Colutea frutescens, or scarlet-bladder senna: shrubby; leaflets ovate-oblong. A hoary shrub, with tomentose leaflets, smooth on the upper surface; height from two to four feet; in favourable seasons, and in a warm situation, plants of three years standing will be six feet high, with large heads, and all the branches covered with flowers, making a very fine appearance. Those plants, however, which are exposed to the open air seldom are of longer duration than two years, and are generally destroyed in severe winters; but they make much stronger plants while they last, and produce a greater number of flowers than those which are housed; these being of a fine scarlet colour, intermixed with the silvery leaves, afford an agreeable variety; the stem is weak; the side branches grow erect; and the leaves have ten or twelve pairs of leaflets; the peduncles are axillary, towards the upper part of the stem, and sustain three or four flowers; these are very long, and not reflex; the legumes are very large; it flowers in June; but, when the seeds are sown forward in the spring, they will produce flowers in August, and sometimes perfect seeds in October. It is a native of the Cape of Good Hope, and was cultivated in 1683 by Mr. James Sutherland; it was not, however, generally known in our gardens till the time of Miller.

5. Colutea perennans, or perennial bladder-senna: herbaceous; leaflets ovate-oblong, pubescent. The whole of this plant is slightly pubescent; root perennial; stems erect, round, striated, pale green, annual, quite simple, or with almost barren branchlets; seeds very few, compressed, and black. Native of Africa; introduced in 1776, by Jos. Nic. de Jacquin, M. D. It flowers in August.

6. Colutea herbacea, or annual bladder-senna: herbaceous; leaflets linear, smooth. Annual, seldom perennial in the stem, smooth; corollas dark blood red, with a striated standard, the length of the wings and keel; seeds two or four, rather large, compressed, of a dirty chesnut colour; stem a foot and a half high and slender, dividing at the top into three or four branches; leaflets five or six pairs, very narrow, an inch long, a little hoary; flowers small, three together, on slender peduncles; appearing in July: the seeds ripen in autumn. Native of the Cape of Good Hope.

7. Colutea fistulosa: herbaceous; leaflets ovate, complicate, pubescent underneath.

8. Colutea Americana; shrubby; leaflets ovate, emarginate; legumes oblong, compressed, acuminate. Sent from Vera Cruz, in New Spain, in the year 1730, by Dr. Houstoun. It has a shrubby stalk, which rises to the height of twelve or fourteen feet, sending out many branches; the leaves are composed of three pairs of oval leaflets, terminated by an odd one; these are indented at the top, and are of a light green; the flowers are of a bright yellow, and stand two or three upon each peduncle, and are succeeded by compressed winged pods near four inches long, which end in long points.

9. Colutea procumbens: stems trailing; leaflets ovate-oblong, tomentose; flowers axillary, on very long peduncles. This has many slender woody stems, which trail on the ground, and are divided into smaller branches; the leaves are composed of twelve or fourteen pairs of small, narrow, oval, leaflets, terminated by an odd one; these, and also the stalks, are covered with a whitish down. The flowers are very small, of a purple colour, and stand upon very long slender peduncles, each sustaining three or four flowers; these are succeeded by compressed pods little more than half an inch long, which are a little bent like a sickle, each containing a single row of small kidney-shaped seeds: it flowers in June and July, and the seeds ripen in autumn. This is a perennial plant, which, if sheltered in the winter, will continue several years; but the branches do not extend more than a foot in length; and, unless they are supported, always trail upon the ground. The seeds were sent to Mr. Miller from the Cape of Good Hope in 1753.

Propagation and Culture. The three first sorts are very hardy shrubs, which thrive in the open air extremely well, and are generally propagated for sale in the nursery-gardens; but the first sort having been longer in England, is more generally known and propagated than either of the other, which have been but few years in the English gardens; nor had the third sort been long known in this country in Mr. Miller's time; but, as the seeds ripen here very well, it is now in as great plenty as the first sort. They are propagated by sowing their seeds any time in the spring, in a bed of common earth; and, when the plants are come up, they must be kept clear from weeds; and the Michaelmas following they should be transplanted either into nursery rows, or in the places where they are designed to remain; for, if they are left in the seed-bed too long, they are very subject to have downright tap-roots, which render them unfit for transplantation; nor should they be suffered to remain too long in the nursery before they are transplanted, where they are to remain, for the same reason. The first sort growing to the height of twelve or fifteen feet, is very proper to intermix with trees of a middling growth in wilderness quarters; or in clumps of flowering trees, where the oddness of their flowers and pods will make a pretty variety, especially as they continue a long time in flower; for they usually begin flowering by the end of May, and from that time to September they are seldom destitute of flowers. These shrubs make great shoots annually, which are frequently broken down by strong winds in the summer; so that if they are not sheltered by other trees, their branches should be supported, otherwise they will be broken and split off, whereby the trees will be rendered unsightly. The third sort does not grow so tall as the common, but makes a more regular shrub, and is less liable to split. The flowers of this sort being of a dusky red colour, spotted with yellow, it makes a very pretty variety, and is as hardy as the common sort, therefore may be propagated by seeds in the same manner. Mr. Curtis has learned, by experience, that a very wet soil proves fatal to the common bladder-senna. The ear-wigs, finding a commodious retreat within the bladders, are great destroyers of the seeds: Mr. Miller therefore recommends the hanging lobster-claws, or bowls of tobacco-pipes, on the shrubs, to entice these insects. The third sort sends forth many suckers, by which also it may be propagated; but the plants thus raised never grow so strong, and are subject to produce many suckers.

The fourth sort is tender, and will not live through the winters, when they are severe, in the open air in England; but, in mild winters, if it be planted in a dry soil, and a warm situation, it will thrive very well; and those plants which live abroad will flower much stronger, and make a finer appearance than those which are preserved in the green-house; for they require a large share of air, otherwise they are apt to draw up weak, and not produce their flowers in plenty; therefore, when any of the plants are sheltered in winter, they must be placed as near the window as possible, that they may have all the advantages of air; and in the spring they must be hardened, to bear the open air as soon as possible. This is propagated by seeds like the former. If the seeds are sown early in the spring upon a warm border of light earth, the plants will flower in August; and, if the autumn proves favourable, they will

will sometimes ripen their seeds very well; but there are some persons who sow the seeds upon a moderate hot-bed in the spring, whereby they bring their plants so forward as to flower in July, whereby the seeds are generally perfected from these plants. When the plants are transplanted, it should always be done while they are young, for they do not bear removing when they are large. This sort will sometimes live in the open air for three or four years, when the plants stand in a well-sheltered situation; and these will grow to have large heads, and make a very fine appearance when they are in flower; they will also continue much longer in beauty than those plants which are treated more tenderly.

The sixth sort is a low annual plant, which seldom grows more than a foot and a half in height; the flowers being small, and having little beauty, it is seldom preserved but in botanic gardens. The seeds of this sort must be sown upon a moderate hot-bed in the spring, and the plants must be put into small pots, and brought forward in another hot-bed. In July they will flower, when they may be exposed in the open air, in a warm situation, where the seeds will ripen in September, and the plants will soon after decay. The eighth sort, growing naturally in hot countries, is too tender to thrive in the open air in England. It is propagated by seeds, which must be sown on a hot-bed in the spring; and, when the plants are two inches high, they should be each transplanted into a separate small pot, filled with light earth, and plunged into a hot-bed of tanners' bark, observing to shade them till they have taken fresh root; after which they must be treated in the same way as other plants from the same climate, always keeping them in a stove, which should be of a moderate temperature of heat. The ninth sort may be raised on a moderate hot-bed in the spring, and afterward exposed to the open air in summer; but in winter the plants must be sheltered under a frame, otherwise the frost will destroy them. See CORONILLA, INDIGOFERA, PSORALEA, and SOPHORA.

COLU'THUS, a native of Lycopolis in Egypt, who wrote a poem on the rape of Helen, in imitation of Homer. The composition remained long unknown, till it was discovered at Lycopolis in the fifteenth century, by the learned cardinal Bessarion. Coluthus was, as some suppose, a contemporary of Tryphiodorus.

COLY'BA, or COLYBUS, *f.* A term in the Greek liturgy, signifying an offering of corn and boiled pulse, made in honour of the saints, and for the sake of the dead.

COLYM'BADES, *f.* [from κολυμβαω, to swim.] Olives pickled and swimming in their own oil.

COLYM'BUS, *f.* [from κολυμβαω, to swim, because of their swimming upon the surface of the water.] In ornithology, the GUILLEMOT, GREBE, and DIVER. This genus of birds belongs to the order of anseres, and is distinguished by the following characters: bill plain, awl-shaped, straight, sharpened; chaps toothed; nostrils slit at the base of the bill; feet fettered. Twenty-eight species are now known, which are subdivided into those with three toes, corresponding to the guillemots; those with four toes and palmated, corresponding to the divers; those with four toes and lobed, corresponding to the grebes. The birds of this genus cannot walk, but they run swiftly on the water, and swim and dive with the utmost agility: their skin is adhesive, and their tail short. The guillemots live generally at sea; have a slender tongue, of the size of their bill, which is flat, and covered at its base with short feathers; their upper mandible somewhat bent at the tip; their flesh is commonly stringy, and their eggs nauseating; they keep together in flocks, and lie on the bare rocks. The divers in the northern climates inhabit also the lakes; their bill is strong, not so sharp, cylindrical; the margin of the mandibles bent inwards, the upper mandible exceeding the under: the nostrils parted by little membranes; the tongue long, sharp, serrated on both sides at the root; the legs small and flattened; they have black stripes on their thighs, and twenty tail-quills. They are monogamous; lay their eggs on the turf; fly difficultly, and pass the time of incubation in fresh water. The grebes have no tail; their bill is strong, their straps bald; their tongue slightly cleft at the tip; their body squat, and thickly clothed with soft shining feathers; their wings are short, their legs compressed. They inhabit chiefly the lakes of the south of Europe, and are subject to much variety of colour.

1. Colymbus troile, the foolish guillemot. In the Ferro islands, the guillemot is called *lomwier*, or *lomwia*; in Norway, *lomvie*, *longivie*, *langvire*, *lumbe*, and *sforfulg*; in Denmark, *aalge*; in Lapland, *doppau*; in Greenland, *tuglok*. The name *uria* is given by Gesner, from a strained application of the Greek ουρια, or diver: the Greeks could never have known the guillemot, which is confined to the northern seas. They fly very low on the sea, and their flight resembles that of the partridges. Its wings are so narrow and short, that, to reach its nest, which is placed on the rocks, it is obliged to leap from cliff to cliff, resting a moment at each throw. This habit, or rather this necessity, is common to it with the puffin, the penguin, and other short-winged birds; of which this species, almost banished from the temperate countries of Europe, have settled on the extremity of Scotland, on the coasts of Norway and Iceland, and on the Ferro islands, the last inhabited tracts of our northern world, where these birds seem to struggle against the incroachments of the ice. It is even impossible for them to inhabit those latitudes in the winter; they are much accustomed indeed to the utmost severity of cold, and remain on the floating ice; but they cannot subsist except in an open sea, and must leave it when frozen over. It is in this migration, or rather in this dispersion during the winter, and after having quitted their abodes in the regions of the north, that they descend along the coasts of England, where they settle on the shelves and desert islets, and breed on the projecting crags, as near as they can reach to the summit of the rocks. They lay one large egg, more than three inches in length, of a bluish white, or pale sea-green, and so irregularly spotted and streaked with black, that no two are alike. They are said to continue in the Orknies the whole year. The chief places they are known to breed in are, the uninhabited isle of Priestholm, near the isle of Anglesea; on the Godreve rocks, not far from St. Ives in Cornwall; the Farn isles, near the coast of Northumberland; in the Freshwater cliffs at the back of the Isle of Wight; and the cliffs about Scarborough in Yorkshire. They are also found in most of the northern parts of Europe, as far as Spitsbergen, the coast of Lapmark, and along the White and Icy Sea, quite to Kamtschatka. It is frequently met with on the coast of Italy in the winter; and is also known in Newfoundland, and in a few parts of the continent of North America. Our late voyagers met with it on the coast north of Nootka Sound. It is called by the Welch *guillem*; in Northumberland and Durham, *guillemot*, or *sea-hen*; in Yorkshire, *scout*; by the Cornish, *kiddaw*; and in the southern parts of England, *willock*. Its natural stupidity in suffering itself to be taken by the hand, or shot at repeatedly, without leaving the place, gained it the name of *foolish guillemot*. In Kamtschatka it is called *aru* or *kara*; and the inhabitants kill them in numbers for the sake of their flesh, though it is very tough and ill-tasted; but more for their skins, of which, as of other fowls, they make garments; the eggs are also accounted a great delicacy. Its body is black; its breast and belly snowy; its secondary wing-quills tipt with white. Its length is seventeen inches; its alar extent twenty-seven and a half; its weight twenty ounces.

2. Colymbus minor, the lesser guillemot; length sixteen inches; breadth twenty-six; weight nineteen ounces: bill black; the top of the head, taking in the eyes, hind part of the neck, the back, wings, and tail, are black, behind the eye continued in a streak on each side; the greater wing-coverts tipped with white, forming a narrow band on the wings; the sides of the head beneath the

eye,

eye, and all the under parts, white; legs black. It varies in having the black streak behind the eye much broader in some individuals. This is much less common in England than the foolish guillemot; and only frequents our coasts in winter: is rarely seen on those of Wales; but in the Firth of Forth in Scotland, it is met with among the black-billed auks in innumerable flocks, in pursuit of sprats; they are there called *morrots*, and all retire before the spring. They are frequent also on our western coast in the winter.

3. Colymbus grylle, the black guillemot, (improperly called the Greenland dove.) In those frozen countries where stern Boreas reigns alone, and where the gentle zephyrs do not sport, the sweet murmurs of the dove are never heard. The charming votary of love shuns such chilling scenes; and the pretended dove of Greenland is found to be a melancholy water-fowl, which can only swim and dive, screaming incessantly a dry reiterated tone of complaint. It bears no resemblance to our pigeon, except in bulk, which is nearly the same in both. It is a guillemot smaller than the two preceding, and its wings are also shorter in proportion. Its legs are in the same manner placed in the abdomen; and its walk is feeble and tottering. Its bill is shorter, more inflated, and not so much pointed as in the preceding species. Its feathers are all unwebbed, and resemble silky hair. The colours are black, with a white spot on each wing, and more or less of white on the fore side of the neck and of the body: but this character varies so much, that some individuals are entirely black, and others almost entirely white. "It is in winter (says Willughby) that they are found completely white; and as, in the transition from one of these garbs to the other, they must necessarily be more or less mixed or variegated with black and white, we may reckon the spotted Greenland doves of different authors to be only varieties of the same individual; because they differ not from each other, unless in the greater or less mixture of black and white in their plumage." These fly commonly in pairs, razing the surface of the sea with a brisk flapping of their narrow wings. They place their nests in the crevices of the lowest rocks, from which the young can throw themselves into the sea, and avoid becoming the prey of foxes that incessantly watch them. These birds lay only two eggs; some of their nests are found on the coasts of Wales and of Scotland, and also in Sweden in the province of Gothland. But the far greater number breed in much more northern countries, in Spitzbergen and in Greenland, the principal abode of these tribes of the feathered race. They also occur in St. Kilda, on the Bass isle in the Firth of Forth, in the Farn islands off the Northumbrian coast, and on the Llandidno, in Caernarvonshire.

The great differences in the plumage of this species of guillemot seems to give rise to the following varieties, viz. The white-winged guillemot; somewhat larger than the last; bill black; the general tint of the plumage is mouse colour; several of the middle wing-coverts tipped with white, forming a broad oblong spot across the wings; legs red. It inhabits Oonalashka in the North Pacific Ocean. Another variety is the black and white-mottled guillemot, which Edwards calls the spotted Greenland dove. The upper parts are of a brownish black, transversely striped with a darker colour; the sides of the head, and under parts, from chin to vent, are dusky white, transversely barred with pale ash-colour; the wing-coverts mottled with black and white; native of Greenland. A third variety has the head, neck, and breast, white, very lightly spotted with black; back black, with some of the feathers edged with white; belly snow-white; wings and tail black, with a white spangle on the wings. This is from Christiansoe, and called there *sildeperris*. In the collection of sir Joseph Banks is a farther variety, not greatly differing; the upper parts of the body dusky black; crown mottled with white; hind part of the neck inclining to ash-colour; greater wing-coverts irregularly marked black and white; quills and tail black; from Kamtschatka. A fifth variety has the plumage in patches of white and black on the upper parts, and all beneath white. All these guillemots, which are probably nothing but the same bird in the different stages of moulting, are found on the Bass island in Scotland, and the isle of St. Kilda. They make their nest in burrows under ground, lay a grey egg, or, according to others, two, of a whitish colour, as big as those of a hen, marked with many grey and black spots. They dive well, and hence by some are called *diving pigeons*.

4. Colymbus lacteolus, the white guillemot; bill flesh-colour; inside of the mouth white; irides brown; eye-lids brownish flesh-colour; head and body white as snow; back, wings, and base of the tail, pale grey; quills whitish, down the shafts inclining to brown; legs dusky flesh-colour and naked far above the knees. This Dr. Pallas mentions as a non-descript; and was met with by him on the coast of Holland, cast a-shore between the villages of Catwick and Scheveningen, in the winter of 1760.

5. Colymbus marmoratus, the marbled guillemot; ten inches in length; the bill compressed a little on the sides, and slender; crown of the head dusky; upper part of the body transversely barred with tawney, chesnut, and brown, as far as the tail, which is short and black; the wing-coverts dusky, edged with white; quills black; the chin and throat dusky, mixed with irregular blotches of white; breast, belly, and vent, barred and undulated with dusky and white; legs pale orange. Inhabits Prince William's Sound, on the western coast of America, and Kamtschaka.

THE GREBES.

The grebe is well known by those beautiful silvery tufts, which have the soft closeness of down, the elasticity of feathers, and the lustre of silk. Its undressed plumage, particularly that of the breast, is really a fine down, very close and firm, and regularly disposed, whose glistening filaments lie upon each other, and join so as to form a glassy shining surface, equally impenetrable by cold or humidity. This clothing, so well adapted to the rigours of season and of climate, was necessary to the grebe, which in the severest winter remains constantly in the water, like the divers. But the grebes differ essentially from the divers, which have their toes completely webbed, and not edged with a scalloped membrane, parted at each toe. The grebe hath its legs placed entirely behind, and almost sunk into its belly, so that only the feet appear, and are like oars; they naturally throw themselves outwards, and could not support the body of the bird on the ground, unless it stood quite erect. In this position, the striking with its wings would, instead of raising it into the air, only overturn it, since the legs could not aid the impulsion. It requires, therefore, a great effort to begin its flight on land; and, as if conscious of this imbecility, it is observed to avoid the shore; and, to prevent its being driven thither, it always swims against the wind. If unfortunately a wave casts it on the brink, it continues struggling with its feet and wings to mount into the air, and return to the water: it may be then caught by the hand, in spite of the violent strokes it gives with its bill in defence. But it is as nimble in the water as it is feeble on shore; it swims, dives, dashes through the waves, and runs on the surface, with surprising rapidity; its motions are said even to be quicker and brisker than when under water. It pursues the fish to a very great depth, and is often caught in fishermen's nets.

6. Colymbus cristatus, the crested grebe; about the size of a duck; bill two inches and a half long, of a reddish flesh-colour; tip brown; lore and irides crimson; head greatly enlarged with feathers, so as to make it appear unnatural; these feathers are much elongated on each side of the hind head, appearing like ears, and from thence rounded like a ruff to the under jaw; the colour black, except the middle of the last, which is bright ferruginous; the hind part of the neck, upper parts of the body, and wings,

wings, are brown; sides of the head, round the eyes, and under parts, from chin to vent, silvery white; in many birds a mixture of pale ferruginous across the breast; on the wings an oblique white bar; the inner ridge of the wing is also white; legs dusky. The female differs in having the head less tufted; in other respects it much resembles the male. The young birds differ exceedingly at different stages of life; at first they are perfectly downy, and striped, especially down the neck, with black; after this, when about half grown, the stripes on the neck are less distinct, being rather mottled than striped; and the under part, though white, is clouded with dusky; at this period a fulness round the head is observed; as the bird advances still farther towards perfection, the brown and white appear clear and distinct, the head becomes much tufted, and the horns are a little elongated. But we have great reason to believe that the bird does not obtain the full and perfect crest till the second year at least. This species is common in some parts of England, breeding in the meres of Shropshire and Cheshire, and in the eastern fen of Lincolnshire, where they are called *gaunts*; in some parts known by the name of *cargoose*. The female lays four white eggs the size of those of a pigeon; the nest is of a large size, and formed of bogbean, stalks of water-lily, pond-weed, and water-violet, floating independent among the reeds and flags; the water penetrates it, and the bird sits and hatches in that condition. The food of the old bird is small fish, which it gets by diving, and at times will eat vegetables. It feeds the young with small eels; and will carry them, when tired, on its back; it is a quick diver, and difficult to be shot, as it darts down on the least appearance of danger; and seldom flies farther than the end of the lake it frequents. Their skins are made into tippets equally valuable with those from Geneva.

7. Colymbus urinator, the tippet grebe; somewhat less than the crested grebe; and it wants both the crest and ruff, so conspicuous in that bird. The sides of the neck are striped downwards from the head with narrow lines of black and white; in other respects the colours and marks agree. It is said to be rare in England, but has been shot on Rosternemere in Cheshire. They are common in the winter season on the lakes of Geneva, appearing in flocks of ten or twelve, and are killed for the sake of their beautiful skins; the under sides of them, being dressed with the feathers on, are made into muffs and tippets; each bird sells for about fourteen shillings. It is also a common bird in the lakes of Siberia; but not in Russia. Their fat is supposed to have great virtue in rheumatic complaints.

8. Colymbus Cayennensis, the Cayenne grebe; nineteen inches and a half in length; bill dusky; the under mandible yellow at the base; head, and upper part of the neck and body, dusky brown; fore parts, as far as the breast and sides, rufous, the last mixed with brown; breast and upper part of the belly white; the lower part, and vent, brown; legs dusky: native of Cayenne.

9. Colymbus auritus, the eared grebe; about the size of a teal; bill black, bending a little upwards at the point, the colour of the base reddish; lore and irides crimson; the head is very full of feathers of a dusky black, the neck and under parts of the body mottled with white; from behind each eye springs a tuft of orange-coloured feathers, growing broader, and almost meeting behind; the breast and under parts are silvery white; sides of the body ferruginous chesnut; legs black. The female differs in having the head less full of feathers than the male. This bird is found in the northern districts of Europe, the temperate parts of Siberia, and in Iceland. Said also by Bougainville to be met with in Falkland Islands, where it was named the *diver with spectacles*. There is a smaller variety of the eared grebe, about the size of a lapwing; bill black; and the head rather fuller of feathers.

10. Colymbus obscurus, the dusky grebe; size of a small teal; bill black, with the sides red; lore and irides red; the upper parts of the head, neck, and body, dusky brown; ridge of the wing white; forehead, and from chin to vent, white; breast very glossy; at the throat the white passes backwards almost to the hind head, and the brown comes forward on each side on the middle of the neck; on the thighs are a few black spots; legs flesh-colour tinged with purple. In some birds the whole neck is ash-coloured; and others are spotted between the legs with black. This species inhabits the fens of Lincolnshire; and frequently occurs in the London markets.

11. Colymbus cornutus, the horned grebe; larger than a teal; alar extent sixteen inches; bill dusky; head very full of feathers, and of a glossy deep green; through each eye is a streak of yellow feathers, elongated into a tuft as it passes to the hind head; upper part of the neck and back dusky brown; fore-part of the neck and breast dark orange red; lesser wing-coverts cinereous, the greater quills black, middle ones white; belly glossy white. This inhabits Hudson's Bay; and first appears in May, about the fresh waters. It lays from two to four white eggs, in June, among the aquatic plants; and covers them while absent. It retires southward in autumn; appears then at New York, staying till spring, when it returns to the north. For its vast expertness in diving it is called the *water-witch*: known at Hudson's Bay by the name of *seekeep*. It migrates into Italy, Germany, Poland, Holland, England, &c. There is a variety of this bird with the head much more tufted, and black; behind the eyes a stripe of loose rufous yellow feathers; the hind part of the neck, and upper parts of the body and wings, dusky black; on the quills a patch of white; fore-parts, from the chin to the breast, and sides, chesnut; breast, belly, and thighs, resplendent white; legs lead-colour: native of Sclavonia.

12. Colymbus rubricollis, the red-necked grebe; length eighteen inches; bill nearly two inches long; sides of the base of both mandibles, for three quarters of an inch, of a fine orange yellow, the rest black; lore brown, irides fine orange red; the crown and sides of the head above the eyes nearly black, and the feathers a little elongated; the hind part of the neck, the back, and wings, dark brown; six of the middle secondaries white, mottled with dusky at the tips; the chin, sides under the eyes, and fore-part of the neck, pale ash-colour; the rest of the neck ferruginous chesnut, mottled on the breast with dusky; from thence to the vent, white, like satin, mottled on the sides with dusky spots; legs black. This species inhabits Denmark and Norway; it is also found towards the Caspian Sea; and migrates into England in the winter months, several of them having been killed both on our northern and southern coasts.

13. Colymbus Thomensis, the grebe of St. Thomas; size of a small fowl; bill black, with a pale tip; irides white; the head and upper parts dull brown; between the bill and the eye is a white spot; the under parts are white, except a large spot of black on the breast; the belly, sides, and thighs, spotted with grey; the wing-coverts pale rufous; legs dusky. Inhabits the isle of St. Thomas, and is called *duc-laart*.

14. Colymbus Ludovicianus, the Louisianian grebe; the bill in this species is slightly bent at the point; the upper parts of the head and body deep brown; sides of the neck and body, quite to the rump, rust-coloured; middle of the breast dusky white; from the base of the neck to the thighs, marked with large transverse black spots; legs dusky. Native of Louisiana.

15. Colymbus minor, the little grebe; in length ten inches; bill reddish brown; irides reddish hazel; all the upper parts of the head, neck, and body, reddish brown, very pale on the rump; sides of the head, and fore-part of the neck, yellowish grey; chin the same, but paler; breast and belly white, mottled with ash-colour, and red; thighs and vent grey; legs dirty green. Male and female much alike, but vary according to age, as in other species.

COLYMBUS.

1. The White-winged Guillemot. 2. The horned Grebe. 3. The Arctic Diver.

species. It makes a large nest, a foot or more in thickness, in the water, composed of grass and aquatic plants, and lays five or six yellowish white eggs; the nest is so placed in the water, that it is constantly kept wet, which seems essential to the hatching of the young both of this and other species of the genus. Their food is fish, water-insects, and plants. It is an admirable diver, and seems to make way under the water at a great rate, rising at an inconceivable distance from the place it plunges in at, and considerably beyond the length of gun-shot. We believe this bird to be pretty frequent on the old continent; it is likewise found at Hudson's Bay, in America, where it is called *disbyhet seekeep*. In England it is called by the various names of *didapper, dipper, loon*, and *dobchick*. There is a variety rather larger, and differs in the following particulars: the upper parts are brown, tinged with purple; the cheeks and sides of the neck incline to rufous; in other things it resembles the little grebe, and inhabits the Philippine islands.

16. Colymbus Dominicus, the grebe of St. Domingo; is the smallest of all the grebes, being scarcely eight inches in length; bill black; plumage of all the upper parts dusky; sides of the head, chin, and fore-part of the neck, dusky grey; breast, belly, sides, and thighs, silvery grey, marked with small brown spots; quills greyish white, more or less marked with greyish brown on the outer webs and tips; legs brown: inhabits the island of St. Domingo. There is a variety from Jamaica, of an uniform dusky lead-colour, except the middle of the belly, which has a large patch of white; the quills as in the above-described, and most likely differs merely in sex. A third variety with the belly wholly brown, comes from Cayenne, where it is known by the name of *foccové*. It is called at Jamaica and Barbadoes *the twopenny chick*. It is likewise an inhabitant of Surinam, where Fermin mentions another to exist, smaller, and wholly covered with cottony white feathers; the bill yellow, and the legs short. He tells us that it is only seen in the savannas, near small ponds, and feeds on the lesser fish. It is most likely that this is the young of the others.

17. Colymbus Hebridus, the Hebridal grebe; a size larger than the little grebe; chin black; fore-part of the neck ferruginous; hind-part mixed with dusky; belly cinereous and silvery white intermixed. Inhabits Tirée, one of the Hebrides.

18. Colymbus podiceps, the pied-bill grebe; length fourteen inches; bill strong, a little bent, not unlike that of common poultry, colour olive, with a dusky base, and crossed through the middle of both mandibles with a bar of black; nostrils very wide; irides white; chin and throat of a glossy black, bounded with white; upper part of the neck and back dusky; cheeks, and under parts of the neck, pale brown; breast and belly silvery, mottled with ash-colour; wings brown; ends of the secondaries white; toes furnished with a broad membrane. The female wants the black bar on the bill, and has the chin and throat of the same colour with the rest of the neck. Inhabits from New York to South Carolina; is called in the first the *hen-beaked wigeon*, and arrives there late in the autumn, and goes away in April.

19. Colymbus subcristatus, the half-crested grebe; the crest on the head is small and black; irides light red; bill black and depressed; throat cinereous; breast and belly of a silvery white mixed with cinereous; back and wings black: native of Austria.

20. Colymbus parotis, the parotid grebe; the head is of a shining black; the throat yellow, barred or striped with black; sides of the neck from the shoulders bright ferruginous, ascending up and terminating on the sides of the head like ears; back and wings black; breast and belly spotted with white: discovered by Dr. Sparrman.

21. Colymbus Caspicus, the Caspian grebe; the head smooth and glossy; all the upper parts of the body dusky brown approaching to black; the under parts of a silvery white: inhabits the Caspian sea.

The DIVERS.

Though many acquatic birds dive even to the bottom of the water in pursuit of their prey, the name of *diver* has been appropriated to a small family, distinguished from the rest by their strait pointed bill, and their three fore toes connected together by an entire membrane, which throws a hem along the inner toe, from which the hind one is parted; their nails are also small and pointed; their tail is extremely short, and scarcely visible; their feet are very flat, and placed quite behind the body; their leg is concealed in the lower belly, a disposition well adapted for swimming, but almost incompatible with walking. In fact, the divers, when on land, are obliged, like the grebes, to stand erect, and cannot maintain their balance; but, in the water their motions are so nimble and prompt, that, the instant they perceive the flash of a gun, they plunge and escape the ball.

22. Colymbus glacialis, the northern diver. This bird is the largest of the genus, and exceeds the goose in size, weighing sixteen pounds, and measures near three feet six inches in length; the breadth four feet eight inches. The bill is four inches and a half long, and black; the head and neck of a deep velvet black; under the chin is a patch of white, marked with several parallel lines of black; on each side of the neck a large portion of the same, elegantly marked with black lines, almost uniting at the back part; sides of the breast decorated in the same manner, but the lines not so numerous; the hind part of the neck, back, wing-coverts, and scapulars, are black, marked with round spots of white, which grow larger as they advance downwards; and on the scapulars, and part of the larger coverts, the spots are of a square form, and placed in rows; the quills and tail are black; the wings are short; the breast and under parts white; legs black. The female is smaller, and the ring on the neck is less distinct. In young birds, also, the plumage does not seem to correspond, even when of a considerable size; hence we suspect that the bird does not arrive at perfection till the second or third moulting. This species inhabits several parts of the north of Europe, but is not very frequent on our shores; nor is ever seen southward, except in very severe winters. It is seldom met with on land, being for the most part on the open sea, where it is continually diving for fish, which it does with great agility, and flies high and well. One of these was caught alive near Keswick, in Cumberland, in July, 1781. It was, as is supposed, making for the lake, but grew tired before it had power to reach it. It is common in Iceland and Greenland, where it breeds, and at that time frequents the fresh waters. It is very plentiful in Norway, and all along the Arctic coasts, as far as the river Ob, in the Russian dominions, and at Hudson's Bay. The Barabinzians, a nation situated between that river and the Irtisch, tan the breasts of this and other water-fowl, whose skins they prepare in such a manner as to preserve the down upon them; and, sewing a number of them together, sell them to make pellices, caps, &c. Garments made of these are very warm, never imbibing the least moisture; and are more lasting than would be imagined. The female lays two large pale brown or stone-coloured eggs, in June. They change place according to the season, and are found at times at New York. The natives of Greenland use the skins for clothing; and the Indians about Hudson's Bay adorn their heads with circlets of their feathers. At the last place it is known by the name of *athinuemoqua*. As they are seldom seen on the sea-coasts, but chiefly among the lakes, they are called by the Indians *inland loons*. In the northern regions, every pair of these birds occupy a lake, and breed on the small islets, where the young defend themselves courageously with their bills. Of this bird we have the following account in the Naturalist's Calendar, published in 1795, by the late reverend Gilbert White, of Selbourn, in Hampshire; "As one of my neighbours was traversing

Wolmer forest from Bramshot across the moors, he found a large uncommon bird fluttering in the heath, but not wounded, which he brought home alive. On examination it proved to be colymbus glacialis. Every part and proportion of this bird is so incomparably adapted to its mode of life, that in no instance do we see the wisdom of God in the creation to more advantage. The head is sharp, and smaller than the part of the neck adjoining, in order that it may pierce the water; the wings are placed forward and out of the center of gravity, for a purpose noticed hereafter; the thighs quite at the podex in order to facilitate diving; and the legs are flat, and as sharp backwards almost as the edge of a knife, that in striking they may easily cut the water; while the feet are palmated, and broad for swimming, yet so folded up when advanced forward to take a fresh stroke, as to be full as narrow as the shank. The two exterior toes of the feet are longest; the nails flat and broad resembling the human, which give strength and increase the power of swimming. The foot, when expanded, is not at right angles to the leg or body of the bird; but the exterior part inclining towards the head forms an acute angle with the body; the intention being not to give motion in the line of the legs themselves, but by the combined impulse of both in an intermediate line, the line of the body. Most people know, that have observed at all, that the swimming of birds is nothing more than a walking in the water, where one foot succeeds the other as on the land; yet no one, as far as I am aware, has remarked that diving fowls, while under water, impel and row themselves forward by a motion of their wings, as well as by the impulse of their feet: but such is really the case, as any person may easily be convinced who will observe ducks when hunted by dogs in a clear pond. Nor do I know that any one has given a reason why the wings of diving fowls are placed so forward: doubtless, not for the purpose of promoting their speed in flying, since that position certainly impedes it; but probably for the increase of their motion under water, by the use of four oars instead of two; yet were the wings and feet nearer together, as in land-birds, they would, when in action, rather hinder than assist one another. This colymbus was of considerable bulk, weighing only three drachms short of three pounds avoirdupois. It measured in length from the bill to the tail (which was very short) two feet; and to the extremities of the toes four inches more; and the breadth of the wings expanded was forty-two inches. A person attempted to eat the body, but found it very strong and rancid, as is the flesh of all birds living on fish."

23. Colymbus immer, the immer diver; this is less than the preceding, but measures upwards of two feet in length; bill four inches and a quarter long; the top of the head, and hind-part of the neck, are brown; forehead, and sides of the head and neck, speckled; and the back and wings brown; each feather margined with a paler tint; on the middle of the neck the brown comes very forward, and almost surrounds it; above this it is spotted with black and white; except these markings, all the under parts, from chin to vent, are white; but the last is mottled with brown; quils and tail brown, the last edged with white; legs dusky. This species is better known in the northern parts of England, than the southern, where it seldom appears, except the winter be very severe. It inhabits the seas about the Orknies, and the Ferro isles. Found also in Iceland, and most parts of northern Europe; likewise in Kamtschatka; but not in any part of Siberia or Russia. Inhabits Swisserland, particularly on the lake Constance, where it is known by the name of *fluder*. It dives to very great depths, and swims under water to the distance of an hundred paces without emerging to take breath: a portion of air included in its dilated wind-pipe supplies its respiration during this interval. The same is the case with other divers and grebes; they glide through the water freely in all directions; in it they find their food, their shelter, their asylum: when the bird of prey hovers above them, or the fowler appears on the shore, they plunge for safety. But man, more formidable by his address than by his strength, prepares snares for them, even in the bottom of their retreat: a net or a line baited with a small fish, allures the unwary bird; it swallows death with the repast, and perishes in that element where it received birth; for its nest is placed on the water amidst the tall rushes and flags.

24. Colymbus stellatus, the stellated diver; smaller than the preceding; weighs two pounds and a half, twenty-seven inches in length, and three feet nine in breadth: the bill is three inches long, and bends a little upwards, of a pale horn-colour, the top of the upper mandible brown; the head is dusky, dotted with grey; the sides under the eye, the chin, and throat, white; fore-part of the neck very pale ash-colour; back mouse-colour, marked with oval spots of white; breast and under parts white; legs brown. This bird is frequent in England, and found on the river Thames, where it is called by the fishermen *sprat loon*, being often seen in vast numbers among the shoals of that fish, diving after them, and frequently approaching very near the boats while fishing. It is common about the Baltic and the White Sea, but not observed in other parts of Russia, yet is a native of Kamtschatka. It lays two eggs in the grass, on the borders of lakes not far from the sea; they are oval, size of those of a goose, and marked with a few black spots. These birds are frequent about the fish-ponds in France; and they visit New York in winter, but return very far north to breed.

25. Colymbus arcticus, the artic diver; only two feet in length; bill near two inches long, slender, and black; the fore-part of the head and throat black; hind-part of the head and neck ash-colour; sides of the last white, spotted with black; on the fore-part of the neck is a large patch of black, changing to purple and green in different lights; the back and upper parts black; scapulars marked with square spots of white; wing-coverts the same, but the spots are round; breast and belly white; tail short and black; legs black, with a cast of red on the inside. This bird is rarely found in England. It abounds in the northern parts of Europe, Norway, Sweden, and Denmark, in the inland lakes of Siberia, especially those of the Arctic regions; also in Iceland, Greenland, and the Ferro isles; likewise in America, at Hudson's Bay. It is said to cry and be very restless against rain, making a great noise; hence the Norwegians think it impious to destroy them; but the Swedes, less superstitious, dress their skins, which, like all of this genus, are exceedingly tough, and use them for gun-cases, and facings for winter caps.

26. Colymbus septentrionalis, the red-throated diver; weighs three pounds, and is two feet five inches in length; bill three inches long, black, and slender; the head and chin are cinereous, dotted with brown; the rest of the head, sides of the neck, and throat, ash-colour; the hind-part of the neck longitudinally streaked with dusky and white; the throat, and part of the neck, of a fine chesnut red; from thence the under parts are white; the upper parts, wings, and tail, dusky, marked with a few white spots; legs dusky, with a reddish tinge. This is seldom met with southward, except in severe winters. It breeds in the northern parts of Scotland, on the borders of the lakes; and is found in Russia, Siberia, and Kamtschatka; but does not haunt the inland lakes. It is common in Iceland and Greenland; breeds in June, and lays two ash-coloured eggs, marked with a few black spots; making a nest in the grass on the shores, composed of moss and grass, and placed contiguous to the water. It swims and dives well, and flies admirably, and while flying is very noisy. It oftener frequents fresh waters than those of the sea. Feeds on small fish, crabs, and sea insects; and the skin is put to the same uses as that of the black-throated species. It inhabits the rivers of Hudson's Bay in the summer,

summer, appearing as soon as the rivers are open. The young fly before the end of August, and they all depart in September.

27. Colymbus striatus, the striped diver; weight between two and three pounds; bill three inches long, and black; head and neck light grey, striped regularly downwards with long, narrow, black lines; back and scapulars dusky and plain; primaries, tail, and legs, dusky; cheeks, and whole under side of the body, glossy white. It inhabits the inland lakes of Hudson's Bay, about one hundred miles southward of York Fort. Lays, in June, two eggs; flies high, and passes backwards and forwards, making a great noise, which is said to portend rain; it is detested by the natives, who look on this note as supernatural: named, at Hudson's Bay, *mathemoqua*.

28. Colymbus Sinensis, the Chinese diver; bill dusky; irides ash-colour; the upper parts of the head, neck, body, wings, and tail, dusky greenish brown; the middle of the feathers much darker; the fore-part of the neck the same, but considerably paler; chin pale rufous; breast, and under parts of the body, pale rufous white, marked with dusky rufous spots; the quills and tail are pale brown; legs ash-colour. Native of China.

COM, or KOM, a town of Persia, in the province of Irak Agemi, celebrated for its silk manufactures, chiefly velvets: ninety miles south of Casbin, and 150 north of Ispahan.

CO'MA, *s.* [from κω, or κεω, to lie down] This word anciently denoted any total suppression of the powers of sense; but now it means a lethargic drowsiness. The coma vigil is a disease where the patients are continually inclined to sleep, but cannot. In botany, it means the top of a branch or flower when it resembles a lock of hair, from κομη, a lock of hair.

CO'MA AU'REA, *s.* in botany. See ATHANASIA, CHRYSOCOMA, and GNAPHALIUM.

CO'MA BERENICES, BERENICE'S HAIR, *s.* A modern constellation of the northern hemisphere; composed of unformed stars between the Lion's tail and Bootes. It is said that this constellation was formed by Conon, an astronomer, to console the queen of Ptolemy Euergetes, for the loss of a lock of her hair, which was stolen out of the temple of Venus, where she had dedicated it on account of a victory obtained by her husband. The stars in this constellation are, in Tycho's catalogue fourteen, in Hevelius's twenty-one, and in the Britannic catalogue forty-three.

COMA'CHIO, a town of Italy in the duchy of Ferrara, situated in a marshy country, called the *Valley of Comachio*, the see of a bishop, suffragan of Ravenna; it was taken by the imperialists in 1708, but restored by Charles VI. to pope Benedict XIII. twenty-eight miles east of Ferrara, and forty-nine south of Venice. Lat. 44. 42. N. lon. 29. 52. E. Ferro.

COMA'NA, anciently a city of Cappadocia, famous for a temple of Bellona, where there were above 6000 ministers of both sexes. The chief priest among them was very powerful, and knew no superior but the king of the country. This high office was generally conferred upon one of the royal family. *Strabo*.

COMA'NA, a town and province in the northern division of Terra Firma, South America. It lies on the north-easternmost part of the sea-coast.

CO'MAR, or KOMAR, in Hindoostan, a zemindar's demesne of land.

COMAR'GO, a town of New Leon, in North America, situated on the south side of Rio Bravo, which empties into the gulf of Mexico on the west side.

COMAROI'DES, *s.* in botany. See POTENTILLA.

CO'MART, *s.* This word seems to signify treaty; article; from *con* and *mart*, or *market*:

By the same *comart*,
And carriage of the articles design'd,
His fell to Hamlet. *Shakespeare.*

COMART'CH, a river of South Wales, in the county of Brecknock, which runs into the Yrvon: eight miles west of Bealth.

COM'ARUM, *s.* [κομαρος of Theophrastus, is an evergreen-tree.] In botany, a genus of the class icosandria, order polygynia, natural order senticosæ. The generic characters are—Calyx: perianthium one-leafed, ten-cleft, very large, spreading, coloured; alternate divisions smaller, inferior, permanent. Corolla: petals five, oblong, acuminate, three times smaller than the calyx on which they are inserted. Stamina: filaments twenty, subulate, inserted into the calyx, length of the corolla, permanent; antheræ lunular, deciduous. Pistillum: germs numerous, roundish, very small, collected into a head; styles simple, short, from the side of the germ; stigmas simple. Pericarpium: none; common receptacle of the seeds ovate, fleshy, very large, permanent. Seeds: numerous, acuminate, covering the receptacle.—*Essential Character.* Calyx; ten cleft; petals five, smaller than the calyx; receptaculum of the seeds ovate, spongy, permanent.

There is but one species, called comarum palustre, or marsh cinquefoil; with creeping woody roots, which send out many black fibres, penetrating deep into boggy ground; stems many, herbaceous, about two feet high, generally inclining to the ground. At each joint is one leaf, composed of five, six, or seven, leaflets. The petals are not more than a third part of the size of the calyx. It is a native of most parts of Europe, in boggy ground. A few plants are growing upon a bog at Hampstead; but the nearest place to London where it grows wild in plenty, is in the meadows near Guilford in Surrey. It is found also at Selburne, in Hampshire; near Bromsgrove Lickey, in Worcestershire; Gamlingay, in Cambridgeshire; in Norfolk; near Colchester, in Essex; Giggleswick Tarn, near Settle; in Scotland and Ireland. The roots dye wool of a dirty red colour, and have astringency enough, with other plants of the same order, to tan leather. The Irish rub their milking pails with it, to make the milk appear thicker and richer. Goats eat it. Cows and sheep are not fond of it. Horses and swine refuse it. Flowers in June. There is a variety with thicker and more villose leaves, which grows plentifully in Ireland, and in the north of England; but, after one year's growth in a garden, it is not to be distinguished from the common sort.

Propagation and Culture. This plant, being a native of bogs, cannot well be preserved in a garden, except it be planted in a soil congenial to its natural one. The roots may be removed from the place of their growth in October, and will be in no danger of succeeding if they are planted in boggy ground.

CO'MATE, *s.* [from *con* and *mate.*] Companion.—My *comates* and brothers in exile. *Shakespeare.*

CO'MATE, *adj.* [*comatus*, Lat.] Seeming to have a bush appendant:

How *comate*, crinite, caudate, stars, are fram'd,
I knew. *Fairfax.*

COMATO'SE, *adj.* Lethargic; sleepy to a disease.—Our best castor is from Russia; the great and principal use whereof, is in hysterical and *comatose* cases. *Grew.*

COMB in the end, and COMP in the beginning, of names, seem to be derived from the British *kum*, which signifies a low situation. *Camden.*—In Cornish, *comb* signifies a valley, and had the same meaning anciently in the French tongue.

COMB, *s.* [*camb*, Sax. *kam*, Dut.] An instrument to separate and adjust the hair:

By fair Ligea's golden *comb*,
Wherewith she sits on diamond rocks,
Sleeking her soft alluring locks. *Milton.*

The top or crest of a cock, so called from its pectinated indentures.—Cocks have great *combs* and spurs, hens little or none. *Bacon.*

High was his *comb*, and coral red withal,
With dents embattled like a castle-wall. *Dryden.*

The

The cavities in which the bees lodge their honey. Perhaps from the same word which makes the termination of towns, and signifies *hollow* or *deep*:

This in affairs of state,
Employ'd at home, abides within the gate,
To fortify the *combs*, to build the wall,
To prop the ruins, lest the fabric fall. *Dryden.*

To COMB, *v. a.* To divide, and clean, and adjust the hair with a comb.—Divers with us that are grown grey, and yet would appear young, find means to make their hair black, by *combing* it, as they say, with a leaden comb. *Bacon.*

She with ribbon tied
His tender neck, and *comb'd* his silken hide. *Dryden.*

To lay any thing consisting of filaments smooth, by drawing through narrow interstices; as, *to comb wool.*

COMB-BRUSH, *s.* A brush to clean combs.

COMB-MAKER, *s.* One whose trade is to make combs.—This wood is of use for the turner, engraver, carver, and *comb-maker. Mortimer.*—An ingenious machine for cutting and making combs, has lately been invented by Mr. William Bundy, of Camden-town, near London; which is said to cut the teeth extremely neat, fine, and true, and to perform the work with great facility. It is protected by the king's letters patent, granted June 20, 1796.

COMB-MARTIN, a small town on the north coast of Devonshire, in the Bristol channel, with a small creek for boats; near it are silver mines, which formerly produced a considerable quantity of ore: thirty-nine miles west of Bridgewater, and 176 west of London.

COMBAHEE', a considerable river of South Carolina, which enters St. Helena sound between Coosa and Ashepoo rivers.—*Combahee Ferry*, on this river, is seventeen miles from Jacksonsborough, fifteen from Pocotaglio, and fifty-two from Charlestown.

COM'BAM, a town of Hindoostan, in the country of Cuddapa: sixty-five miles north of Cuddapa.

COM'BAMET, a town of Hindoostan, in the country of Golconda: sixty-eight miles east of Hydrabad.

To COM'BAT, *v. n.* [*combattre*, Fr.] To fight: generally in a duel, or hand to hand.—Pardon me, I will not *combat* in my shirt. *Shakespeare.*—To act in opposition, as the acid and alkali combat:

Two planets rushing from aspect malign
Of fiercest opposition in mid sky,
Should *combat*, and their jarring spheres confound. *Milton.*

To COM'BAT, *v. a.* To oppose; to fight:

Love yields at last, thus *combated* by pride,
And she submits to be the Roman's bride. *Granville.*

COM'BAT, *s.* Contest; battle; duel; strife; opposition: generally between two, but sometimes it is used for battle.—The noble *combat* that, 'twixt joy and sorrow, was fought in Paulina! She had one eye declined for the loss of her husband, another elevated that the oracle was fulfilled. *Shakespeare.*—The *combat* nowe by courage must be tried. *Dryden.*—In our ancient law *combat* was a formal trial of some doubtful cause, by the swords of two champions. The last trial of this kind in England was between Donald lord Ray appellant, and David Ramsay, esquire, defendant, when, after many formalities, the matter was referred to the king's pleasure. See the article BATTEL, vol. ii. p. 809.

COM'BATANT, *s.* [*combattant*, Fr.] He that fights with another; duellist; antagonist in arms:

So frown'd the mighty *combatant*, that hell
Grew darker at their frown. *Milton.*

A champion.—When any of those *combatants* strips his terms of ambiguity, I shall think him a champion for knowledge. *Locke.*—With *for* before the thing defended.—Men become *combatants for* those opinions. *Locke.*

COM'BE, in fabulous history, a daughter of the Ophius, who first invented a brazen suit of armour. She was changed into a bird, and escaped from her children, who had conspired to murder her. *Ovid.*

COM'BE, *s.* [Sax.] A valley between two hills. *Mason's Supplement to Johnson.*

COMBEAU' FONTAI'NE, a town of France, in the department of the Upper Saône, and chief place of a canton, in the district of Jussey: eleven miles west-north-west of Vezoul, and seven south of Jussey.

COMBE'FIS (Francis), a learned Dominican, born in 1605, and highly distinguished by a pension voluntarily offered to him by the clergy of France, as an encouragement to publish new editions of the Greek fathers. He gave editions of Amphilocus, Methodius, Andreas Cretensis, and other works of the Greek fathers. He made a considerable addition to the Bibliotheca Patrum, Greek and Latin, in three volumes folio. He published also, the five Greek historians after Theophanes, by way of supplement to the Byzantine historians, in one volume folio. This is said to have been undertaken by order of the French minister Colbert. There are also other works of Combefis, who died in 1679: "consumed," says his biographer, "by the austerities of the cloister, by the labours of the study, and by the pains of the stone."

COM'BENY, a river of South Wales, in Caermarthenshire, which runs to the Loughor: five miles north-east of Llanelthy.

COM'BER (Dr. Thomas), a learned divine of the church of England, born at Westerham in Kent, in 1645. He was educated at Sidney-Sussex-college in Cambridge, and took the degree of D. D. between 1676 and 1679. In 1677 he was made by archbishop Sterne a prebendary of York; and in January 1683 was collated to the præcentorship. Upon the deprivation of Dr. Glanville, he was nominated to succeed him in the deanery of Durham. He was chaplain to Anne princess of Denmark, and to king William and queen Mary, and would probably have been raised higher in the church if he had lived; but he died, November 25, 1699, and was buried at Stonegrave in Yorkshire, of which he was rector. He was the author of several learned works, chiefly relating to the common-prayer and offices of the church.

There was also another Thomas Comber, D. D. who lived in the same century, and was of Trinity-college in Cambridge. He was born in Sussex, Jan. 1575; admitted scholar of Trinity in May 1593; chosen fellow of the same, Oct. 1597; preferred to the deanery of Carlisle, Aug. 1630; and sworn in master of Trinity-college, Oct. 1631. In 1642, he was imprisoned, plundered, and deprived of all his preferments; and died in Feb. 1653, at Cambridge. He wrote An historical Vindication of the divine Right of Tythes, against Selden's History of Tythes, quarto.

CO'MBER, *s.* He whose trade it is to disentangle wool, and lay it smooth for the spinner.

COMBERME'RE, a lake of England, in the county of Chester, on the borders of Shropshire: five miles south of Nantwich.

COM'BINATE, *adj.* Betrothed; promised; settled by compact.—She lost a nobler brother; with him the sinew of her fortune, her marriage dowry: with both, her *combinate* husband, this well-seeming Angelo. *Shakespeare.*

COMBINATION, *s.* Union for some certain purpose; association; league. A combination is of private persons; a confederacy, of states or sovereigns:

This cunning cardinal
The articles o' th' *combination* drew,
As himself pleas'd. *Shakespeare.*

Combinations to do unlawful acts, are punishable *before* the unlawful act is executed; this is to prevent the consequence of combinations and conspiracies. It is now generally used in an ill sense.—They aim to subdue all to their own will and power, under the disguises of holy *combinations. King Charles.*—Union of bodies, or qualities; commixture conjunction.—Resolution of compound bodies

dies by fire, does not so much enrich mankind as it divides the bodies; as upon the score of its making new compounds by new *combinations*. *Boyle*.—Ingratitude is always in *combination* with pride and hard-heartedness. *South*.—Copulation of ideas in the mind.—They never suffer any ideas to be joined in their understandings, in any other or stronger *combination* than what their own nature and correspondence give them. *Locke*.—*Combination* is used, in mathematics, to denote the variation or alteration of any number of quantities, letters, sounds, &c. in all the different manners possible. Thus the number of possible changes or *combinations* of the twenty-four letters of the alphabet, taken first two by two, then three by three, and so on, according to Prestet's calculation, amount to 1,391,724,288,887,252,999,425,128,493,402,200.

Father Mersenne gives the combinations of all the notes and sounds in music, as far as 64; the sum of which amounts to a number expressed by 90 places of figures. And father Truchet, in Mem. de l'Acad. shews, that two square pieces, each divided diagonally into two colours, may be arranged and combined 64 different ways, so as to form so many different kinds of chequer-work; a thing that may be of use to masons, paviours, painters, &c.

DOCTRINE OF COMBINATIONS.—1. Having given any number of things, with the number in each combination; to find the number of combinations. When only two are combined together.

One thing admits of no combination.
Two, *a* and *b*, admit of 1 only, viz. *ab*.
Three, *a*, *b*, *c*, admit of 3, viz. *ab*, *ac*, *bc*.
Four admit of 6, viz. *ab*, *ac*, *ad*, *bc*, *bd*, *cd*.
Five admit of 10, viz. *ab*, *ac*, *ad*, *ae*, *bc*, *bd*, *be*, *cd*, *ce*, *de*.

Whence it appears that the numbers of combinations, of two and two only, proceed according to the triangular numbers 1, 3, 6, 10, 15, 21, &c. which are produced by the continual addition of the ordinal series 0, 1, 2, 3, 4, 5, &c. And if n be the number of things, then the general formula for expressing the sum of all their combinations by twos, will be $\frac{n\cdot\overline{n-1}}{1\cdot 2}$.

Thus, if $n = 2$; this becomes $\frac{2\cdot 1}{2} = 1$.

If $n = 3$; it is $\frac{3\cdot 2}{2}$ - - $= 3$.

If $n = 4$; it is $\frac{4\cdot 3}{2}$ - - $= 6$. &c.

When three are combined together; then
Three things admit of 1 order, *abc*.
Four admit of 4; viz. *abc*, *abd*, *acd*, *bcd*.
Five admit of 10; viz. *abc*, *abd*, *abe*, *acd*, *ace*, *ade*, *bcd*, *bce*, *bde*, *cde*. And so on according to the first pyramidal numbers 1, 4, 10, 20, &c. which are formed by the continual addition of the former, or triangular numbers 1, 3, 6, 10, &c. And the general formula for any number n of combinations, taken by threes, is $\frac{n\cdot\overline{n-1}\cdot\overline{n-2}}{1\cdot 2\cdot 3}$.

So, if $n = 3$; it is $\frac{3\cdot 2\cdot 1}{1\cdot 2\cdot 3} = 1$.

If $n = 4$; it is $\frac{4\cdot 3\cdot 2}{6} = 4$.

If $n = 5$; it is $\frac{5\cdot 4\cdot 3}{2} = 6$. &c.

Proceeding thus, it is found that a general formula for any number n of things, combined by m at each time, is $s = \frac{n\cdot\overline{n-1}\cdot\overline{n-2}\cdot\overline{n-3}, \&c}{1\cdot\quad 2\cdot\quad 3\cdot\quad 4\cdot \&c}$, continued to m factors, or terms, or till the last factor in the denominator be m. So, in 6 things, combined by fours, the number of combinations is $\frac{6\cdot 5\cdot 4\cdot 3}{1\cdot 2\cdot 3\cdot 4} = 15$.

By adding all these series together, their sum will be the whole number of possible combinations of n things combined both by twos, by threes, by fours, &c. And as the said series are evidently the coefficients of the power n of a binomial, wanting only the first two 1 and n; therefore the said sum, or whole number of all such combinations, will be $\overline{1+1}|^{n} - n - 1$, or $2^{n} - n - 1$. Thus if the number of things be 5; then $2^5 - 5 - 1 = 32 - 6 = 26$.

2. To find the number of changes and alterations which any number of quantities can undergo, when combined in all possible varieties of ways, with themselves and each other, both as to the things themselves, and the order or position of them.

One thing admits but of one order or position. Two things may be varied four ways; thus, *aa*, *ab*, *ba*, *bb*. Three quantities, taken by twos, may be varied nine ways; thus, *aa*, *ab*, *ac*, *ba*, *ca*, *bb*, *bc*, *cb*, *cc*. In like manner four things, taken by twos, may be varied 4^2 or 16 ways; and 5 things, by twos, 5^2 or 25 ways; and, in general, n things, taken by twos, may be changed or varied n^2 different ways. For the same reason, when taken by threes, the changes will be n^3; and when taken by fours, they will be n^4; and so generally, when taken by n's, the changes will be n^n. Hence, then, adding all these together, the whole number of changes, or combinations in n things, taken both by 2's, by 3's, by 4's, &c. to n's, will be the sum of the geometrical series $n + n^2 + n^3 + n^4 \cdots n^n$, which sum is $= \frac{n^n - 1}{n - 1} \times n$.

For example, if the number of things n be 4; this gives $\frac{4^4 - 1}{4 - 1} \times 4 = \frac{255}{3} \times 4 = 340$.

And if n be 24, the number of letters in the alphabet; the theorem gives

$$\frac{24^{24} - 1}{24 - 1} \times 24 = \overline{24^{24} - 1} \times \frac{24}{23} =$$

1391724288887252999425128493402200. In so many different ways, therefore, may the 24 letters of the alphabet be varied or combined among themselves, or so many different words may be made out of them.

To COMBI'NE, *v. a.* [*combiner*, Fr. *binos jungere*, Lat.] To join together:

Let us then not suspect our happy state,
As not secure to single or *combin'd*. *Milton.*

To link in union:

God, the best maker of all marriages,
Combine your hearts in one, your realms in one. *Shakes.*

To agree; to accord; to settle by compact:

My heart's dear love is set on his fair daughter;
As mine on hers, so hers is set on mine,
And all *combin'd*, save what thou must *combine*
By holy marriage. *Shakespeare.*

To join words or ideas together: opposed to *analyse*.

To COMBI'NE, *v. n.* To coalesce; to unite each with other. Used both of things and persons:

Honour and policy, like unsever'd friends
I' th' war, do grow together: grant that, and tell me
In peace what each of them by th' other loses,
That they *combine* not there? *Shakespeare.*

To unite in friendship or design.—*Combine* together 'gainst the enemy. *Shakespeare.*

You with your foes *combine*,
And seem your own destruction to design. *Dryden.*

COMBI'NEABLE, *adj.* Consistent; that may be combined.—I insist upon it, that pleasures are very *combineable* with both business and studies, and have a much better relish from the mixture. *Chesterfield.*

COM'BLESS, *adj.* Wanting a comb or crest:

What, is your crest a coxcomb?——
—A *combless* cock, so Kate will be my hen. *Shakespeare.*

COM'BOURG, a town of France, in the department of the Ille and Vilaine, and chief place of a canton, in the district of Dol: two leagues and a half south of Dol.

COMBRAIL'LES, before the revolution a small country of France, in the province of Auvergne, of which Evaux was the capital.

COMBRE'E, a town of France, in the department of the Mayne and Loire, and chief place of a canton, in the district of Segre: seven miles west of Segre.

COMBRE'T, a town of France, in the department of the Aveiron: eight leagues east of Alby.

COMBRE'TUM, *s.* [the name of a plant in Pliny, described by him as very like the bacchar, but taller, with the leaves drawn out so finely as to resemble threads.] In botany, a genus of the class octandria, order monogynia, natural order of calycanthemæ. The generic characters are—Calyx: perianthium one-leafed, superior, bell-shaped, four or five-toothed, deciduous. Corolla: petals four or five, ovate, acute, inserted into the calyx, and scarcely longer than it. Stamina: filaments eight or ten, bristle-form, erect, very long; antheræ a little oblong. Pistillum: germ inferior, linear; style bristle-form, length of the stamens; stigma acute. Perianthium: none, except the crust of the seed. Seed: single, four or five-angled; angles membranaceous; acuminate.—*Essential Character.* Calyx, four or five-toothed, bell-shaped, superior; corolla, four or five-petalled, inserted into the calyx; stamina, very long; seed, one; four or five-angled, the angles membranaceous.

Species. 1. Combretum laxum: spikes lax, leaves opposite. This genus is very imperfectly known, and being a very fine one, deserves the attention of the cultivators of exotic plants. The first species is a shrub with round scandent branches, the younger ones brachiate; leaves ovate, acuminate, sometimes blunt, with or without a point, quite entire, smooth, petioled, three inches long; spikes erect, three inches long, axillary and terminating; flowers small, whitish, on very short pedicels. Jacquin affirms, that the plant which Aublet has figured and described under the same name, is not his plant, although it have the same habit, for the flowers are totally different. He would unite Aublet's with Loefling's plant, and consider them as a distinct species. It seems indeed to agree better with our second species, than with the first. The leaf and fruit in Aublet's figure agree well enough with Jacquin's of his *secundum*, but not with that of Gærtner, who refers to Aublet, and not to Jacquin. Native of the West-Indies.

2. Combretum secundum: spikes in one row, leaves opposite. This is a small tree, twelve feet high, supporting itself on other trees by its round and very long branches; leaves ovate-oblong, acuminate, quite entire, smooth, veined, distich, petioled, four inches long, the upper ones on the flowering branchlets smaller; spike pinnate, composed of several opposite ones in a double row uncertain in their number, and an odd one at the end, extended horizontally along with the extremity of the branch whence it arises: pedicels one-flowered, extremely short, placed very close to each other; flowers very numerous, with scarcely any scent, yellowish green except the anthers, which are red, all turned upwards and erect, all together appearing like a crest; the branches, when broken, and the leaves bruised, have a fetid and very unpleasant smell. Native of Carthagena in South America; and also of Guiana.

3. Combretum purpureum: leaves ovate-oblong, both they and the calyxes naked, spikes simple, directed one way. This is a very smooth shrub, with round brachiate branches; native of the East-Indies.

4. Combretum decandrum: leaves alternate, flowers ten-stamened. This is a weak branching shrub, climbing to twenty feet in height, with prickles on the older branches; flowers small and very numerous, coming out usually before the leaves; fruits brownish. Native of Carthagena; flowering in May and June, and fruiting in July and August.

COMBRON'DE, a town of France, in the department of the Puy-de-dôme, and chief place of a canton, in the district of Riom: two leagues north of Riom.

COM'BUST, *adj.* or COMBUSTION, *s.* in astrology, is said of a planet when it is in conjunction with the sun, or not distant from it above half their disc. But, according to Argol, a planet is *combust*, or in *combustion*, when it is within eight degrees and a half of the sun.

COMBUSTI'BLE, *adj.* [*comburo, combustum*, Lat.] Having the quality of catching fire; susceptible of fire.—Sin is to the soul like fire to *combustible* matter; it assimilates before it destroys it. *South.*

The flame shall still remain;
Nor, till the fuel perish, can decay,
By nature form'd on things *combustible* to prey. *Dryden.*

COMBUSTI'BLENESS, *s.* Aptness to take fire.

COMBUS'TIO PECU'NIÆ, the ancient way of trying mixt and corrupt money, by melting it down upon payments into the exchequer. In the time of Henry II. a constitution was made, called the trial by combustion; the practice of which differed little from the present method of assaying silver. But whether this examination of money by combustion, was to reduce an equation of money only of sterling, viz. a due proportion of alloy with copper, or to reduce it to a fine pure silver without alloy, doth not appear.

COMBUS'TION, *s.* [Fr.] Conflagration; burning; consumption by fire.—The future *combustion* of the earth is to be ushered in and accompanied with violent impressions upon nature. *Burnet.*—Tumult; hurry; bustle.—Those cruel wars between the houses of York and Lancaster, brought all England into an horrible *combustion*. *Raleigh.*

How much more of pow'r,
Army against army, numberless to raise
Dreadful *combustion* warring, and disturb,
Though not destroy, their happy native seat! *Milton.*

In the chemical investigation of natural bodies, there is a remarkable distinction with regard to the effects of combustion upon them. Some will admit of being heated to such a degree as even to become luminous, or red hot, without any permanent or considerable change of their properties or component parts; and as soon as the communication of heat ceases, the bodies immediately begin to cool. On the other hand there are a great number of bodies, which, when heated with access of vital air to such a degree as to become luminous, undergo a change in their properties, insomuch that their temperature even increases, and they continue to give out heat until the general state of the combination of their parts is changed. These substances are distinguished by the name of combustible bodies, and the alteration produced by this apparently spontaneous production of heat, is called *combustion.*

It must always have been a problem of the first importance in natural philosophy, to ascertain what happens in combustion. The division of substances into combustible and incombustible, is as striking and distinct as any we are acquainted with; and it is a natural inference, that the one class of bodies must possess some general property or identical substance not to be found in the other. The philosophy of the middle ages, probably in consequence of their logical classifications, was much more disposed to attach itself to substances than habitudes or properties. It is less to be wondered at, therefore, that Beccher and Sthal, in their chemical theory, should have assigned a substance eminently combustible, or fire itself, as resident in all combustible bodies, and occasioning the difference between them and other bodies, instead of enquiring whether the general effect might not have arisen from some principle of the chemical affinities. Modern chemists

mists have very ably and successfully maintained this last doctrine. Something, however, like party, has arisen in the discussion of this great question. It is perhaps the lot of humanity that apathy should attend absolute impartiality, or the absence of prejudice. It is probable that the bigotry of the maintainers of what is now called the ancient chemistry, and the impetuosity of the cultivators of the new, may have occasioned a more complete discussion of the subject, than philosophers, whose passions were less animated, might have taken the trouble to have made. The modern maintainers of phlogiston, or the principle of inflammability, do not teach exactly the same doctrine as Stahl. This chemist supposed combustion to consist in the escape of fire from bodies. Various facts have compelled modern chemists to modify this position. The most generally received statement is, that a substance called phlogiston, and very strongly attractive of vital air, resides in all combustible bodies; that a certain degree of heat weakens the adherence between phlogiston and the combustible substance, and consequently disposes it to a more speedy union with the vital air of the atmosphere; that the capacity of vital air for heat is diminished by this union, and consequently an increase of temperature follows, which serves to accelerate the disengagement of more of the phlogiston; and in this way heat continues to be extricated, until the body has become dephlogisticated, or incombustible. The modern or anti-phlogistic theory is exactly the same, excepting that instead of supposing combustible bodies to contain a principle of inflammability which attracts the vital air of the atmosphere, it infers that the body itself, now termed *caloric*, attracts and combines with that air; and, as no difficulty ensues from this statement, it is clear that the phlogiston is redundant and unnecessary in accounting for the effects. See the article CHEMISTRY, p. 153, 179, 181, 195, &c. of this volume.

COM'CHE, a town of Persia, where the caravans rest in the road from Ispahan to Ormus.

To COME. *v. n.* pret. *came*, particip. *come*, [coman; Sax. *komen*, Dut. *kommen*, German.] To remove from a distant to a nearer place; to arrive: opposed to go:

And troubled blood through his pale face was seen
To *come* and *go*, with tidings from the heart. *Spenser*.

To draw near; to advance towards:

By the pricking of my thumbs,
Something wicked this way *comes*. *Shakespeare*.

To move in any manner towards another; implying the idea of being received by another, or of tending towards another. The word always respects the place to which the motion tends, not that place which it leaves; yet this meaning is sometimes almost evanescent and imperceptible.—As soon as the commandant *came* abroad, the children of Israel brought in abundance the first fruits. 2 *Chronicles*.—Knowledge is a thing of their own invention, or which they *come* to by fair reasoning. *Burnet*.—It is impossible to *come* near your lordship, at any time, without receiving some favour. *Congreve*.—God has made the intellectual world harmonious and beautiful without us; but it will never *come* into our heads all at once. *Locke*.—To proceed; to issue.—Behold, my son, which *came* forth of my bowels, seeketh my life. 2 *Samuel*, xvi. 11.—To advance from one stage or condition to another.—Seditious tumults, and seditious fames, differ no more but as brother and sister; if it *come* to that, that the best actions of a state are taken in an ill sense and traduced. *Bacon*.—His soldiers had skirmishes with the Numidians, so that once the skirmish was like to *come* to a just battle. *Knolles*.—The force whereby bodies cohere is very much greater when they *come* to immediate contact, than when they are at ever so small a finite distance. *Cheyne*.—To be brought to some condition either for better or worse, implying some degree of casuality: with *to*.—One said to Aristippus, 'tis a strange thing why men should rather give to the poor than to philosophers. He answered, because they think themselves may sooner *come to* be poor than to be philosophers. *Bacon*.—His sons *come to* honour, and he knoweth it not. *Job*.—To attain any condition or character.—The testimony of conscience, thus informed, *comes* to be so authentic, and so much to be relied upon. *South*.

A serpent, ere he *comes* to be a dragon,
Does eat a bat. *Ben Jonson*.

To become.—How *came* the publican justified, but by a short and humble prayer? *Duppa*.

So *came* I a widow;
And never shall have length of life enough
To rain upon remembrance with mine eyes. *Shakespeare*.

To arrive at some act or habit, or disposition.—They would quickly *come* to have a natural abhorrence for that which they found made them slighted. *Locke*.—To change from one state into another desired; as the butter *comes*, when the parts begin to separate in the churn.—It is reported, that if you lay good store of kernels of grapes about the root of a vine, it will make the vine *come* earlier, and prosper better. *Bacon*.—In the *coming* or sprouting of malt, as it must not *come* too little, so it must not *come* too much. *Mortimer*.

Then butter does refuse to *come*,
And love proves cross and humoursome. *Hudibras*.

To become present, and no longer future:

A time will *come*, when my maturer muse
In Cæsar's wars a nobler theme shall chuse. *Dryden*.

To become present and no longer absent:

That's my joy
Not to have seen before; for nature now
Comes all at once, confounding my delight. *Dryden*.

Come then, my friend, my genius, *come* along,
Thou master of the poet and the song! *Pope*.

To happen; to fall out.—The duke of Cornwall, and Regan his duchess, will be here with him this night. How *comes* that? *Shakespeare*.—To befal, as an event.—Let me alone that I may speak, and let *come* on me what will. *Job*, xiii. 13.—To follow as a consequence.—Those that are kin to the king, never prick their finger but they say, there is some of the king's blood spilt. How *comes* that? says he, that takes upon him not to conceive: the answer is, I am the king's poor cousin, sir. *Shakespeare*.—To cease very lately from some act or state; to have just done or suffered any thing.—David said unto Uriah, *camest* thou not from thy journey? 2 *Samuel*, xi. 10.

To COME *about*. To come to pass; to fall out; to come into being. Probably from the French *venir à bout*.—That cherubim, which now appears as a God to a human soul, knows very well that the period will *come about* in eternity, when the human soul shall be as perfect as he himself now is. *Addison*.

And let me speak to th' yet unknowing world,
How these things *came about*. *Shakespeare*.

To change; to come round.—The wind *came about*, and settled in the West for many days. *Bacon*.

On better thoughts, and my urg'd reasons,
They are *come about*, and won to the true side. *Ben Jonson*.

To COME *again*. To return.—There came water thereout; and when he had drunk, his spirit *came again*, and he revived. *Judges*, xv. 19.

To COME *after*. To follow.—If any man will *come after* me, let him deny himself, and take up his cross and follow me. *Matthew*, xvi. 24.

To COME *at*. To reach; to get within the reach of; to obtain; to gain.—Neither sword nor scepter can *come at* conscience; but it is above and beyond the reach of both. *Suckling*.—Nothing makes a woman more esteemed by

by the opposite sex than chastity, and we always prize those most who are hardest to *come at*. *Addison*.

To COME *by*. To obtain; to gain; to acquire. This seems an irregular and improper use, but has very powerful authorities.—Things most needful to preserve this life, are most prompt and easy for all living creatures to *come by*. *Hooker*.—Are you not ashamed to inforce a poor widow to so rough a course to *come by* her own? *Shakesp.*

Amidst your train this unseen judge will wait,
Examine how you *come by* all your state. *Dryden*.

To COME *in*. To enter.—The simple ideas, united in the same subject, are as perfectly distinct as those that *come in* by different senses. *Locke*.—To comply; to yield; to hold out no longer.—If the arch-rebel Tyrone, in the time of these wars, should offer to *come in* and submit himself to her majesty, would you not have him received? *Spenser*.—To arrive at a port, or place of rendezvous.—At what time our second fleet, which kept the narrow seas, was *come in*, and joined to our main fleet. *Bacon*.

There was the Plymouth squadron now *come in*,
Which in the Streights last winter was abroad. *Dryden*.

To become modish; to be brought into use.—Silken garments did not *come in* till late, and the use of them in men was often restrained by law. *Arbuthnot*.

Then *came* rich cloaths and graceful action *in*,
Then instruments were taught more moving notes. *Rosc.*

To be an ingredient; to make part of a composition.—A generous contempt of that in which too many men place their happiness must *come in* to heighten his character. *Atterbury*.—To accrue from an estate, trade, or otherwise, as gain.—I had rather be mad with him that, when he had nothing, thought all the ships that came into the harbour his; than with you that, when you have so much *coming in*, think you have nothing. *Suckling*.—To be gained in abundance:

Sweetheart, we shall be rich ere we depart,
If fairings *come* thus plentifully *in*. *Shakespeare*.

To COME *in for*. To be early enough to obtain: taken from hunting, where the dogs that are slow get nothing.—Shape and beauty, worth and education, wit and understanding, gentle nature and agreeable humour, honour and virtue, were to *come in for* their share of such contracts. *Temple*.—The rest *came in for* subsidies, whereof they sunk considerable sums. *Swift*.

To COME *in to*. To join with; to bring help.—They marched to Wells, where the lord Audley, with whom their leaders had before secret intelligence, *came in to* them; and was by them, with great gladness and cries of joy, accepted as their general. *Bacon*.

To COME *into*. To comply with; to agree to.—The fame of their virtues will make men ready to *come into* every thing that is done for the public good. *Atterbury*.

To COME *near*. To approach; to resemble in excellence: a metaphor from races.—The whole atchieved with such admirable invention, that nothing ancient or modern seems to *come near* it. *Temple*.

To COME *of*. To proceed, as a descendant from ancestors.—Self love is so natural an infirmity, that it makes us partial even to those that *come of* us, as well as ourselves. *L'Estrange*.

Of Priam's royal race my mother *came*. *Dryden*.

To proceed, as effects from their causes.—The hiccough *comes of* fulness of meat, especially in children, which causeth an extension of the stomach. *Bacon*.—This *comes of* judging by the eye, without consulting the reason. *L'Estrange*.

To COME *off*. To deviate; to depart from a rule or direction.—The figure of a bell partaketh of the pyramis, but yet *coming off* and dilating more suddenly. *Bacon*.—To escape; to get free.—Those that are in any signal danger implore his aid; and, if they *come off* safe, call their deliverance a miracle. *Addison*.

I knew the foul enchanter, though disguis'd;
Enter'd [illegible] very lime-twigs of his spells,
And yet *came off*. *Milton*.

To end an affair; to take good or bad fortune.—Ever since Spain and England have had any thing to debate one with the other, the English upon all encounters, have *come off* with honour and the better. *Bacon*.

Oh, bravely *came we off*,
When with a volley of our needless shot,
After such bloody toil, we bid good-night. *Shakespeare*.

To COME *off from*. To leave; to forbear.—To *come off from* these grave disquisitions, I would clear the point by one instance more. *Felton*.

To COME *on*. To advance; to make progress.—Things seem to *come on* apace to their former state. *Bacon*.

So travellers, who waste the day,
Noting at length the setting sun,
They mend their pace as night *comes on*. *Granville*.

To advance to combat.—The great ordnance once discharged, the armies *came* fast *on*, and joined battle. *Knolles*.

Rhymer, *come on*, and do the worst you can;
I fear not you, nor yet a better man. *Dryden*.

To thrive; to grow big; to grow.—It should seem by the experiments, both of the malt and of the roses, that they will *come* far faster *on* in water than in earth; for the nourishment is easier drawn out of water than out of earth. *Bacon*.

Come on, poor babe;
Some powerful spirit instruct the kites and ravens
To be thy nurses. *Shakespeare*.

To COME *over*. To repeat an act; to revolt.—They are perpetually teazing their friends to *come over* to them. *Addison*.—A man in changing his side, not only makes himself hated by those he left, but is seldom heartily esteemed by those he *comes over* to. *Addison*.—To rise in distillation.—Perhaps also the phlegmatic liquor, that is wont to *come over* in this analysis, may, at least as to part of it, be produced by the operation of the fire. *Boyle*.

To COME *out*. To be made public.—Before his book *came out*, I had undertaken the answer of several others. *Stillingfleet*.—I have been tedious; and, which is worse, it *comes out* from the first draught, and uncorrected. *Dryden*.—To appear upon trial; to be discovered.—It is indeed *come out* at last, that we are to look on the saints as inferior deities. *Stillingfleet*.—The weight of the denarius, or the seventh of a Roman ounce, *comes out* sixty-two grains and four sevenths. *Arbuthnot*.

To COME *out with*. To give a vent to; to let fly.—Those great masters of chymical arcana must be provoked, before they will *come out with* them. *Boyle*.

To COME *to*. To consent or yield.—What is this, if my parson will not *come to*. *Swift*.—To amount to.—In the war, with the Turks, the emperor imposed so great a custom upon all corn to be transported out of Sicily, that the very customs *came to* as much as both the price of the corn and the freight together. *Knolles*.—Animals either feed upon vegetables immediately, or, which *comes to* the same at last, upon other animals which have fed upon them. *Woodward*.

To COME *to himself*. To recover his senses.—He falls into sweet ecstasy of joy, wherein I shall leave him till he *comes to himself*. *Temple*.

To COME *to pass*. To be effected; to fall out.—It *cometh*, we grant, many times *to pass*, that the works of men being the same, their drifts and purpose therein are divers. *Hooker*.—How *comes* it *to pass*, that some liquors cannot pierce into or moisten some bodies, which are easily pervious to other liquors? *Boyle*.

To COME *up*. To grow out of the ground.—Over-wet, at

at sowing-time, breedeth much dearth, insomuch as the corn never *cometh up*. *Bacon*.—Good intentions are the seeds of good actions; and every man ought to sow them whether they *come up* or no. *Temple*.—To come into use; as, *a fashion comes up*.

To COME *up to*. To amount to.—He prepares for a surrender, asserting that all these will not *come up to* near the quantity requisite. *Woodward*.—To rise, to advance.—Considerations there are, that may make us, if not *come up to* the character of those who rejoice in tribulations, yet at least satisfy the duty of being patient. *Wake*.—When the heart is full, it is angry at all words that cannot come *come up to* it. *Swift*.

To COME *up with*. To overtake.

To COME *upon*. To invade; to attack.—Three hundred horse, and three thousand foot, English, commanded by sir John Norris, were charged by Parma, *coming upon* them with seven thousand horse. *Bacon*.—When old age *comes upon* him, it comes alone, bringing no other evil with it but itself. *South*.

To COME. In futurity; not present; to happen hereafter.—It serveth to discover that which is hid, as well as to foretel that which is *to come*. *Bacon*.

In times *to come*,
My waves shall wash the walls of mighty Rome. *Dryden*.

COME is a word of which the use is various and extensive, but the radical signification of *tendency hitherward* is uniformly preserved. When we say *he came from a place*, the idea is that of *returning*, or *arriving*, or becoming *nearer*; when we say, *he went from a place*, we conceive simply departure, or removal to a greater distance. The butter *comes*; it is passing from its former state to that which is desired; it is advancing towards us.

COME, *part*.—Thy words were heard, and I am *come* to thy words. *Daniel*.

COME. A particle of exhortation; be quick; make no delay.—*Come*, let us make our father drink wine. *Gen.* xix. 32.

COME. A particle of reconciliation, or incitement to it:

Come, come, at all I laugh he laughs no doubt;
The only difference is, I dare laugh out. *Pope*.

COME. A kind of adverbial word for *when it shall come*; as, *come Wednesday*, when Wednesday shall come.—*Come* Candlemas, nine years ago she died. *Gay*.

COME, *s*. A sprout: a cant term.—That the malt is sufficiently well dried, you may know both by the taste, and also by the falling off of the *come* or sprout. *Mortimer*.

COME'DIAN, *s*. A player or actor of comic parts. A player in general; a stage-player; an actress or actor.—Melissarion, pretty honey-bee, when of a *comedian* she became a wealthy man's wife, would be saluted Madam Pithias, or Prudence. *Camden*.—A writer of comedies.—Scaliger willeth us to admire Plautus as a *comedian*, but Terence as a pure and elegant speaker. *Peacham*.

CO'MEDY, *s*. [*comedia*, Lat.] A dramatic representation of the lighter faults of mankind, with an intention to make vice and folly ridiculous: opposed to *tragedy*:

A long, exact, and serious, *comedy*;
In every scene some moral let it teach,
And, if it can, at once both please and preach. *Pope*.

COM'ELINESS, *s*. Grace; beauty; dignity. It signifies something less forcible than *beauty*, less elegant than *grace*, and less light than *prettiness*.—A careless *comeliness* with comely care. *Sidney*.—The service of God hath not such perfection of grace and *comeliness*, as when the dignity of the place doth concur. *Hooker*.

COM'ELY, *adj*. [from *become*; or, from cpeman, Sax. to please.] Graceful; decent; having dignity or grandeur of mien or look. Comeliness seems to be that species of beauty which excites respect rather than pleasure. He that is *comely* when old and decrepit, surely was very beautiful when he was young. *South*.—Used of things, decent; according to propriety:

Oh, what a world is this, when what is *comely*
Envenoms him that bears it! *Shakespeare*.

COM'ELY, *adv*. Handsomely; gracefully.—To ride *comely*, to play at all weapons, to dance *comely*, be very necessary for a courtly gentleman. *Ascham*.

COMENIT'ZA, a town of European Turkey, in the province of Epire: fifty-two miles south-west of Delfino.

COME'NIUS (John Amos), a grammarian and protestant divine, born in Moravia in 1592. He was eminent for his design to introduce a new method of teaching languages; for which purpose he published several essays in 1616, and had prepared some others, when the Spaniards pillaged his library, after having taken the city of Fulnec, where he was minister and master of the school. Comenius fled to Lessa, a city of Poland, and taught Latin there. The book he published in 1631, under the title of *Janua Linquarum reserata*, gained him a prodigious reputation, insomuch that he was offered a commission for regulating all the schools in Poland. The parliament of England desired his assistance to regulate the schools in this kingdom. He arrived at London in 1641; and would have been received by a committee to hear his plan, had not the parliament been taken up with other matters. He therefore went to Sweden, being invited by a generous patron, who settled a stipend upon him that delivered him from the fatigues of teaching; and he employed himself wholly in discovering general methods for those who instructed youth. In 1657 he published the different parts of his new method of teaching. He was not only taken up with the reformation of schools, but also with prophecies, the fall of Antichrist, Millennium, &c. At last Comenius took it into his head to address Louis XIV. of France, and to send him a copy of the prophecies of Drabicius, insinuating that it was to this monarch God promised the empire of the world. He became sensible of the vanity of these speculations, and died in 1671.

COM'ER, *s*. One that comes.—House and heart are open for a friend; the passage is easy, and not only admits, but even invites, the *comer*. *South*.

Time is like a fashionable host,
That slightly shakes his parting guest by th' hand;
But with his arms outstretch'd, as he would fly,
Grasps in the *comer*: welcome ever smiles,
And farewel goes out sighing. *Shakespeare*.

CO'MERCHIN, a town of European Turkey, in the province of Romania, sixty-two miles east of Emboli.

COMESSAZ'ZA, a river of Italy, which runs into the Oglio, nine miles north-east of Sabionetta.

COMESSAZ'ZO, a town of Italy, in the duchy of Mantua: three miles and a half north of Sabionetta.

COME'SUS, a lake of United America, in the state of New York: twenty-seven miles south of Lake Ontario.

CO'MET, *s*. [*cometa*, Lat. a hairy star.] An opaque, spherical, and solid, body like a planet, performing revolutions about the sun in elliptical orbits, which have the sun in one of their foci. For an astronomical investigation of comets, see ASTRONOMY, vol. ii. p. 400.

Fierce meteors shoot their arbitrary light,
And *comets* march with lawless horrors bright. *Prior*.

COMETA'RIUM, *s*. A machine adapted to give a representation of the revolution of a comet about the sun. It is so contrived as, by elliptical wheels, to shew the unequal motion of a comet in every part of its orbit. The comet is represented by a small brass ball, carried by a radius vector, or wire, in an elliptical groove about the sun in one of its foci; and the years of its period are shewn by an index moving with an equable motion over a graduated silver circle.

CO'METARY, or COMETIC, *adj*. Relating to a comet.—Refractions of light are in the planetary and *cometary* regions, as on our globe. *Cheyne*.

COME'TES, *s*. [κομητης, hairy; the involucres being remarkably

remarkably hispid.] In botany, a genus of the class tetrandria, order monogynia, natural order tricoccæ. The generic characters are—Calyx: involucre three-flowered, flowers sessile, four-leaved; leaflets oblong, equal, spreading, ciliate-hispid; perianthium four-leaved; leaflets oblong, equal, length of the involucre. Corolla: none. Stamina: filaments four, capillary, length of the perianthium; antheræ roundish. Pistillum: germ roundish; style filiform, length of the flower; stigma three-cleft. Pericarpium: capsule tricoccous. Seed: solitary.—*Essential Character.* Involucre four-leaved, three-flowered; calyx, four-leaved; capsule, tricoccous.

There is but one species known, the cometes alternifiora: it is annual; stem herbaceous; leaves opposite, sessile, obovate, acuminate, very entire, smooth; peduncles axillary, alternate, solitary, one-flowered, patulous, the length of the leaves; stems a foot high, round; peduncles in pairs, terminating and axillary, subalternate. Native of Surat.

COME'THO, in fabulous history, a daughter of Pterilaus, who deprived her father of a golden hair in his head, upon which depended his fate. She was put to death by Amphitryon for her perfidy. *Apollodorus.*

COM'FIT, *s.* [*bellaria arida*, Lat. *konfit*, Dut. It should seem that both are formed by hasty pronunciation from *confect.*] A dry sweetmeat; any kind of fruit or root preserved with sugar, and dried.

To COM'FIT, *v. a.* To preserve dry with sugar:

The fruit that does so quickly waste,
Men scarce can see it, much less taste,
Thou *comfitest* in streets to make it last. *Cowley.*

COM'FIT-MAKER, *s.* A maker of comfits.—You swear like a *comfit-maker's* wife. *Shakespeare.*

COM'FITURE, *s.* Sweetmeat:

From country grass to *comfitures* of court,
Or city's quelque-choses, let not report
My mind transport. *Donne.*

To COM'FORT, *v. a.* [*comforto*, low Lat.] To strengthen; to enliven; to invigorate.—Light excelleth in *comforting* the spirits of men: light varied doth the same effect, with more novelty. This is the cause why precious stones *comfort*. *Bacon.*—To console; to strengthen the mind under the pressure of calamity.—They bemoaned him, and *comforted* him over all the evil that the Lord had brought upon him. *Job*, xlii. 11.

COM'FORT, *s.* Support; assistance; countenance.—Poynings made a wild chace upon the wild Irish; where, in respect of the mountains and fastnesses, he did little good, which he would needs impute unto the *comfort* that the rebels should receive underhand from the earl of Kildare. *Bacon.*—Consolation; support under calamity or danger:

Her soul heaven's queen, whose name she bears,
In *comfort* of her mother's fears,
Has plac'd among her virgin train. *Ben Jonson.*

That which gives consolation or support in calamity:

We need not fear
To pass commodiously this life, sustain'd
By him with many *comforts*, till we end
In dust, our final rest and native home. *Milton.*

COM'FORTABLE, *adj.* Receiving comfort; susceptible of comfort; cheerful: of persons. *Not in use.*

For my sake be *comfortable*; hold death
A while at the arm's end. *Shakespeare.*

Admitting comfort: of condition.—What can promise him a *comfortable* appearance before his dreadful judge? *South.*—Dispensing comfort: having the power of giving comfort.—The lives of many miserable men were saved, and a *comfortable* provision made for their subsistence. *Dryden.*

COM'FORTABLY, *adv.* In a comfortable manner; with cheerfulness; without despair.—Upon view of the sincerity of that performance, hope *comfortably* and cheerfully for God's performance. *Hammond.*

COM'FORTER, *s.* One that administers consolation in misfortunes; one that strengthens and supports the mind in misery or danger.—This very prayer of Christ obtained angels to be sent him, as *comforters* in his agony. *Hooker.*

The heav'ns have blest you with a goodly son,
To be a *comforter* when he is gone. *Shakespeare.*

The title of the Third Person of the Holy Trinity; the Paraclete. *John*, xv. 26.

COM'FORTLESS, *adj.* Wanting comfort; being without any thing to allay misfortune: used of persons as well as things.—Yet shall not my death be *comfortless*. *Sid.*

On thy feet thou stood'st at last,
Though *comfortless*, as when a father mourns
his children, all in view destroy'd at once. *Milton.*

COM'FREY, *s.* in botany. See SYMPHYTUM.

COMHO'LA, a river of Ireland, which runs into Bantry Bay: three miles north of Bantry.

CO'MIC, *adj.* [*comicus*, Lat. *comique*, Fr.] Relating to comedy; not tragic:

I never yet the tragic muse essay'd,
Deterr'd by thy inimitable maid;
And when I venture at the *comic* stile,
Thy scornful lady seems to mock my toil. *Waller.*

Raising mirth:

Stately triumphs, mirthful *comic* shews,
Such as befit the pleasure. *Shakespeare.*

CO'MICAL, *adj.* [*comicus*, Lat.] Raising mirth; merry; diverting.—Something so *comical* in the voice and gestures, that a man can hardly forbear being pleased. *Addison.*—Relating to comedy; befitting comedy; not tragical.—They deny it to be tragical because its catastrophe is a wedding, which hath ever been accounted *comical*. *Gay.*

CO'MICALLY, *adv.* In such a manner as raises mirth. In a manner befitting comedy.—The ladies have laughed at thee most *comically* since thou wentst. *Silent Woman.*

CO'MICALNESS, *s.* The quality of being comical; the power of raising mirth.

COMIL'LAH, a town of Hindoostan, in the country of Bengal: 160 miles east-north-east of Calcutta, and 176 east-south-east of Moorshedabad. Lat. 23. 25. N. lon. 91. 15. E. Greenwich.

COMI'NES, a town of Flanders situated on the Lis, which divides it in two parts. This town is greatly reduced from its former grandeur by accidents and war. In 1450, great part of it was burnt down, together with the castle, but the whole was rebuilt some years after. In 1585; the garrison from Ostend burnt it almost entirely down, except the castle. In 1645, marechal de Gassion made himself master of the castle, but the archduke Leopold retook it in 1648. In 1657, the marechal de Turenne, after defeating a body of troops commanded by the prince de Ligne, at Bousbeeck, took it and gave it up to pillage. Two years after, it was restored to Spain at the treaty of the Pyrenées; but the French again seized it in 1672, and razed the fortifications both of the town and castle. It was also taken by the French republican army on the 22d day of November 1793. Philip de Comines, author of the celebrated Memoirs of his own Time, was born of an illustrious family in this place: twenty-five miles south of Bruges, and seven north of Lille.

COMI'NES (Philip de), an excellent historian, born of a noble family in Flanders in 1446. He lived in intimacy with Charles the Bold, duke of Burgundy, for about eight years; but, being seduced to the interest of France by Louis XI. he was highly promoted by him, and executed

feveral fuccefsful negociations. After this king's death he experienced many troubles on account of being a foreigner, by the envy of other courtiers, and lay long in prifon before he was difcharged: he died in 1509. Comines was a man of more natural abilities than learning; he fpoke feveral living, but knew nothing of the dead, languages: he has left behind him fome memoirs of his own times, that are admired by all true judges of hiftory. Catharine de Medicis ufed to fay, that Comines made as many heretics in politics as Luther had in religion.

CO'MING, *f.* The act of coming; approach:

Sweet the *coming* on
Of grateful evening mild. *Milton.*

State of being come; arrival.—Some people in America counted their years by the *coming* of certain birds amongft them at their certain feafons, and leaving them at others. *Locke.*

CO'MING-IN, *f.* Revenue; income:

What are thy rents? what are thy *comings-in?*
O ceremony, fhew me but thy worth!
What is thy toll, O adoration? *Shakefpeare.*

CO'MING, *part. adj.* Fond; forward; ready to come.—That he had been fo affectionate a hufband, was no ill argument to the *coming* dowager. *Dryden.*

On morning wings how active fprings the mind!
How eafy every labour it purfues,
How *coming* to the poet ev'ry mufe! *Pope.*

Future; to come:

Praife of great acts he fcatters, as a feed
Which may the like in *coming* ages breed. *Rofcommon.*

COMITA'TU COMMISSO, in law, a writ or commiffion whereby a fheriff is authorized to take upon him the charge of the county. And *comitatu et caftro commiffo*, a writ by which the charge of a county, together with the keeping of a caftle, is committed to the fheriff. *Reg. Orig.* 295.

COMITA'TUS, in law, a county. Ingulphus tells us, that England was firft divided into counties by king Alfred; and counties into hundreds, and thefe again into tithings; and Fortefcue writes, that *regnum Angliæ per comitatus ut regnum Franciæ per ballivatus diftinguitur.* It is alfo taken for a territory or jurifdiction of a particular place, as in *Mat. Paris. anno* 1234. and in divers old charters. According to lord Littleton, each county was anciently an earldom, fo that, previous to the reign of king Stephen, there were not any titular earls, nor more earls than counties, though there might be fewer. As to the divifions of counties into hundreds and tithings, fee the article COUNTY.

COMI'TIA, *f.* An affembly of the Roman people. The word is derived from *comitium*, the place where they were convened, *quafi a cum eundo.* The comitium was a large hall, which was left uncovered at the top, in the firft ages of the republic; fo that the affembly was often diffolved in rainy weather. The comitia were called, fome *confularia*, for the election of the confuls; others *prætoria*, for the election of prætors, &c. Thefe affemblies were more generally known by the name of *comitia curiata, centuriata,* and *tributa.* The curiata was when the people gave their votes by curiæ. The centuriata were not convened in later times. Another affembly was called *comitia tributa*, where the votes were received from the whole tribes together. At firft the Roman people were divided only into three tribes; but, as their numbers increafed, the tribes were at laft fwelled to thirty-five. The object of thefe affemblies was the electing of magiftrates and all the public officers of ftate. They could be diffolved by one of the tribunes, if he differed in opinion from the reft of his colleagues. If one among the people was taken with the falling ficknefs, the whole affembly was immediately diffolved, whence that difeafe is called *morbus comitialis.* After the cuftom of giving their votes *vivâ voce* had been abolifhed, every one of the affembly, in enacting of a law, was prefented with two ballots, on one of which were the letters U. R. that is, *uti rogas*, be it as it is required; on the other was an A. that is, *antiquo*, which bears the fame meaning as *antiquam volo*, I forbid it, the old law is more preferable. If the number of ballots with U. R. was fuperior to the A's, the law was approved conftitutionally; if not, it was rejected. Only the chief magiftrates, and fometimes the pontifices, had the privilege of convening thefe affemblies. There were only thefe eight of the magiftrates who had the power of propofing a law, the confuls, the dictator, the prætor, the interrex, the decemvirs, the military tribunes, the kings, and the triumvirs. Thefe were called *majores magiftratus*; to whom one of the *minores magiftratus* was added, the tribune of the people. See ROME.

COMI'TIAL, *adj.* Relating to the affemblies of the people of Rome.

COMITI'VA, *f.* A companion or fellow-traveller: it is mentioned in Brompton, regn. Hen. II. And fometimes it fignifies a troop or company of robbers: as in Walfingham, anno 1366.

COMITLA'N, a town of North America, in Mexico, and province of Chiapa: feventy miles fouth-eaft of Chiapa dos Efpagnols.

CO'MITY, *f.* [*comitas*, Lat.] Courtefy; civility; good breeding.

COM'MA, *f.* [κομμα, Gr.] The point which notes the diftinction of claufes, and order of conftruction, in the fentence; marked thus [,]. See PUNCTUATION.—*Commas* and points they fet exactly right. *Pope.*—The ninth part of a tone, or the interval whereby a femi-tone or a perfect tone exceeds the imperfect tone. It is a term ufed only in theorical mufic, to fhew the exact proportions between concords.

To COMMA'ND, *v. a.* [*commander*, Fr. *mando*, Lat.] To govern; to give orders to; to hold in fubjection or obedience: correlative to *obey.*—Chrift could *command* legions of angels to his refcue. *Decay of Piety.*

Look, this feather,
Obeying with my wind when I do blow,
And yielding to another when it blows,
Commanded always by the greater guft;
Such is the lightnefs of you common men. *Shakefpeare.*

To order; to direct to be done: contrary to *prohibit.*—We will facrifice to the Lord our God, as he fhall *command* us. *Exodus*, viii. 27.

Whatever hypocrites aufterely talk
Of purity, and place, and innocence,
Defaming as impure what God declares
Pure, and *commands* to fome, leaves free to all.
Our maker bids increafe; who bids abftain
But our deftroyer, foe to God and man? *Milton.*

To have in power:

If the ftrong cane fupport thy walking hand,
Chairmen no longer fhall the wall *command.* *Gay.*

To overlook; to have fo fubject as that it may be feen or annoyed:

Up to the eaftern tower,
Whofe height *commands* as fubject all the vale. *Shakefp.*

To lead as a general:

Thofe he *commands* move only in command,
Nothing in love. *Shakefpeare.*

To COMMA'ND, *v. n.* To have the fupreme authority; to poffefs the chief power; to govern.—Thofe two *commanding* powers of the foul, the underftanding and the will. *South.*

COMMA'ND, *f.* The right of commanding; power; fupreme authority. It is ufed in military affairs, as magiftracy

giftracy or government in civil life; with *over*.—He affumed an abfolute *command over* his readers. *Dryden*.

With lightning fill her awful band,
And make the clouds feem all at her *command*. *Waller*.

Cogent authority; defpotifm.—*Command* and force may often create, but can never cure, an averfion; and whatever any one is brought to by compulfion, he will leave as foon as he can. *Locke*.—The act of commanding; the mandate uttered; order given:

Of this tree we may not tafte nor touch;
God fo commanded, and left that *command*
Sole daughter of his voice. *Milton*.

The power of overlooking or furveying any place:

The fteepy ftand,
Which overlooks the vale with wide *command*. *Dryden*.

COMMAND'ANT, *f.* [Fr.] The chief military commander of a place, or of a body of forces.—I hope you go into the beft company there is at Montpelier, and there always is fome at the intendant's or the *commandant's*. *Chefterfield*.—One might expect that a ferious enquiry would be made into the murder of *commandants* in the view of their foldiers. *Burke*.

COMMAND'ER, *f.* He that has the fupreme authority; a general; a leader; a chief.—The Romans, when *commanders* in war, fpake to their army, and ftyled them, My foldiers. *Bacon*.

We'll do thee homage, and be rul'd by thee;
Love thee as our *commander* and our king. *Shakefpeare*.

A paving beetle, or a very great wooden mallet, with an handle about three feet long, to ufe in both hands. *Moxon*.—An inftrument of furgery.—The gloffocomium, commonly called the *commander*, is of ufe in the moft ftrong tough bodies, and where the luxation hath been of long continuance. *Wifeman*.

COMMAND'ERY, *f.* [*præceptoria*, Lat.] Was any manor or chief meffuage, with lands and tenements thereto appertaining, which belonged to the priory of St. John of Jerufalem in England; and he who had the government of fuch a manor or houfe was ftiled the *commander*; who could not difpofe of it but to the ufe of the priory, only taking thence his own fuftenance, according to his degree. New Eagle in Lincolnfhire was and ftill is called the *commandery of Eagle*, and did anciently belong to the faid priory of St. John. So Selbach in Pembrokefhire, and Shingay in Cambridgefhire, were *commanderies* in the time of the knights templars, fays Camden; and thefe in many places of England are termed *temples*, becaufe they formerly belonged to the faid templars. 26 Hen. VIII. c. 2. The manors and lands belonging to the priory of St. John of Jerufalem, were given to Henry VIII. by 32 Hen. VIII. c. 20; about the time of the diffolution of abbies and monafteries: fo that the name only of *commanderies* remains, the power being long fince extinct.

COM'MANDINE (Frederic), a celebrated mathematician and linguift, was born at Urbino in Italy in 1509, and died in 1575; confequently at fixty-fix years of age. He was famous for his learning and knowledge in the fciences. To a great depth and juft tafte in the mathematics, he joined a critical fkill in the Greek language; a happy conjunction which made him very well qualified for tranflating and expounding the writings of the Greek mathematicians. And accordingly, with a moft laudable zeal and induftry, he tranflated and publifhed feveral of their works, to which no former writer had done that good office. On which account, Francis Moria, duke of Urbino, who was very converfant in thofe fciences, proved a very affectionate patron to him. He is greatly applauded by Blanchanus, and other writers; and he juftly deferved thefe encomiums.

COMMAND'MENT, *f.* [*commandement*, Fr.] Mandate; command; order; precept.—By the eafy *commandment* by God given to Adam, to forbear to feed thereon, it pleafed God to make trial of his obedience. *Raleigh*.—Authority; coactive power:

I thought that all things had been favage here,
And therefore put I on the countenance
Of ftern *commandment*. *Shakefpeare*.

By way of eminence, the precepts of the decalogue given by God to Mofes.—And he wrote upon the tables the words of the covenant, and the ten *commandments*. *Exod.* xxxiv. 28.

COMMAND'MENT, *f.* [*præceptum*, Lat.] In law, is of divers kinds: as the *commandment of the king*, when on his own motion he had caft any man into prifon. *Commandment of the juftices*, abfolute or ordinary; abfolute, where upon their own authority they commit a perfon for contempt, &c. to prifon, as a punifhment; ordinary is when they commit one rather for fafe cuftody than for any punifhment: and a man committed upon fuch an ordinary *commandment* is replevifable. *Staundf. P. C.* 72. Perfons committed to prifon by the fpecial *command* of the king, were not formerly bailable by the court of king's bench; but the law is now otherwife. 2 *Hawk. P. C.* c. 15. See Bail. In another fenfe, magiftrates may *command* others to affift them in the execution of their offices, for the ends and purpofes of juftice; and fo may a juftice of peace to fupprefs riots, apprehend felons; an officer to keep the king's peace, &c. A mafter may *command* his fervant to drive another man's cattle out of his ground, to enter into lands, feize goods, diftrain for rent, or do many other things, if the thing be not a trefpafs to others. The *commandment* of a thing is good, where he that *commands* hath power to do it: and a verbal *command* in moft cafes is fufficient; unlefs it be where it is given by a corporation, or when a fheriff's warrant is to a bailiff to arreft, &c. *Bro.* 188. *Dyer*, 202.

In forcible entries, an infant or feme covert may be guilty in refpect of actual violence done by them in perfon; though not in regard to what fhall be done by others at their *command*, becaufe all fuch *commands*, being illegal, are void. *Co. Lit.* 375. In trefpafs, the mafter fhall be charged criminally for the act of the fervant, done by his *command*; but fervants fhall not be excufed for committing any crime by *command of their mafters*, who have no authority over them to give fuch *command*. *H. P. C.* 66. And if a mafter *commands* his fervant to diftrain, and he abufeth the diftrefs, the fervant fhall anfwer it to the party injured.

COMMAN'DRESS, *f.* A woman vefted with fupreme authority:

Be you *commandrefs* therefore, princefs, queen
Of all our forces, be thy word a law. *Fairfax*.

COMMA'NI. See Commendor.

COMMANTAWA'NA, a bay on the north coaft of the ifland of St. Vincent: about one mile eaft of Tarraty Point.

COMMAR'CHIO, *f.* The confines of the land; from whence probably comes the word *marches*.—*Imprimis de noftris landimeris* commarchionibus. *Du Cange*.

COMMATE'RIAL, *adj.* [from *con* and *materia*.] Confifting of the fame matter with another thing.—The beaks in birds are *commaterial* with teeth. *Bacon*.

COMMATERIA'LITY, *f.* Refemblance to fomething in its matter.

To COMMED'DLE, *v. a.* [*con* and *meddle*.] To mix together.—Religion, oh how it is *commeddled* with policy! *Webfter's White Devil*.

COM'MELIN (Jerome), a celebrated French printer, native of Douay, fettled firft at Geneva, afterwards at Heidelberg, where he died in 1598. He was a very learned fcholar, as appears by all the editions of the Greek and Latin fathers which he corrected, and to which he added notes that are much efteemed. He printed fince 1560, in Swifferland, S. Chryfoftomus in Nov. Teftamentum, 4 vols. folio. 1596. This edition, with that of the Old Teftament printed at Paris, makes this work complete,

and the best edition. He took up his residence at Heidelberg, for the convenience of turning over the manuscripts in the palatine library. He printed many other books; those without his name are known by his mark, which represents Truth sitting in a chair.

COMMELI'NA, *f.* [so named by Plumier, from the two *Commelins*, John and Caspar, brothers, and famous Dutch botanists.] In botany, a genus of the class triandria, order monogynia, natural order of ensatæ. The generic characters are—Calyx: spathe cordate, converging, compressed, very large, permanent. Corolla: petals six, of which the three exterior are small, ovate, concave, resembling a perianthium; the three inferior ones alternate, very large, roundish, coloured; nectaries three, resembling stamens, seated on their proper filaments, cruciform, horizontal. Stamina: filaments three, subulate, reclined, agreeing in figure and circuit with the filaments of the nectary, but inferior to them; antheræ ovate. Pistillum: germ superior, roundish; style subulate, revolute, length of the stamens; stigma simple. Pericarpium: capsule naked, nearly globular, three-furrowed, three-celled, three-valved. Seeds: two, angulated.—*Essential Character.* Corolla, six-petalled; nectaries three, cross-shaped, pedicelled.

Species. I. With two petals larger. 1. Commelina communis, or common American commelina: corollas unequal; leaves ovate-lanceolate, acute; stem creeping, smooth. This is an annual plant, having several trailing stalks, that put out roots at the joints. At each joint is one leaf, which is smooth, of a deep green, marked with several longitudinal nerves, and embracing the stalk. Flowers axillary, two or three together, on short peduncles. Corolla composed of two large blue petals, and four small green ones. Stems, according to the observation of Dillenius, from a foot to two feet in length and more, branching. Leaves resembling those of sopewort, feeling roughish if stroked from the base upwards, but having no hairs except at the edges of the sheaths. Native of America, the West-India islands, and Africa. Cultivated in 1732, by Dr. Sherard, at Eltham. It flowers in June and July, and the seeds ripen in autumn.

2. Commelina Africana, or African commelina: corollas unequal; leaves lanceolate, smooth; stem prostrate. Root fibrous; stalks many, trailing, three feet long, putting out roots at every joint, so that where it has room to spread it will cover a large surface. The leaves are very like those of the first sort, but the flowers are larger, and of a deep yellow colour; the seed-vessels also are larger. It differs from the first also in having larger kidney-form yellow petals, with a third ovate, equal to them, but with longer filaments; the sheaths of the leaves are ciliated, the involucre not netted; the sheaths have another very small sheath within them. Capsule ovate, two-valved, three-celled. Seeds in the upper cells, two, three, or four, roundish, smooth, always barren; in the lower cell fertile, the whole covered with the valve growing to it, elliptic, flat above, and convex below. Native of Africa; flowers in July, and the seeds ripen in autumn.

3. Commelina Benghalensis, or East-Indian commelina: corollas unequal; leaves ovate, obtuse; stem creeping. Root annual; (Loureiro says perennial.) Stems numerous, diffused, creeping at the base either by teats or fibres, then ascending to a span or foot in height, roundish, striated, hirsute, jointed, the internodes two inches long, branches from the very base, alternate, the lower ones longest. Leaves before they open rolled in, from an inch to an inch and a half in length, nerved, pubescent, waved. Petioles ciliate with brown hairs, at first linear, then sheathing; sheaths marked with lines, spotted with purple. Native of Bengal and Cochinchina.

4. Commelina erecta, or upright Virginian commelina: corollas unequal; leaves ovate-lanceolate; stem erect, subhirsute, entirely simple. Root perennial; stems a foot and a half high, having a single leaf at each joint, shaped like those of the first sort, and embracing the stem; flowers axillary at the upper part of the stalk, on short peduncles; petals pale blue. Leaves subhirsute, but not hairy except at the sheath. The flowers are larger than in the first sort, plaited about the edge, and as it were crenated, finely striated. Of the three coloured petals the two upper only are conspicuous, the third is small and very narrow, whitish, and pellucid; the three outer petals are slender, the upper one smaller than the other two, which are blueish; capsules roundish, obtusely triangular, three seeded. Cultivated in 1732, by J. Sherard, M. D.

II. Zanonias, with three petals larger. 5. Commelina Virginica: corollas nearly equal; leaves lanceolate, subpetioled, bearded on the edge; stems upright, erect, simple, glossy, two feet high; leaves scabrous on the upper surface, when rubbed from the base; sheaths nerved, subpubescent, ciliated about the edge with ferruginous hairs. Flowers blue, with the petals cordate, and very entire; the lower one on a short pedicel. The structure and fruit like that of the first species, but the capsule a little larger, and whitish; the seeds more wrinkled, and bay, inclining to ash-colour. Native of Virginia. Perennial.

6. Commelina tuberosa, or tuberous-rooted commelina: corollas equal; leaves sessile, oval-lanceolate, subciliate. This has a thick fleshy root composed of several tubers, somewhat like those of ranunculus, several joining together at the top, where they form a head, and diminish gradually downwards; from this arise one or two inclining stalks, which put out side branches from their lower parts. Some of the leaves are on long petioles, others embrace the stalk; they have short hairs on their under surface, and towards the stalk, but are smooth above, of a deep green colour, and close every evening, or in cold weather. The flowers are axillary towards the upper part of the stalk, on slender peduncles. Corolla composed of three large roundish blue petals, and three smaller, which are green. Cultivated in 1732, in the Eltham garden, from seeds sent from Mexico, where it is said to grow on the mountains. It is used there externally for discussing tumours, and internally in hot plethoric habits. Mr. Miller had it from Vera Cruz in New Spain, by Dr. Houstoun.

7. Commelina zanonia, or gentian-leaved commelina: corollas equal; peduncles thickened; leaves lanceolate; sheaths swelling, hirsute about the edge; bractes in pairs. This has trailing stalks like the first, with narrow grassy leaves, embracing the stalks with their base. The flowers are produced at the ends of the stalks upon thick peduncles, three flowers generally on each. The corolla has three equal large petals of a sky blue, and three smaller, which are green. Native of the West Indies; Miller had the seeds from the island of Barbuda; cultivated in 1759 by him. It flowers from June to August, but does not perfect seeds in England.

8. Commelina vaginata, or sheathed commelina: corollas equal; leaves linear; flowers two-stamened, sheathed with an involucre. Annual; stems ascending, numerous, somewhat scabrous. Found by Koenig in the East Indies.

9. Commelina nudiflora: corollas equal; peduncles capillary; leaves linear; involucre none; flowers two-stamened. Annual. Found by Koenig in dry pastures of the East Indies.

10. Commelina spirata, or spear-leaved commelina: corollas equal; leaves lanceolate; flowers panicled. Annual; stem creeping, ascending, somewhat scabrous. Observed by Koenig in the East Indies, in moist places near brooks. Introduced in 1783 by John earl of Bute; flowers in July and August.

11. Commelina cucullata, or hooded commelina: corollas unequal, two-petalled; leaves ovate; involucres cowled, turbinate. Stem erect, a span high, creeping at the base with filiform roots; (Linnæus;) but, according to Loureiro, it is a foot and a half high, and red; leaves five-nerved, waved. The two large petals of the corolla bright blue; the four others he attributes to the calyx, and affirms that it certainly has no more than two large petals; though Linnæus, on the authority of Burmann, puts it among the tripetalous species. Murray supposes it not to be different from commelina Benghalensis. Probably

bably Linnæus was of the same opinion. Native of the East Indies and Cochinchina, where it is a weed in their gardens.

12. Commelina Japonica, or Japan commelina: leaves ovate-lanceolate, waved; stem erect, angular hairy; flowers panicled. Stem grooved, erect, hairy, panicled at top, a foot high; leaves alternate, sheathing, oblong, acute, smooth, the lower ones a finger's length, the upper ones an inch. Flowers on the panicled branches in racemes. Native of Japan.

Propagation and Culture. All the sorts are propagated by seeds; the first will grow if sown in the full ground; but, if the seeds are sown upon a warm border of light earth in autumn, the plants will rise early in the spring; so from these good seeds may be expected, if the season proves favourable: whereas those which are sown in the spring, often lie long in the ground, and rarely ripen their seed. These plants have but little beauty, so that two or three of each sort is as many as most people choose to have; therefore if the seeds are sown in autumn where the plants are designed to remain, or the seeds permitted to scatter, the plants will require no farther care, but to keep them clear from weeds. The second seldom ripens seeds in England, but the roots send out offsets, by which the plant is easily propagated. But it is too tender to live in the full ground in winter, unless it has a warm sheltered situation; therefore should be planted in pots, and sheltered under a common frame in winter, and exposed abroad in summer; the best time to transplant and part these roots is about the end of March. The other sorts are tender; their seeds therefore must be sown on a moderate hot-bed in the spring, and, when the plants are two inches high, they should be transplanted to a fresh hot-bed to bring the plants forward; when they have taken fresh root, they should have a large share of fresh air admitted to them every day in warm weather, to prevent their growing weak; and in June these may be carefully taken up, and transplanted on a warm border of light earth, observing to shade them till they have taken fresh root; after which they will require no other care, but to keep them clean from weeds. With this management the plants will flower and produce good seeds. The second and sixth sorts may be continued, if they are planted in pots, and in autumn placed in the bark-stove; or if the roots of the sixth sort are taken out of the ground in autumn, and kept in a warm place in winter, they may be planted again in the spring, placing them on a hot-bed to forward their shooting, and these will produce stronger plants than those which rise from seeds. See TRADESCANTIA.

COMME'MORABLE, *adj.* Deserving to be mentioned with honour; worthy to be kept in remembrance.

To COMME'MORATE, *v. a.* [*con* and *memoro*, Lat.] To preserve the memory by some public act; to celebrate solemnly.—Such is the divine mercy which we now *commemorate*; and, if we *commemorate* it, we shall rejoice in the Lord. *Fiddes.*

COMMEMORA'TION, *f.* An act of public celebration; solemnization of the memory of any thing.—That which is daily offered in the church, is a daily *commemoration* of that one sacrifice offered on the cross. *Taylor.*—*Commemoration* was formerly made, with thanksgiving, in honour of good men departed this world. *Ayliffe.*

COMME'MORATIVE, *adj.* Tending to preserve memory of any thing.—The original use of sacrifice was *commemorative* of the original revelation; a sort of daily memorial or record of what God declared, and man believed. *Forbes.*

To COMMEN'CE, *v. n.* [*commencer*, Fr.] To begin; to take beginning.—Man, conscious of his immortality, cannot be without concern for that state that is to *commence* after this life. *Rogers.*—To take a new character:

If wit so much from ign'rance undergo,
Ah! let not learning too *commence* its foe. *Pope.*

To COMME'NCE, *v. a.* To begin; to make a beginning of: as, to *commence* a suit;

Most shallowly did you these arms *commence*,
Fondly brought here, and foolishly sent hence. *Shakesp.*

COMMEN'CEMENT, *f.* Beginning; date.—The waters were gathered together into one place, the third day from the *commencement* of the creation. *Woodward.*—A time set apart for conferring degrees publicly in the university of Cambridge. *Mason's Supp.*

To COMME'ND, *v. a.* [*commendo*, Lat.] To represent as worthy of notice, regard, or kindness; to recommend.—Vain-glory is a principle I *commend* to no man. *Decay of Piety.*—Among the objects of knowledge, two especially *commend* themselves to our contemplation; the knowledge of God, and the knowledge of ourselves. *Hale.*—To deliver up with confidence.—Father, into thy hands I *commend* my spirit. *Luke.*

To thee I do *commend* my watchful soul,
Ere I let fall the windows of mine eyes:
Sleeping and waking, O defend me still! *Shakespeare.*

To praise; to mention with approbation.—Historians *commend* Alexander for weeping when he read the actions of Achilles. *Dryden.*

Who is Silvia? What is she,
That all our swains *commend* her?
Holy, fair, and wise, is she. *Shakespeare.*

To mention by way of keeping in memory; to recommend to remembrance:

Signior Anthonio
Commends him to you.—
—Ere I ope his letter,
I pray you tell me how my good friend doth. *Shakespeare.*

To produce to favourable notice.—The chorus was only to give the young ladies an occasion of entertaining the French king with vocal music, and of *commending* their own voices. *Dryden.*—To send:

These draw the chariot which Latinus sends,
And the rich present to the prince *commends*. *Dryden.*

COMME'ND, *f.* Commendation. *Not now in use.*

Tell her I send to her my kind *commends*:
Take special care my greetings be deliver'd. *Shakespeare.*

COMMEND'ABLE, *adj.* Laudable; worthy of praise. Anciently accented on the first syllable.—Order and decent ceremonies in the church, are not only comely, but *commendable*. *Bacon.*

COMMEND'ABLY, *adv.* Laudably; in a manner worthy of commendation.—Of preachers the shire holdeth a number, all *commendably* labouring in their vocation. *Carew.*

COMMEN'DAM, *f.* [*ecclesia commendata, vel custodia ecclesiæ alicui commissa.*] Is the holding of a benefice or church-living, which being void, is commended to the charge and care of some sufficient clerk, to be supplied until it may be conveniently provided of a pastor: and he to whom the church is commended, hath the profits thereof only for a certain time, and the nature of the church is not changed thereby, but is as a thing deposited in his hands in trust, who hath nothing but the custody of it, which may be revoked. When a parson is made bishop, there is a cessation or voidance of his benefice, by the promotion; but if the king by special dispensation gives him power to retain his benefice, notwithstanding his promotion he shall continue parson, and is then said to hold it *in commendam*. *Hob.* 144. As the king is the means of avoidances on promotions to dignities, and the presentations thereon belong to him, he often on the creation of bishops grants them licences to hold their benefices *in commendam*; but this is usually where the bishopricks are small, for the better support of the dignity of the bishop promoted: and it must be always before consecration; for afterwards it comes too late, because the benefice is then absolutely void. A commendam, founded on the statute 25 Hen. VIII. c. 21, is a dispensation from the supreme power, to hold or take an ecclesiastical

ecclesiastical living *contra jus positivum*: and there are several sorts of commendams; as a *commendam semestris*, which is for the benefit of the church, without any regard to the commendatory, being only a provisional act of the ordinary, for supplying the vacation of six months, in which time the patron is to present his clerk, and is but a sequestration of the cure and fruits until such time as the clerk is presented: *commendam retinere* is for a bishop to retain benefices, on his preferment; and these commendams are granted on the king's mandate to the archbishop, expressing his consent, which continues the incumbency, so that there is no occasion for institution. A *commendam recipere* is to take a benefice *de novo* in the bishop's own gift, or in the gift of some other patron, whose consent must be obtained. *Dyer*, 228. 3 *Lev.* 381. *Hob.* 143. *Daw.* 79.

A commendam may be temporary for six or twelve months, for two or three years, or it may be for life, when it is equal to a presentation, without institution or induction. But all dispensations beyond six months were only permissive at first, and granted to persons of merit: the *commendam retinere* is for one or two years, and sometimes for three or six years, and doth not alter the estate which the incumbent had before: a *commendam retinere*, as long as the commendatory should live and continue bishop, hath been held good. *Vaugh.* 18. The *commendam recipere* must be for life, as other parsons and vicars enjoy their benefices; and as a patron cannot present to a full church, so neither can a *commendam recipere* be made to a church that is then full. *Show.* 414. A benefice cannot be commended by parts, any more than it may be presented unto by parts; as that one shall have the glebe, another the tithes, &c. Nor can a commendatory have a *juris utrum*, or take to him and his successors, sue or be sued, in a writ of annuity, &c. But a commendatory *in perpetuum* may be admitted to do it. 11 Hen. IV. These commendams are now in fact seldom or never granted to any but bishops; and in that case the bishop is made commendatory of the benefice while he continues bishop of such diocese; as the object is to make an addition to a small bishoprick: and it would be unreasonable to grant it to a bishop for life, who might afterwards be translated to one of the richest sees.

COMMEN'DATARY, *s.* One that holds a living in commendam.

COMMENDA'TION, *s.* Recommendation; favourable representation.—This jewel and my gold are yours, provided I have your *commendation. Shakespeare.*—Praise; declaration of esteem.—His fame would not get so sweet and noble an air to fly in as in your breath, so could not you find a fitter subject of *commendation. Sidney.*—Ground of praise.—Good-nature is the most godlike *commendation* of a man. *Dryden.*—Message of love:

Hark you, Margaret,
No princely *commendations* to my king!—
—Such *commendations* as become a maid,
A virgin, and his servant, say to him. *Shakespeare.*

COMMEN'DATORY, *adj.* Favourably representative; containing praise.—We bestow the flourish of poetry on those *commendatory* conceits, which popularly set forth the eminency of this creature. *Brown.*

COMMENDA'TUS, *s.* in the feodal system, one who lives under the protection of a great man. *Commendati homines* were persons who, by voluntary homage, put themselves under the protection of any superior lord: for ancient homage was either *predial*, due for some tenure, or *personal*, which was by compulsion, as a sign of necessary subjection; or voluntary, with a desire of protection; and those who, by voluntary homage, put themselves under the protection of any man of power, were sometimes called *homines ejus commendati*, as often occurs in Doomsday. *Commendati dimidii* were those who depended on two several lords, and paid one half of their homage to each; and *sub-commendati* were like under-tenants under the command of persons that were themselves under the command of some superior lord: also there were *dimidii sub-commendati*, who bore a double relation to such depending lords. This phrase seems to be still in use in the usual compliment, "Commend me to such a friend," &c. which is to let him know, "I am his humble servant."

COMMEN'DER, *s.* Praiser.—Such a concurrence of two extremes, by most of the same *commenders* and disprovers. *Wotton.*

COMMEN'DO, or COMMANI, or KOMMANI, a kingdom of Africa, on the Gold Coast, about twenty miles square, formerly a part of the kingdom of Fetu, or Zabu, but now an independent kingdom of itself. The natives are of a warlike disposition, and so numerous that the king is said to be able, in this little kingdom, to raise an army of 20,000 men; his ordinary body-guard is composed of 500 men, well armed. Most writers suppose that Commendo abounds in gold mines; but that the king, fearful of exciting the avarice of Europeans, prevents their being wrought.

COMMEN'DO (Grand), or GUAFFO, a town of Africa, capital of the kingdom of Commendo, and residence of the king, situated at some distance from the coast. It is well inhabited and large, containing about 400 houses: four miles north of Little Commendo.

COMMEN'DO (Little), a town of Africa, situated on the Gold Coast, close to the shore of the Atlantic; it was once a place of great note, and one of the finest towns in Guinea. At present, it exhibits only the remains of a once flourishing great city. Here the natives are in general turbulent, cunning, and deceitful; much addicted to lying and stealing. Their employment consists either in fishing or in commerce, and their neighbours employ them as brokers and factors. Every morning seventy or eighty large canoes may be seen upon the coast fishing, or trading with the European shipping in the road. About the middle of the day they put to shore, when the south-west winds begin to blow, both for facility of unloading, and for securing a market for their cargoes either at Great or Little Commendo, where the inland negroes assemble with the commodities of their several countries. No markets on earth are better supplied with all sorts of grain, roots, pulse, and fish, than these, nor at a more reasonable price. Here the English and Dutch have forts. Lat. 4. 54. N. lon. 0. 34. E. Greenwich.

COMMENSA'LITY, *s.* [from *commensalis*, Lat.] Fellowship of table; the custom of eating together.—They being enjoined and prohibited certain foods, thereby to avoid community with the Gentiles, upon promiscuous *commensality. Brown.*

COMMENSURABI'LITY, *s.* Capacity of being compared with another, as to the measure; or of being measured by another. Thus an inch and a yard are commensurable, a yard containing a certain number of inches; the diameter and circumference of a circle are incommensurable, not being reduceable to any common measure. Proportion.—Some place the essence thereof in the proportion of parts, conceiving it to consist in a comely *commensurability* of the whole unto the parts, and the parts between themselves. *Brown.*

COMMEN'SURABLE, *adj.* [*con* and *mensura*, Lat.] Reducible to some common measure; as a yard and a foot are measured by an inch.

COMMEN'SURABLE QUANTITIES, or MAGNITUDES, are such as have some common aliquot part, or which may be measured or divided, without a remainder, by one and the same measure or divisor, called their common measure. Thus, a foot and a yard are commensurable, because there is a third quantity that can measure each, viz. an inch; which is 12 times contained in the foot, and 36 times in the yard. Commensurables are to each other, as one rational whole number is to another; but incommensurables are not so: and therefore the ratio of commensurables is rational; but that of incommensurables irrational: hence also the exponent of the ratio of commensurables, is a rational number.

COMMEN'SURABLE NUMBERS, whether integers, or

or fractions, or surds, are such as have some other number, which will measure or divide them exactly, or without a remainder. Thus, 6 and 8 are commensurable, because 2 measures or divides them both. And $\frac{2}{3}$ and $\frac{3}{4}$, or $\frac{8}{12}$ and $\frac{9}{12}$ are commensurable fractions, because the fraction $\frac{1}{6}$, or $\frac{1}{12}$, &c. will measure them both: and in this sense, all fractions may be said to be commensurable. Also, the surds $2\sqrt{2}$ and $3\sqrt{2}$ are commensurable, being measured by $\sqrt{2}$, or being to each other as 2 to 3.

COMMEN'SURABLENESS, *s.* Commensurability; proportion.—There is no *commensurableness* between this object and a created understanding, yet there is a congruity and connaturality. *Hale.*

To COMMEN'SURATE, *v. a.* [*con* and *mensura*, Lat.] To reduce to some common measure.—That division is not natural, but artificial, and by agreement, as the aptest terms to *commensurate* the longitude of places. *Brown.*

COMMEN'SURATE, *adj.* Reducible to some common measure.—They permitted no intelligence between them, other than by the mediation of some organ equally *commensurate* to soul and body. *Government of the Tongue.*—Equal; proportionable to each other.—Is our knowledge adequately *commensurate* with the nature of things? *Glanville.*—Those who are persuaded that they shall continue for ever, cannot chuse but aspire after a happiness *commensurate* to their duration. *Tillotson.*

COMMEN'SURATELY, *adv.* With the capacity of measuring, or being measured by some other thing.—We are constrained to make the day serve to measure the year as well as we can, though not *commensurately* to each year; but by collecting the fraction of days in several years, till they amount to an even day. *Holder.*

COMMENSURA'TION, *s.* Proportion; reduction of some things to some common measure.—A body over great, or over small, will not be thrown so far as a body of a middle size; so that, it seemeth, there must be a *commensuration* or proportion between the body moved and the force, to make it move well. *Bacon.*—All fitness lies in a particular *commensuration*, or proportion of one thing to another. *South.*

To COM'MENT, *v. n.* [*commentor*, Lat.] To annotate; to write notes upon an author; to expound; to explain: with *upon* before the thing explained.—They have contented themselves only to *comment upon* those texts, and make the best copies they could after those originals. *Temple.*—To make remarks; to make observations:

Enter his chamber, view his lifeless corpse,
And *comment* then *upon* his sudden death. *Shakespeare.*

COM'MENT, *s.* Annotations on an author; notes; explanation; exposition; remarks.—Adam came into the world a philosopher, which appeared by his writing the nature of things upon their names: he could view essences in themselves, and read forms without the *comment* of their respective properties. *South.*—Remarks; observation:

In such a time as this, it is not meet
That every nice offence should bear its *comment. Shakesp.*

COM'MENTARY, *s.* [*commentarius*, Lat.] An exposition; book of annotations or remarks.—In religion, scripture is the best rule; and the church's universal practice, the best *commentary. King Charles.*—Memoir; narrative in familiar manner.—They show still the ruins of Cæsar's wall, that reached eighteen miles in length, as he has declared it in the first book of his *Commentaries. Addison.*

COM'MENTATOR, *s.* Expositor; annotator.—Galen's *commentator* tells us, that bitter substances engender choler, and burn the blood. *Arbuthnot.*

No *commentator* can more slily pass
O'er a learn'd unintelligible place. *Pope.*

COM'MENTER, *s.* One that writes comments; an explainer; an annotator:

Slily as any *commenter* goes by
Hard words or sense. *Donne.*

COMMENTI'TIOUS, *adj.* [*commentitius*, Lat.] Invented; fictitious; imaginary.—It is easy to draw a parallelism between that ancient and this modern nothing, and make good its resemblance to that *commentitious* inanity. *Glanville.*

COMMEQUIERS, a town of France, in the department of the Vendée: fifteen miles north of Sables d'Olonne.

COMMERA'GH, mountains of Ireland, in the county of Waterford: eight miles north of Dungarvon.

COM'MERCE, *s.* [*commercium*, Lat. It was anciently accented on the last syllable.] Intercourse; exchange of one thing for another; interchange of any thing; trade; traffic.—Places of public worship being provided, our repair thither is especially for mutual conference, and, as it were, *commerce* to be had between God and us. *Hooker.*

Instructed ships shall sail to quick *commerce*,
By which remotest regions are ally'd;
Which makes one city of the universe,
Where some may gain, and all may be supply'd. *Dryden.*

Common or familiar intercourse.—Good-nature, which consists in overlooking of faults, is to be exercised only in doing ourselves justice in the ordinary *commerce* and occurrences of life. *Addison.*

To COM'MERCE, *v. n.* To traffic.—Ezekiel in the description of Tyre, and of the exceeding trade that it had with the East, as the only mart town, reciteth both the people with whom they *commerce*, and also what commodities every country yielded. *Raleigh.*—To hold intercourse with:

Come, but keep thy wonted state,
With even step and musing gait,
And looks *commercing* with the skies,
Thy rapt soul sitting in thine eyes. *Milton.*

To a commercial intercourse with foreign nations, we may justly attribute the stability of empire, and the opulence of a people; because it encourages an universal spirit of industry, removes local prejudices, and elevates the mind to magnanimity and wisdom. Whatever seems necessary for sensual or intellectual gratifications; for the ease, convenience, or elegance, of life; are primarily, or mediately, communicated by commerce. And, in proportion as commerce hath been encouraged or depressed by different states, their progress in arts, manufactures, and science, is correctly marked; and by them the virtues of their princes, and the vigour of their laws. Nothing more amply demonstrates the truth of this remark than the prosperity of the British empire, which is peculiarly indebted to commerce, for its improvement in knowledge and the polite arts, for its riches and grandeur, for the glory of its arms, and, in short, for the great bulk of all its solid comforts and conveniences. The necessity of commerce, as the fountain of industry and social intercourse, is a principle of nature implanted in our humanity, seconded by a wise ordination of the deity, in granting to particular parts of our earth, what other parts do not afford; whence an exchange of one commodity for another, in the primitive ages of the world, seems to have laid the foundation of peace and good will amongst nations, upon principles of reciprocal advantage and mutual convenience, the strongest cements the universe affords, when cultivated as they ought. And such indeed was the simplicity of earlier times, that the people of one nation were wont to leave their merchandise in private places, on the frontiers of another nation with whom they wanted to deal, and who were to take it away, in exchange for what they should think an equivalent of their own merchandise, relying solely on each other's honour. This method, however, did not long hold, but in time gave way to a direct commercial correspondence by proper barter.

It is not precisely known when the commerce by buying and selling first began; nor when coins, and the several

ral species of gold, silver, and copper, had their rise. The first moneys were wood, leather, and iron; and even at this day, it is the custom in some places of both Indies to give a certain value in sea-shells and cocoa-nuts, for merchandises, drugs, &c. The first instance of this kind of commerce mentioned in the sacred writings, is in the time of the patriarch Abraham; though we may observe, that for many ages, barter was conducted on a very narrow scale, extending no farther than to the common necessaries of life; the plowman giving his corn and his pulse to the shepherd, and receiving milk and wool in exchange. The discovery of water-carriage unquestionably became the grand means of the advancement of commerce; though at first merely by floats or rafts, across rivers and lakes. But, when these were improved into vessels of such capacity as emboldened men to launch into the wide ocean, a mutual correspondence from nation to nation was set on foot; and those who had the superiority of shipping naturally acquired the greatest share of wealth and power, extending their commerce to more distant climes, to which the invention of writing did not a little contribute. The Egyptians, Phœnicians, and the Carthaginians, who were a Tyrian colony, were the first, the most daring, and expert, traders of all antiquity. They were the first who ran the hazard of long voyages, and who set on foot a traffic by sea between coasts very remote. Under the Asiatic and Grecian empires, we have the traces of a commerce cultivated by several nations; but it flourished more considerably under the dominion of the Romans; as appears from the vast number of colleges and companies of merchants in the several cities mentioned by historians, as well as by ancient inscriptions to their memory. The destruction of the Roman empire by the irruptions of the barbarians, levelled that of commerce along with it, or at least suspended its ordinary operation for some time. By degrees it began to recover itself, and made a new progress; especially in Italy. Hence, the Pisans, Florentines, Genoese, and Venetians, abounding in shipping, took occasion to spread themselves through all the ports of the Levant and Egypt, bringing thence silks, spices, and other merchandise; and furnishing the greatest part of Europe therewith. Charlemagne having conquered Saxony, and becoming jealous of the growing power of these Italian traders, was determined to check them. For this purpose he carried his fleet up the Adriatic sea, amongst the numerous small Venetian isles; where, for want of knowing the channels, his attempt miscarried, and he was obliged to retire with loss. To prevent future incursions of this kind, the inhabitants, by degrees, joined all those little contiguous islands together, by the means of bridges; the whole of which, being thus united, now constitute the noble city of Venice.

Thus was the modern commerce founded on the ruins of that of the ancient Greeks and Romans to the same places; and thus did those famous Italian republics acquire their lustre and power; which were afterwards considerably increased by the effects of the crusades. These republics furnished the crusaders with transports, military stores, and provisions, and obtained charters very favourable to the establishment and extension of their commerce. When Constantinople was taken, under the banner of the holy cross, many valuable branches of trade, which formerly, centered in that city, were transferred to Venice, Genoa, and Pisa. The Germans, however, had a long time carried on a separate commerce, which was not borrowed from the Romans, nor did it fall with theirs. Towards the end of the twelfth century, the German cities, situate on the coast of the Baltic, and the rivers that run into it, got into a considerable traffic with the neighbouring states. But, as their commerce was much interrupted by pirates, seventy-two of them united together for their mutual defence, and were thence called *Hanseatic* or *Hans Towns*. These flourished till the end of the fifteenth, or beginning of the sixteenth, century, when a division arising amongst them, and about the same time a new passage to the Indies, by the Cape of Good Hope, being discovered by the Portuguese, and settlements made on the coasts of Africa, Arabia, and the Indies, the Italian and Hanseatic commerce sunk, and the chief trade came into the hands of the Portuguese.

The Portuguese had not possessed those different trades above an hundred years, when, about the beginning of the seventeenth century, the Dutch began to share it with them; and in a little time dispossessed them of almost the whole. The English, French, Danes, and Hamburghers, excited by their success, then began to make settlements in the Indies, and on the coasts of Africa; in which the English soon became superior. The discovery of America by Columbus in 1492, in favour of the Spaniards, likewise became the object of a new, vast, and most important, commerce for every nation in Europe, whereof Cadiz and Seville were made the center. It is true the first conquerors of this new world, the Spaniards, still possess the greatest and richest part of it, and preserve the commerce thereof to themselves with a jealous eye; yet the English, French, Dutch, and Portuguese, have had several rich and flourishing colonies both in the islands and on the continent. And it is pretty certain that it is as much for other nations as themselves, that the Spaniards every year send their galleons for the treasures of Peru and Mexico.

Notwithstanding the introduction of this new and important commerce to America, the former trade of Europe by no means suffered by it; and the north and south regions have still the same occasion for exchanges with each other as before. The navigation from the Baltic to the Mediterranean was tedious and difficult: the situation of Flanders, and the manufactories which flourished there from the tenth century, together with the free fairs of that country, soon engaged the merchants, both of the north and south, to establish large magazines there, first at Bruges, and then in Antwerp, where riches and magnificence quickly followed. The republic of Holland, soon after its establishment, beheld those commercial cities with envy, and became competitors with them. The amazing industry and perseverance of this people, added to the favourable reception their laws gave to strangers, and the refuge afforded thereby to religionaries, drew store of merchants and manufacturers to it, and soon sunk the extensive commerce of Antwerp. The successes of the Hollanders excited in the London merchants a similar thirst for commercial enterprise and speculation; which the convenience and multitude of the English ports, the goodness of the wools, and the industry of the people, so amply seconded, that it quickly brought into Britain a considerable share of the commerce of Europe; whence was laid the foundation of the growing wealth and magnificence of London, and the increasing prosperity and glory of the British empire.

The most important circumstance for the benefit of commerce would now be a regulation and revision of what is termed *strand-right*, or the mass of usage and of law relative to ships and cargoes wrecked and stranded. Many iniquitous practices of different European maritime countries are on these melancholy occasions carried on with impunity; and some jurisdictions of this nature have even a stronger tendency to consult the profit of the sovereign and of his agents, than the permanent interests of the merchant; and they do not commonly excel in the expedition and cheapness of their proceedings. Yet to such courts, and not to juries of merchants and ship-owners, are intrusted, in most countries, the decision of maritime causes. How vast a sequestration of British property, in Spain, has resulted during the French revolutionary war, from a rash condemnation in the admiralty court, of some silks belonging to the court of Ytanda! This donative of a few thousands to our sailors, cost to our manufacturers the confiscation of millions! It is important,

portant, therefore, that to such tribunals as administer in Great Britain the internal laws, should be confided the arbitration of all alien interests; of which *strand-right* forms so considerable a part.

COM'MERCIAL, *adj.* Relating to commerce or traffic.

COM'MERCY, a town of France, and principal place of a district, in the department of the Meuse, given by the duke of Lorrain to the bishops of Metz. It became afterwards a kind of sovereignty, divided between the houses of Nassau and Retz, who ceded their rights to the duke of Lorrain. It contains two parishes: eight leagues south-south-east of Verdun, and five and a half east of Bar-le-Duc.

COM'MERSON (Philibert), doctor of physic, king's botanist, and member of the faculty at Montpelier, was born at Chatillon les Dombes, near Bourg in Bresse, in 1727. He discovered an early propensity to botany and other branches of natural history, which he pursued with unremitting ardour; for after finishing his academical course, and during his residence at Montpelier as a physician, he consulted the gratifying his botanical avidity, more than either decency or discretion allowed. He would pluck the rarest and most precious plants in the king's botanic garden there, to enrich his herbal; and when on this account the directors of the garden refused him admittance, he scaled the walls by night to continue his depredations. The reputation he gained during a residence of four years at Montpelier, was so extensive, that he was chosen by Linnæus to form the queen of Sweden's collection of the rarest fishes in the Mediterranean, and to compose accurate descriptions of them; which undertaking he executed with great labour and dexterity, producing an elegant Ichthyology 2 vols. 4to. with a Dictionary and Bibliography, containing accounts of all the authors who had treated that branch of natural history. Among his various productions, is a dissertation intitled "The Martyrology of Botany," containing accounts of all the authors who lost their lives by the fatigues and accidents incident to the zeal for acquiring natural curiosities; a list, in which his own name was destined to be inrolled. Sometimes he has been found in his closet with a candle burning long after sun-rise, with his head bent over his herbal, unconscious of the return of day; and would come from his botanical excursions in a piteous condition, torn with briars, bruised with falls from rocks, emaciated with hunger and fatigue, after many narrow escapes from precipices and torrents. These ardent occupations did not however extinguish sentiments of a more tender nature. M. Commerson married, in 1760, a wife, who died in childbed two years after; and whose memory he preserved by naming a new kind of plant, whose fruit seemed to contain two united hearts, "*Pulcheria Commersonia.*" He arrived at Paris in 1764, where he became connected with all the learned botanists, particularly the celebrated Jussieu; and was recommended to the duke de Praslin, minister for the marine department, to accompany M. Bougainville in his voyage round the world. The duke conceived the highest idea of his merit from the sketch he drew of the observations that might be made relative to natural history in such a voyage; and he sailed accordingly in 1766, making the most industrious use of every opportunity to fulfil his engagements. He died at the Isle of France in 1773, and by his will left to the king's cabinet all his botanical collections, which, before he engaged in this voyage, amounted to above 200 volumes in folio; those made during the voyage, together with his papers and herbal, were sent home in thirty-two cases, containing an inestimable treasure of hitherto unknown materials for natural history: Messrs. Jussieu, D'Aubenton, and Thouin, were commissioned to examine and arrange them. Among the high mountains in the interior parts of the island of Madagascar, M. Commerson relates in his letters, that he found a nation of dwarfs, about three feet and a half high, called *Kimosse*, or *Quimosse*, in the language of the country; somewhat paler than the other blacks, but with intellectual faculties not inferior to their neighbours. The above particulars are derived from the eulogy of M. de Lande on this famous botanist.

COM'MERSONIA, *s.* [this name was given by Forster in memory of *Commerson*, the French traveller.] In botany, a genus of the class pentandria, order pentagynia. The generic characters are—Calyx: perianthium one-leafed, five-parted, corolliferous; divisions ovate acute. Corolla: five-petalled; petals linear, dilated at the base on both sides with an inflected lobe, spreading; nectary five-parted, within the stamens; divisions lanceolate, erect, shorter than the petals; corpuscles filiform, five, villose, from the divisions of the nectary. Stamina: filaments five, very short at the bases of the petals; antheræ roundish, twin. Pistillum: germ globular, villose, with five swellings; styles five, filiform, approximating, short; stigmas globular. Pericarpium: capsule globular, five-celled, echinate, with long, hairy bristles; cells two-seeded. Seeds: ovate.—*Essential Character.* Calyx, one-leafed, bearing the corolla; petals, five; nectary, five-parted: capsules, five-celled, echinate.

There is but one species, called Commersonia echinata, or prickly Commersonia. It is a tree, with alternate, obliquely ovate, acuminate, serrate, leaves, hoary underneath; flowers minute, panicled, hoary; the fruit very much resembles that of sparrmannia, both in form and surface; a native of Otaheite and the other Society isles; discovered April the 30th, 1774. See BARRINGTONIA.

To COM'MIGRATE, *v. n.* [*con* and *migro*, Lat.] To remove in a body, or by consent, from one country to another.

COM'MIGRATION, *s.* A removal of a large body of people from one country to another.—Both the inhabitants of that, and of our world, lost all memory of their *commigration* hence. *Woodward.*

COMMINA'TION, *s.* [*comminatio*, Lat.] A threat; a denunciation of punishment, or of vengeance.—Some parts of knowledge God has thought fit to seclude from us; to fence them not only by precept and *commination*, but with difficulty and impossibilities. *Decay of Piety.*—The recital of God's threatenings on stated days.

COMMI'NATORY, *adj.* Denunciatory; threatening.

COMMIN'GES, before the revolution, a country of France, in Gascony, about fifteen leagues in length, and six in breadth; the see of a bishop, whose residence was at St. Bertrand, the capital.

To COMMIN'GLE, *v. a.* [*commisceo*, Lat.] To mix into one mass; to unite intimately; to mix; to blend:

Blest are those,
Whose blood and judgment are so well *commingled*,
That they are not a pipe for fortune's finger,
To sound what stop she please. *Shakespeare.*

To COMMIN'GLE, *v. n.* To unite one with another.—Dissolutions of gum tragacanth and oil of sweet almonds do not *commingle*, the oil remaining on the top till they be stirred. *Bacon.*

COMMINU'IBLE, *adj.* Frangible; reducible to powder; susceptible of pulverization.—The best diamonds are *comminuible*; and are so far from breaking hammers, that they submit to pestilation, and resist not any ordinary pestle. *Brown.*

To COMMINU'TE, *v. a.* [*comminuo*, Lat.] To grind; to pulverize; to break into small parts.—Parchment, skins, and cloth, drink in liquors, though themselves be entire bodies, and not *comminuted*, as sand and ashes. *Bacon.*

COMMINU'TION, *s.* The act of grinding into small parts; pulverization.—The jaw in men, and animals furnished with grinders, hath an oblique or transverse motion, necessary for *comminution* of the meat. *Ray.*—Attenuation.—Causes of fixation are the even spreading of the spirits and tangible parts, the closeness of the tangible parts, and the jejuneness or extreme *comminution* of spirits; of which the two first may be joined with a nature liquefiable. *Bacon.*

COMMI'RE (John), a celebrated Latin poet, born at Amboise in 1625, entered into the society of the Jesuits, and

and taught polite literature and divinity. He died at Paris in 1702. We have a volume of his Latin poems, and a collection of his posthumous works. His odes and fables are more particularly admired.

COMMI'SERABLE, *adj.* Worthy of compassion; pitiable: such as must excite sympathy or sorrow.—It is the sinfullest thing in the world to destitute a plantation once in forwardness: for, besides the dishonour, it is the guiltiness of blood of many *commiserable* persons. *Bacon.*

To COMMI'SERATE, *v. a.* [*con* and *misereor*, Lat.] To pity; to look on with compassion; to compassionate.

Then we must those, who groan beneath the weight
Of age, disease, or want, *commiserate*. *Denham.*

COMMISERA'TION, *s.* Pity; compassion; tenderness; or concern for another's pains.—These poor seduced creatures, whom I can neither speak nor think of but with much *commiseration* and pity. *Hooker.*

She ended weeping; and her lovely plight
Immoveable, till peace, obtain'd from fault
Acknowledg'd and deplor'd, in Adam wrought
Commiseration. *Milton.*

COMMI'SERATIVELY, *adv.* Out of compassion. *Mason's Suppl.*

COM'MISSARY, *s.* [*commissarius*, low Lat.] An officer made occasionally for a certain purpose; a delegate; a deputy.—It is a title of ecclesiastical jurisdiction, appertaining to those who exercise spiritual jurisdiction (at least so far as their commission permits) in places of the diocese so far distant from the chief city, as the chancellor cannot call the subjects. *Cowell.*—The *commissaries* of bishops have authority only in some certain place of the diocese, and in some certain causes of the jurisdiction limited to them by the bishop's commission. *Ayliffe.*—An officer who draws up lists of the numbers of an army, and regulates the procuration and conveyance of provision or ammunition:

But is it thus you English bards compose?
With Runick lays thus tag insipid prose?
And when you should your heroes deeds rehearse,
Give us a *commissary*'s list in verse? *Prior.*

COM'MISSARISHIP, *s.* The office of a commissary.—A *commissariship* is not grantable for life, so as to bind the succeeding bishop, though it should be confirmed by the dean and chapter. *Ayliffe.*

COMMIS'SION, *s.* [*commissio*, low Lat.] The act of entrusting any thing; a trust; a warrant by which any trust is held, or authority exercised.—*Commission* is the warrant, or letters patent, that all men exercising jurisdiction, either ordinary or extraordinary, have for their power. *Cowell.*—A warrant by which a military officer is constituted.—I was made a colonel; though I gained my *commission* by the horse's virtues, having leapt over a six-bar gate. *Addison.*

He for his son a gay *commission* buys,
Who drinks, whores, fights, and in a duel dies. *Pope.*

Charge; mandate; office; employment.—It was both a strange *commission*, and a strange obedience to a *commission*, for men in the midst of their own blood, and being so furiously assailed, to hold their hands contrary to the laws of nature and necessity. *Bacon.*

Such *commission* from above
I have receiv'd to answer thy desire
Of knowledge within bounds. *Milton.*

Act of committing a crime; perpetration. Sins of *commission* are distinguished in theology from sins of *omission.*—Every *commission* of sin introduces into the soul a certain degree of hardness. *South.*—A number of people joined in a trust or office; the state of that which is entrusted to a number of joint officers; as, *the broad seal was put into commission.* [In commerce.] The order by which a factor trades for another person.

Commission of Anticipation, was a commission under the great seal to collect a tax or subsidy before the day. 15 *H.* VIII.

Commission of Array. See the article Militia.

Commission of Association, a commission to associate two or more learned persons with the justices in the several circuits and counties of Wales, &c.

Commission of Bankrupt. See the article Bankrupt, vol. ii. p. 692.

Commission of Charitable Uses, goes out of the chancery to the bishop and others, where lands given to charitable uses are misemployed, or there is any fraud or disputes concerning them, to enquire of and redress the abuse, &c. 43 *Eliz.* c. 4.

Commission of Delegates, is a commission under the great seal to certain persons, usually two or three temporal lords, as many bishops, and two judges of the law, to sit upon an appeal to the king in the court of chancery, where any sentence is given in any ecclesiastical cause by the archbishop. 25 *H.* VIII. c. 19. Now generally three of the common law judges, and two civilians, sit as delegates.

Commissions of the Peace. See the article Justice of Peace.

Commission of Lunacy, a commission out of chancery to enquire whether a person represented to be a lunatic be so or not; that if lunatic, the king may have the care of his estate, &c.

Commission of Rebellion, otherwise called a writ of rebellion, issues when a man after proclamation made by the sheriff, upon a process out of the chancery, on pain of his allegiance, to present himself to the court by a day assigned, makes default in his appearance: and this commission is directed to certain persons, to the end they, three, two, or one, of them apprehend the party, or cause him to be apprehended, as a rebel and contemner of the king's laws, wheresoever found within the kingdom, and bring or cause him to be brought to the court on a day therein assigned: this writ or commission goes forth after an attachment returned, *non est inventus*, &c.

Commission of Sewers, is directed to certain persons to see drains and ditches well kept and maintained in the marshy and fenny parts of England, for the better conveyance of the water into the sea, and preserving the grass upon the land. 23 *H.* VIII. c. 5. 13 *Eliz.* c. 9.

Commission of Treaty with Foreign Princes, is where leagues and treaties are made and transacted between states and kingdoms, by their ambassadors and ministers, for the mutual advantage of the kingdoms in alliance.

Commission to take up Men for War, was a commission to press or force men into the king's service. This power of impressing has been heretofore doubted, but the legality of it is now fully established. Vide *Fost. Rep.* 154. 1 *Comm.* 419. *Broadfoot's* case, *Comb.* 245.

To COMMIS'SION, *v. a.* To empower; to appoint; to send with mandate or authority:

The peace polluted thus, a chosen band
He first *commissions* to the Latian land. *Dryden.*

To COMMIS'SIONATE, *v. a.* To commission; to empower: *not in use.*—As he was thus sent by his father, so also were the apostles solemnly *commissionated* by him to preach to the gentile world. *Decay of Piety.*

COMMIS'SIONER, *s.* One included in a warrant of authority.—A *commissioner* is one who hath commission, as letters patent, or other lawful warrant, to execute any public office. *Cowell.*—Suppose itinerary *commissioners* to inspect, throughout the kingdom, into the conduct of men in office, with respect to morals and religion, as well as abilities. *Swift.*

Like are their merits, like rewards they share;
That shines a consul, this *commissioner*. *Pope.*

COMMIS'SURE, *s.* [*commissura*, Lat.] Joint; a place where

where one part is joined to another.—This animal is covered with a strong shell, jointed like armour by four transverse *commissures* in the middle of the body, connected by tough membranes. *Ray.*

To COMMIT', *v. a.* [*committo*, Lat.] To intrust; to give in trust; to put into the hands of another:

It is not for your health, thus to *commit*
Your weak condition to the raw cold morning. *Shakesp.*

To put in any place to be kept safe.—They who are desirous to *commit* to memory, might have ease. 2 *Mac.* ii. 25.

Is my muse controul'd
By servile awe? Born free, and not be bold!
At least I'll dig a hole within the ground,
And to the trusty earth *commit* the sound. *Dryden.*

To send to prison; to imprison.—They two were *committed*, at least restrained of their liberty. *Clarendon.*

So, though my ankle she has quitted,
My heart continues still *committed*;
And, like a bail'd and main-priz'd lover,
Although at large, I am bound over. *Hudibras.*

To perpetrate; to do a fault; to be guilty of a crime.—Letters out of Ulster gave him notice of the inhuman murders *committed* there upon a multitude of the protestants. *Clarendon.*—To put together for a contest; a Latinism.—How becomingly does Philopolis exercise his office, and seasonably *commit* the opponent with the respondent, like a long practised moderator. *More.*—To place in a state of hostility or incongruity: a Latinism:

Harry, whose tuneful and well-measur'd song
First taught our English music how to span
Words with just note and accent, not to scan
With Midas' ears, *committing* short and long. *Milton.*

COMMIT'MENT, *s.* [from *commit.*] in law, the sending of a person to prison, by warrant or order, who hath been charged with the commission of any crime. Anciently more felons were committed to jail without a mittimus in writing, than were with it; such were commitments by watchmen, constables, &c. But, since the habeas corpus act, a commitment in writing seems more necessary than formerly; otherwise a prisoner may be admitted to bail under that act, whatsoever his offence may have been. There is no doubt but that persons apprehended for offences which are not bailable, and also all persons who neglect to offer bail for offences which are bailable, must be committed. It is said, that wheresoever a justice of peace is impowered by any statute to bind a person over, or to cause him to do a certain thing, and such person being in his presence shall refuse to be bound, or to do such thing, the justice may commit him to the jail to remain there till he shall comply. It seems agreed by all the old books, that wheresoever a constable or private person may justify the arresting another for a felony or treason, he may also justify the sending or bringing him to the common jail; and that every private person hath as much authority in cases of this kind, as the sheriff, or any other officer; and may justify such imprisonment by his own authority, but not by the command of another. 2 *Hawk. P. C.* c. 16.

But, inasmuch as it is certain, that a person lawfully making such an arrest, may justify bringing the party to the constable, in order to be carried by him before a justice of peace; and, inasmuch as the statutes of 1 & 2 P. & M. c. 13. and 2 & 3 P. & M. c. 10. which direct in what manner persons brought before a justice of the peace for felony shall be examined by him, in order to their being committed or bailed, seem clearly to suppose, that all such persons are to be brought before such justice for such purpose; and, inasmuch as the statute of 31 Car. II. c. 2. commonly called the *habeas corpus* act, seems to suppose that all persons, who are committed to prison, are there detained by virtue of some warrant in writing, which seems to be intended of a commitment by some magistrate, and the constant tenor of the late books, practice, and opinions, are agreeable hereto; it is certainly most adviseable at this day, for any private person who arrests another for felony, to cause him to be brought, as soon as conveniently he may, before some justice of peace, that he may be committed or bailed by him. 2 *Hawk. P. C.* c. 16.

It is certain that the privy council, or any one or two of them, or secretary of state, may lawfully commit persons for treason, and for other offences against the state, as in all ages they have done. 2 *Hawk. P. C.* 117. As to commitments by the privy council, two cases in Leonard, (1 *Leon.* 71. 2 *Leon.* 175.) pre-suppose some power for this purpose, without saying what; and the case in 1 Anders. 297. plainly recognises such a power in high treason. But as to the jurisdiction of privy counsellors in other offences, it does not appear to have been either claimed or exercised. As to commitments by the secretary of state: in the case of Entick *v.* Carrington, C. B. Mich. 6 G. III. upon a special verdict respecting the validity of a secretary of state's warrant to seize persons and papers in the case of libels, a very critical enquiry was made into the source of this power in that officer, in cases of libels and other state crimes. 2 *Wilf.* 275. It appears that the king being the principal conservator of the realm, the secretary of state has so much of the royal authority transferred to him, as justifies commitment for these crimes, but not the seizure of papers.

The following instances of commitments by the privy council and secretary of state, will further explain the nature of this power. 1. Howell was committed in the 28 Eliz. and Hollyard in the 30 Eliz. by secretary Walsingham, privy counsellor; and it was determined that, where the commitment is not by the whole council, the cause must be expressed in the warrant: see 31 *Car.* II. c. 2. *Lord Raym.* 65. 2. In 34 Eliz. the judges remonstrated against the exercise of this power; and declared that all prisoners may be discharged, unless committed by the queen's command, or by her whole council, or by one or two of them, for high treason. 1 *And.* 297. 3. Melvin was committed, in 4 C. I. by secretary Conway, on suspicion of high treason; but the court thought the cause of the suspicion should have been expressed. *Palm.* 558. 4. Croston was committed by the council, in 14 C. II. for high treason generally. *Vaugh.* 142. 5. Fitzpatrick by the privy council, in 7 W. III. for high treason, in aiding an escape; and bailed for neglect of prosecution. 1 *Salk.* 103. 6. Yaxley was committed, 5 W. & M. by the secretary of state, lord Nottingham, for refusing to declare if he was a Jesuit. *Carth.* 291. 7. Kendal and Roe were committed, 7 W. III. by secretary Trumbal, for high treason, in assisting the escape of Montgomery; and by Holt chief justice held good, but the prisoners were bailed. *Skin.* 596. *Holt* 144. *Lord Raym.* 61. 8. Derby was committed, 10 Anne, for publishing a libel, called the Observator; and the court held the warrant good and legal. *Fortesc.* 140. 9. Sir W. Wyndham was committed, 4 Geo. I. by secretary Stanhope, for high treason; and by Parker chief justice held good. *Stra.* 3. 3 *Vin.* 516. 10. Lord Scarsdale, Duplin, and Harvey, were committed, 2 Geo. I. by lord Townshend, secretary of state, for treasonable practices, and admitted to bail. 3 *Vin.* 534. 11. Earbury was arrested and committed by warrant from the secretary of state, for being the author of a seditious libel, and his papers seized, and he continued on his recognizance. 7 *Geo.* II. 8 *Mod.* 177. 12. Hensey was committed, 31 Geo. II. by the earl of Holderness, secretary of state, for high treason, in adhering to the king's enemies. 1 *Burr.* 642. 13. Shebbeare was committed, 31 Geo. II. on two warrants from the secretary of state, for a libel. 1 *Burr.* 460. 14. Wilkes was committed, 3 Geo. III. by warrant from the earl of Hallifax, secretary of state, for a libel; but discharged by his privilege of parliament. 2 *Wilf.* 150. 15. Sayer was apprehended, 18 Geo. III. by warrant from the earl of Rochford, secretary of state, for high treason, and bailed

bailed by lord Mansfield. *Black. Rep.* 1165. 16. Hardy, Horne Tooke, Thelwall, and others, were committed to the Tower, on a charge of high treason, 33 Geo. III. (May 30, 1794,) by the privy council. 17. Thomas Crossfield was committed to the Tower by the privy council, for high treason, 34 Geo. III. Jan. 31, 1795.

As to the manner of commitment, it is enacted by 2 & 3 P. & M. c. 10. that justices of peace shall examine persons brought before them for felony, or suspicion thereof, before they commit them to prison, and shall bind their accusers to give evidence against them. A justice of the peace may detain a prisoner a reasonable time, in order to examine him; and it is said, that three days is a reasonable time for this purpose. 2 *Hawk. P. C.* c. 16, 2 *Inst.* 52. 591. Every commitment must be in writing, and under the hand and seal, and shew the authority, of him that made it, and the time and place, and must be directed to the keeper of the prison. It may be either in the king's name, and only tested by the justice, or in the justice's name. It may command the jailer to keep the party in safe and close custody; for, this being what he is obliged to do by law, it can be no fault to command him so to do. It ought to set forth the crime with convenient certainty, whether the commitment be by the privy council, or any other authority, otherwise the officer is not punishable by reason of such mittimus for suffering the party to escape; and the court, before whom he is removed by habeas corpus, ought to discharge or bail him; and this doth not only hold where no cause at all is expressed in the commitment, but also where it is so loosely set forth, that the court cannot judge whether it were a reasonable ground for imprisonment or not. 2 *Hawk. P. C.* c. 16.

A commitment for high treason or felony in general, without expressing the particular species, has been held good. But now, since the habeas corpus act, it seems that such a general commitment is not good; and therefore where A. and B. were committed for aiding and abetting sir James Montgomery to make his escape, who was committed by a warrant of a secretary of state for high treason, on a habeas corpus, they were admitted to bail, because it did not appear of what species of treason sir James was guilty. *Skin.* 596. 1 *Salk.* 347. It is safe to set forth that the party is charged upon oath; but this is not necessary, for it hath been resolved, that a commitment for treason, or for suspicion of it, without setting forth any particular accusation or ground of the suspicion, is good. This resolution was in the case of sir W. Wyndham, 2 Geo. I. who was committed by the secretary of state, for high treason, generally. 3 *Vin.* 515. It was confirmed by Pratt, chief justice, in Wilkes's case, committed by a similar warrant for a libel. And Mr. J. Foster says, in cases wherein the justice of the peace hath jurisdiction, the legality of his warrant will never depend on the truth of the information whereon it is grounded. *Curtis's Ca.* 136.

Every such mittimus ought to have a lawful conclusion, viz. that the party be safely kept till he be delivered by law, or by order of law, or by due course of law; or that he be kept till further order, (which shall be intended of the order of law,) or to the like effect; and, if the party be committed only for want of bail, it seems to be a good conclusion of the commitment, that he be kept till he find bail; but a commitment till the person who makes it shall take further order, seems not to be good; and it seems that the party committed by such or any other irregular mittimus may be bailed. 2 *Hawk. P. C.* c. 16. Also a commitment grounded on an act of parliament ought to be conformable to the method prescribed by such statute; as where the churchwardens of Northampton were committed on the 43 Eliz. c. 2. and the warrant concluded in the common form, viz. "until they be duly discharged according to law;" but the statute appointing, "that the party should there remain until he should account," for want of such conclusion they were discharged. And, where a man is committed as a criminal, the conclusion must be, "until he be delivered by due course of law;" if he be committed for contumacy, it should be "until he comply."

All commitments must be to some prison within the realm of England. For, by 31 Car. II. c. 2. the habeas corpus act, it is enacted, "that no subject of this realm, being an inhabitant or resiant of this kingdom of England, dominion of Wales, or town of Berwick-upon-Tweed, shall or may be sent prisoner into Scotland, Ireland, Jersey, Guernsey, Tangier, or into any parts, garrisons, islands, or places, beyond the seas, which then were, or at any time after should be, within or without the dominions of his majesty."

By 14 Ed. III. c. 10. sheriffs shall have the custody of the jails as before that time they were wont to have, and they shall put in such under-keepers for whom they will answer. And this is confirmed by 19 Hen. VII. c. 10. Also by 5 Hen. IV. c. 10. it is enacted, "that none be imprisoned by any justice of the peace, but only in the common jail, saving to lords, and others who have jails, their franchise in this case." It seems that the king's grant, since the statute, 5 Hen. IV. c. 10. to private persons to have the custody of prisoners committed by justices of peace, is void. And it is said, that none can claim a prison as a franchise, unless he have also a jail-delivery. 11 & 12 W. III. c. 19. made perpetual by 6 G. I. c. 19. to enable justices of peace to build and repair jails in their respective counties, where a clause like that in 5 H. IV. c. 10. is inserted. Also it hath been held, that regularly no one can justify the detaining a prisoner in custody out of the common jail, unless there be some particular reason for so doing; as, if the party be so dangerously sick, that it would apparently hazard his life to send him to the jail; or, there be evident danger of a *rescous* from rebels, &c. yet constant practice seems to authorise a commitment to a messenger; and it is said that it shall be intended to have been made in order for the carrying of the party to jail. 2 *Hawk. P. C.* c. 16. And it is said, that if a constable bring a felon to jail, and the jailer refuse to receive him, the town where he is constable ought to keep him till the next jail-delivery. 2 *H. P. C.* c. 16.

A prisoner in the custody of the king's messenger, on a warrant from the secretary of state, who is brought into the king's-bench by habeas corpus to be bailed, but has not his bail ready, cannot be committed to the same custody he came in, but must be committed to the custody of the marshal, which will prevent the necessity of suing out a new habeas corpus, as he may be brought up from the prison of the court, by a rule of court, whenever he shall be prepared to give bail. 1 *Burr.* 460. If a person arrested in one county for a crime done in it, fly into another county, and be retaken there, he may be committed by a justice of the first county to the jail of such county. But, by the better opinion, if he had before any arrest fled into such county, he must be committed to the jail thereof by a justice of such county. *Dalt.* c. 118. Also it seems to be laid down as a rule, that any offender may be committed to the jail next to the place where he was taken, whether it lie in the same county or not. 2 *Hawk. P. C.* c. 16. By 6 Geo. I. c. 19. vagrants and other criminals, offenders, and persons charged with small offences, may for such offences, or for want of sureties, be committed either to the common jail or house of correction, as the justices in their judgment shall think proper. By 24 Geo. II. c. 55. if a person is apprehended, upon a warrant indorsed in another county, for an offence not bailable; or, if he shall not there find bail, he shall be carried back into the first county, and be committed; or, if bailable, bailed by the justices in such first county.

As to the charges of commitment, it is enacted by 3 Jac. I. c. 10. that offenders committed are to bear their own charges, and the charges of those who are appointed to guard them; and, if they refuse to pay, the charges may be levied by sale of their goods. And, by 27 Geo. II.

c. 3. if they have no goods within the county where they are apprehended, the justices are to grant a warrant on the treasurer of the county for payment of the charges. But in Middlesex the same shall be paid by the overseers of the poor of the parish where the person was apprehended. By 3 Hen. VII. c. 3. the sheriff shall certify the names of all prisoners in his custody to the justices of jail-delivery, which is commonly called the *calendar of prisoners*.

As prisoners ought to be committed at first to the proper prison, so ought they not to be removed thence, except in some special cases; and to this purpose it is enacted, by 31 Car. II. c. 2. "that if any subject of this realm shall be committed to prison, or in custody of any officer or officers whatsoever, for any criminal, or supposed criminal, matter, that the said person shall not be removed from the said prison and custody, into the custody of any other officer or officers, unless it be by habeas corpus, or some other legal writ; or, where the prisoner is delivered to the constable, or other inferior officer, to carry such prisoner to some jail; or, where any person is sent by order of any judge of assize, or justice of the peace, to any common work-house, or house of correction; or, where the prisoner is removed from one prison or place to another within the same county, in order to a trial or discharge by due course of law; or, in case of sudden fire or infection, or other necessity, upon pain that he who makes out, signs, or countersigns, or obeys or executes, such warrant, shall forfeit to the party grieved one hundred pounds for the first offence, two hundred pounds for the second, &c. 2 *Hawk. P. C.* c. 16.

A person legally committed for a crime, certainly appearing to have been done by some one or other, cannot be lawfully discharged by any other but by the king, till he be acquitted on his trial, or have an ignoramus found by the grand jury, or none to prosecute him on a proclamation for that purpose, by the justices of jail-delivery. But if a person be committed on a bare suspicion, without any appeal or indictment, for a supposed crime, where afterwards it appears that there was none; as for the murder of a person thought to be dead, who afterwards is found to be alive; it hath been holden that he may be safely dismissed without any farther proceeding; for that he who suffers him to escape, is properly punishable only as an accessory to his supposed offence; and it is impossible there should be an accessory where there can be no principal; and it would be hard to punish one for a contempt founded on a suspicion appearing in so uncontested a manner to be groundless. 2 *Hawk. P. C.* c. 16. But the safest way for the jailer is, in all cases, to have the authority of some court, or magistrate, for discharging the prisoner. If the words of a statute are not pursued in a commitment, the party shall be discharged by habeas corpus. All the cases here put down, are applicable only when the habeas corpus act is in force; for, during its suspension, no discharge from prison can be sued out under it, nor obtained, but by consent of the king's privy council.

COMMIT'TEE, *s.* [from *commit.*] Those to whom the consideration or ordering of any matter is referred, by some court, or by consent of parties to whom it belongs; as in parliament, a bill either consented to and passed, or denied, or neither, but being referred to the consideration of certain persons appointed by the house farther to examine it, they are thereupon called a *committee*. And when a parliament is called, and the speaker and members have taken the oaths, and the standing orders of the house are read, committees are appointed to sit on certain days, viz. the committee of privileges, of religion, of grievances, of courts of justice, and of trade; which are the standing committees. But though they are appointed by every new parliament, they do not all of them act, only the committee of privileges; and this being not of the whole house, is first called in the speaker's chamber, from whence it is adjourned into the house, every one of the house having a vote therein, though not named. Any member may be present at any select committee; but is not to vote unless he be named. The chairman of the committee sits in the clerk's place at the table, and writes the votes for and against the matter referred to them; and, if the number be equal, he has a casting voice, otherwise he hath no vote in the committee; and, after the chairman hath put the question for reporting to the house, if that be carried, he leaves the chair, and the speaker being called to his chair, (who quits it in the beginning, and the mace is laid under the table,) he is to go down to the bar, and so bring up his report to the table. After a bill is read a second time in the house of commons, the question is put, whether it shall be committed to a committee of the whole house, or a private committee; and the committees meet in the speaker's chamber, and report their opinion of the bill with the amendments, &c. And if there be any exceptions against the amendments reported, the bill may be re-committed: eight persons make a committee, which may be adjourned by five.

COMMITTE'E, *s.* in law, one to whom the care of an idiot or lunatic, or his estate, is committed.—The lord-chancellor usually commits the care of his person to some friend, who is then called his *committée. Blackstone.*—The heir is generally made the manager or *committée* of the estate. *Idem.* See LUNATIC.

COMMIT'TER, *s.* Perpetrator; he that commits.—Such an one makes a man not only a partaker of other men's sins, but a deriver of the whole guilt to himself; yet so as to leave the *committer* as full of guilt as before. *South.*

COMMIT'TIBLE, *adj.* Liable to be committed.—Besides the mistakes *committible* in the solary compute, the difference of chronology disturbs his computes. *Brown.*

To COMMI'X, *v. a.* [*commisceo*, Lat.] To mingle; to blend; to mix; to unite with things in one mass.—I have written against the spontaneous generation of frogs in the clouds; or, on the earth, out of dust and rain-water *commixed. Ray.*

To COMMI'X, *v. n.* To mingle:

The smile mocking the sigh, that it would fly
From so divine a temple, to *commix*
With winds that sailors rail at. *Shakespeare.*

COMMIX'ION, *s.* Mixture; incorporation of different ingredients:

Were thy *commixion* Greek and Trojan, so
That thou could'st say, this hand is Grecian all,
And this is Trojan. *Shakespeare.*

COMMIX'TION, *s.* Mixture; incorporation; union of various substances in one mass.—Some species there be of middle and participating natures, that is, of birds and beasts, as batts, and some few others, so confirmed and set together, that we cannot define the beginning or end of either; there being a *commixtion* of both in the whole, rather than adaptation or cement of the one unto the other. *Brown.*

COMMIX'TURE, *s.* The act of mingling; the state of being mingled; incorporation; union in one mass.—In the *commixture* of any thing that is more oily or sweet, such bodies are least apt to putrefy, the air working little upon them. *Bacon.*—The mass formed by mingling different things; composition; compound.—There is scarcely any rising but by a *commixture* of good and evil arts. *Bacon.*

Fair ladies, mask'd, are roses in the bud,
Or angels veil'd in clouds; are roses blown,
Dismask'd, their damask sweet *commixture* shewn. *Shakes.*

COMMO'DE, *s.* [Fr.] The head-dress of women.—She has contrived to shew her principles by the setting of her *commode*; so that it will be impossible for any woman that is disaffected to be in the fashion. *Addison.*

She, like some pensive statesman, walks demure,
And smiles and hugs, to make destruction sure;

4 Or

Or under high *commodes*, with looks erect,
Barefac'd devours, in gaudy colours deck'd. *Canv.*

COMMODIA'NUS (Gazeus), a Christian author in the fourth century, who wrote a work in Latin verse, intitled Instructions; the moral of which is excellent, but the verse is heavy. M. Davies published a fine edition of it in 1711, at the end of Municius Felix.

COMMO'DIOUS, *adj.* [*commodus*, Lat.] Convenient; suitable; accommodate to any person; fit; proper; free from hindrance or uneasiness.—Such a place cannot be *commodious* to live in; for being so near the moon, it had been too near the sun. *Raleigh.*

To that recess, *commodious* for surprise,
When purple light shall next suffuse the skies. *Pope.*

Useful; suited to wants or necessities.—Bacchus had found out the making of wine, and many things else *commodious* for mankind. *Raleigh.*

COMMO'DIOUSLY, *adv.* Conveniently. Without distress:

We need not fear
To pass *commodiously* this life, sustain'd
By him with many comforts, till we end
In dust, our final rest and native home. *Milton.*

Suitably to a certain purpose.—Wisdom may have framed one and the same thing to serve *commodiously* for divers ends. *Hooker.*

COMMO'DIOUSNESS, *s.* Convenience; advantage.—Of cities, the greatness and riches increase according to the *commodiousness* of their situation in fertile countries, or upon rivers and havens. *Temple.*

COMMO'DITY, *s.* [*commoditas*, Lat.] Interest; advantage; profit.—They knew, that howsoever men may seek their own *commodity*, yet, if this were done with injury unto others, it was not to be suffered. *Hooker.*

Commodity, the biass of the world,
The world, which of itself is poised well,
Till this advantage, this vile drawing biass,
This sway of motion, this *commodity*,
Makes it take head from all indifferency,
From all direction, purpose, course, intent. *Shakespeare.*

Convenience; particular advantage.—Travellers turn out of the highway, drawn either by the *commodity* of a footpath, or the delicacy or the freshness of the fields. *Ben Jonson.*—Wares; merchandise; goods for traffic.—*Commodities* are moveables, valuable by money. *Locke.*—Of money, in the commerce and traffic of mankind, the principal use is that of saving the commutation of more bulky *commodities*. *Arbuthnot.*

COMMODO'RE, *s.* [probably corrupted from the Spanish *commandador*.] The captain who commands a squadron of ships; a temporary admiral.

COM'MODUS (L. Aurelius Antoninus), son of M. Antoninus, succeeded his father in the Roman empire. He was naturally cruel, and fond of indulging his licentious propensities; and regardless of the instructions of philosophers, and of the decencies of nature, he corrupted his own sisters, and kept three hundred women, and as many boys, for his illicit pleasures. See ROME.

COM'MON, *adj.* [*communis*, Lat.] Belonging equally to more than one.—Though life and sense be *common* to man and brutes, and their operations in many things alike; yet by this form he lives the life of a man, and not of a brute. *Hale.*—He who hath received damage, has, besides the right of punishment *common* to him with other men, a particular right to seek reparation. *Locke.*—The crime was *common*, *common* be the pain. *Pope.*—Having no possessor or owner.—Where no kindred are to be found, we see the possessions of a private man revert to the community, and so become again perfectly *common*; nor can any one have a property in them, otherwise than in other things *common* by nature. *Locke.*—Vulgar; mean; not distinguished by any excellence; often seen; easy to be had; of little value; not rare; not scarce.

Or as the man, who princes do advance
Upon their gracious mercy-seat to sit,
Doth *common* things, of course and circumstance,
To the reports of *common* men commit. *Davies.*

Public; general; serving the use of all.—He was advised by a parliament-man not to be strict in reading all the *common-prayer*, but make some variation. *Walton.*—I need not mention the old *common* shore of Rome, which ran from all parts of the town, with the current and violence of an ordinary river. *Addison.*—Of no rank; mean; without birth or descent:

Flying bullets now,
To execute his rage, appear too slow;
They miss, or sweep but *common* souls away;
For such a loss Opdam his life must pay. *Waller.*

Frequent; usual; ordinary.—There is an evil which I have seen *common* among men. *Eccles.* vi. 1.—Neither is it strange that there should be mysteries in divinity, as well as in the *commonest* operations in nature. *Swift.*—Prostitute.—'Tis a strange thing, the impudence of some women! was the word of a dame who herself was *common*. *L'Estrange.*—Hipparchus was going to marry a *common* woman, but consulted Philander upon the occasion. *Spectator.*—In grammar. Such verbs as signify both action and passion are called *common*; as *aspernor*, *I despise*, or *am despised*; and also such nouns as are both masculine and feminine, as *parens*.

COM'MON, *s.* An open ground equally used by many persons; and free for their cattle. In the eye of law, it is a right or privilege, which one or more persons claim to take or use, in some part or portion of that which another man's lands, waters, woods, &c. do naturally produce; without having an absolute property in such land, waters, wood, &c. It is called an *incorporeal right*, which lies in grant, as if originally commencing on some agreement between lords and tenants, for some valuable purposes; which by age being formed into a prescription continues, although there be no deed or instrument in writing which proves the original contract or agreement. 2 *Inst.* 65. 1 *Vent.* 387.

There is not only common of pasture, but also common of piscary or fishing; common of estovers; common of turbary; which see under their several heads. The word *common*, however, in its most usual acceptation, signifies common of pasture. This is a right of feeding one's beasts on another's land; for in those waste grounds usually called commons, the property of the soil is generally in the lord of the manor; as in common fields it is in the particular tenants. This kind of common is divided into common in gross, common appendant, common appurtenant, and common *pur cause de vicinage*. Common in gross is a liberty to have common alone, without any lands or tenements, in another person's land, granted by deed to a man and his heirs, or for life, &c. 4 *Rep.* 30. Common appendant is a right belonging to a man's arable land, of putting beasts commonable into another's ground. And common appurtenant is belonging to an estate for all manner of beasts commonable or not commonable. 4 *Rep.* 37. *Plowd.* 161.

Common appendant and appurtenant are in a manner confounded, as appears by Fitzherbert; and are by him defined to be a liberty of common appertaining to or depending on a freehold; which common must be taken with beasts commonable, as horses, oxen, kine, and sheep; and not with goats, hogs, and geese. But some make this difference, that common appurtenant may be severed from the land whereto it pertains, but not common appendant; which, according to sir Edward Coke, had this beginning: when a lord enfeoffed another of arable land, to hold of him in socage, the feoffee, to maintain the service of his plough,

plough, had at first, by the curtesy or permission of the lord, common in his wastes for necessary beasts to eat and compost his land, and that for two causes; one, for that it was tacitly implied in the feoffment, by reason the feoffee could not till or compost his land without cattle, and cattle could not be sustained without pasture; so by consequence the feoffee had, as a thing necessary and incident, common in the waste and lands of the lord; and this may be collected from the ancient books and statutes; and the second reason of this common was, for the maintenance and advantage of tillage, which is much regarded and favoured by the law. 4 *Rep.* 37.

Common pur cause de vicinage, common by reason of neighbourhood; is a liberty that the tenants of one lord in one town have to common with the tenants of another lord in another town; it is where the tenants of two lords have used, time out of mind, to have common promiscuously in both lordships lying together and open to one another. 8 *Rep.* 78. And those that challenge this kind of common, which is usually called *intercommoning*, may not put their cattle in the common of the other lord, for then they are distrainable; but they may turn them into their own fields, and if they stray into the neighbouring common, they must be suffered. *Terms de Ley.* The inhabitants of one town or lordship may not put in as many beasts as they will, but with regard to the freehold of the inhabitants of the other; for otherwise it were no good neighbourhood, upon which all this depends. If one lord incloses the common, the other town cannot then common; but, though the common of vicinage is gone, common appendant remains. 4 *Rep.* 38. Every common *per cause de vicinage* is a common appendant. 1 *Danv. Abr.* 799. This is, indeed, only a permissive right intended to excuse what in strictness is a trespass in both, and to prevent a multiplicity of suits. And therefore either township may inclose and bar out the other, though they have intercommoned time out of mind. 2 *Comm.* 34.

Common appendant is only to ancient arable land, not to a house, meadow, pasture, &c. It is against the nature of common appendant to be appendant to meadow or pasture; but, if in the beginning land be arable, and of late a house hath been built on some part of the land, and some acres are employed to meadow and pasture, in such case it is appendant; though it must be pleaded as appendant to the land, and not to the house, pasture, &c. 1 *Nelf. Abr.* 457. This may be common appendant, though it belongs to a manor, farm, or plough-land; and common appendant is of common right; but it is not common appendant, unless it has been appendant time out of mind. 1 *Danv.* 746. It may be upon condition, for all the year, or for a certain time, or for a certain number of beasts, &c. by usage; though it ought to be for such cattle as plough and compost the land to which it is appendant. Common appendant may be to common in a field after the corn is severed, till the ground is re-sown; so it may be to have common in a meadow after the hay is carried off the same, till Candlemas, &c. *Yelv.* 185. This common, which is in its nature without number, by custom may be limited as to the beasts; common appurtenant ought always to be for those levant and couchant, and may be *sans number. Plowd.* 161. A man may prescribe to have common appurtenant for all manner of cattle, at every season in the year. 25 *Aff.* 8. Common by prescription for all manner of commonable cattle as belonging to a tenement, &c. must be for cattle levant and couchant upon the land, (which is so many as the land will maintain,) or it will not be good; and, if a person grants common *sans number*, the grantee cannot put in so many cattle, but that the grantor may have sufficient common in the same land. 1 *Danv. Abr.* 798. He who hath common appendant or appurtenant, can keep but a number of cattle proportionable to his land; for he can common with no more than the lands to which his common belongs is able to maintain. 3 *Salk.* 93. Common appurtenant may be to a house, pasture, &c. though common appendant cannot; but it ought to be prescribed for as against common right; and uncommonable cattle, as hogs, goats, &c. are appurtenant: this common may be created by grant at this day; so may not common appendant. 1 *Inst.* 122. Common appurtenant for a certain number of beasts may be granted over. 1 *Danv.* 802. By 13 Geo. III. c. 81. rams are not to remain on commons from the 25th of August to the 25th of November.

The property of the soil in the common is entirely in the lord; and the use of it jointly in him and the commoners. Lords of manors may depasture in commons where their tenants put in cattle; and a prescription to exclude the lord is against law. 1 *Inst.* 122. The lord may agist the cattle of a stranger in the common by prescription; and he may license a stranger to put in his cattle, if he leaves sufficient room for the commoners. 1 *Danv.* 795. Also the lord may surcharge an overplus of the common; and if, where there is not an overplus, the lord surcharges the common, the commoners are not to distrain his beasts; but must commence an action against the lord. But it is said, if the lord of the soil put cattle into a close, contrary to custom, when it ought to lie fresh, a commoner may take the cattle damage feasant; otherwise it is a general rule that he cannot distrain the cattle of the lord. 1 *Danv.* 807. The lord may distrain where the common is surcharged; and bring action of trespass for any trespass done in the common. 9 *Rep.* 113. A lord may make a pond on the common; though the lord cannot dig pits for gravel or coal, the statutes of approvement extending only to inclosure. 3 *Inst.* 204. If the lord makes a warren on the common, the commoners may not kill the conies; but are to bring their action, for they may not be their own judges. 1 *Rol.* 90. 405.

By the statute of Merton, 20 Hen. III. c. 4. lords may *approve* against their tenants, viz. inclose part of the waste, and thereby discharge it from being common, leaving common sufficient; and neighbours, as well as tenants, claiming common of pasture, shall be bound by it. If the lord incloses on the common, and leaves not common sufficient, the commoners may not only break down the inclosures, but may put in their cattle, although the lord ploughs and sows the land. 2 *Inst.* 88. 1 *Rol. Abr.* 406. Where the tenants of the manor have a right to dig gravel on the wastes, or to take estovers, there the lord has no right under the statute of Merton, to inclose and approve the wastes of the manor. Yet a custom in a manor that any person being desirous of inclosing, may apply to the court, &c. first obtaining the consent of the lord, does not abridge the lord's common-law right of inclosing without any such application, provided he leave common sufficient for the tenants. 2 *Term Rep.* 391. By 29 Geo. II. c. 36. owners of common, with the consent of the majority, in number and value, of the commoners; the majority of the commoners, with consent of the owners; or any persons with the consent of both, may inclose any part of a common for the growth of wood. If the wood is destroyed, the offender may be punished according to 1 Geo. I. c. 48. if not convicted in six months, the owner shall have satisfaction from the adjoining parishes, as for fences overthrown, by stat. Westm. 2. Persons cutting wood on commons shall incur the same penalty. And, by 31 Geo. II. c. 41. the recompence is to be paid to persons interested, in proportion to their interest. Tenants for life, or for years determinable on lives, may consent for their term; but that binds not, after determination of their estate.

A commoner hath only a special and limited interest in the soil, but yet he shall have such remedies as are commensurate to his right, and therefore may distrain beasts damage-feasant, bring an action on the case, &c. but not being absolute owner of the soil, he cannot bring a general action of trespass for a trespass done upon the common. *Bridg.* 10. *Godb.* 123. 2 *Leon.* 201. A commoner cannot regularly do any thing on the soil which tends to the

the melioration or improvement of the common, as cutting down of bushes, fern, &c. 1 *Sid.* 251. 12 Hen. VIII. c. 2. Therefore if a common every year in a flood is surrounded with water, the commoner cannot make a trench in the soil to avoid the water, because he has nothing to do with the soil, but only to take the grass with the mouth of the cattle. 1 *Rol. Abr.* 405. 2 *Bulst.* 116.

Every commoner may break the common if it be inclosed; and, although he does not put his cattle in at the time, yet his right of commonage shall excuse him from being a trespasser. *Lit. Rep.* 38. That is, supposing the inclosure made by the lord, and that there is not sufficient common, or that the inclosure is made by any other person than the lord. If a tenant of the freehold ploughs it, and sows it with corn, the commoner may put in his cattle, and therewith eat the corn growing upon the land; so if he lets his corn lie in the field beyond the usual time, the other commoners may, notwithstanding, put in their beasts. 2 *Leon.* 202. The commoner cannot use common but with his own proper cattle; but, if he hath not any cattle to manure the land, he may borrow other cattle to manure it, and use the common with them; for, by the loan, they are in a manner made his own cattle. 1 *Danv.* 798. Grantee of common appurtenant, for a certain number of cattle, cannot common with the cattle of a stranger: he that hath common in gross, may put in a stranger's cattle, and use the common with such cattle. Common appendant or appurtenant, cannot be made common in gross: and approvement extends not to common in gross. 2 *Inst.* 86. A commoner may distrain beasts put into the common by a stranger, or every commoner may bring action of the case, where damage is received. 9 *Rep.* 11. But one commoner cannot distrain the cattle of another commoner, though he may those of a stranger, who hath no right to the common. 2 *Lutw.* 1238. Wherever there is colour of right for putting in cattle, a commoner cannot distrain; where there is no colour he may: so he may distrain a stranger's cattle, but not those of a commoner, though he exceeds his number. Where writ of admeasurement lies, he cannot distrain. *Quære*, whether he may distrain cattle surcharged, where the right of common is for a number certain. 4 *Burr.* 2426. 1 *Black. Rep.* 673.

The usual remedies for surcharging the common, are either by distraining so many of the beasts as are above the number allowed, or else by an action of trespass; both which may he had by the lord: or lastly, by a special action on the case for damages, in which any commoner may be plantiff. *Freem.* 273. But the ancient and most effectual method of proceeding, is by writ of admeasurement of pasture. This lies, either where a common appurtenant or in gross is certain as to number; or where a man has common appendant, or appurtenant to his land, the quantity of which common has never yet been ascertained. In either of these cases, as well the lord, as any of the commoners, is entitled to this writ of admeasurement; which is one of those writs, that are called *vicontiel*, (2 *Inst.* 369. *Finch. L.* 314.) being directed to the sheriff, (*vicecomiti*,) and not to be returned to any superior court, till finally executed by him. It recites a complaint, that the defendant hath surcharged the common: and therefore commands the sheriff to admeasure and apportion it; that the defendant may not have more than belongs to him, and that the plantiff may have his rightful share. And upon this suit all the commoners shall be admeasured, as well those who have not, as those who have, surcharged the common; as well the plantiff as defendant. *F. N B.* 125. The execution of this writ must be by a jury of twelve men, who are upon their oaths to ascertain, under the superintendance of the sheriff, what and how many cattle each commoner is entitled to feed. And the rule for this admeasurement is generally understood to be, that the commoner shall not turn more cattle upon the common, than are sufficient to manure and stock the land to which his right of common is annexed; or, as our ancient law expressed it, such cattle as only are levant and couchant upon his tenement, (*Bro. Abr.* 1. *Prescription* 28.) which being a thing uncertain before admeasurement, has frequently, though erroneously occasioned this unmeasured right of common to be called a common without stint, or *sans nombre*, (*Hardr.* 117.) a thing, which though possible in law, does in fact very rarely exist. *Lord Raym.* 407.

If, after the admeasurement has thus ascertained the right, the same defendant surcharges the common again, the plaintiff may have a writ of second surcharge, (*de secundâ superoneratione*,) which is given by the stat. Westm. 2. 13 Edw. I. c. 8. and thereby the sheriff is directed to inquire by a jury, whether the defendant has in fact again surcharged the common, contrary to the tenor of the last admeasurement; and if he has, he shall then forfeit to the king the supernumerary cattle put in, and also shall pay damages to the plantiff. *F. N. B.* 126. 2 *Inst.* 370. This process seems highly equitable, for the first offence is held to be committed through mere inadvertence, and therefore there are no damages or forfeiture on the first writ, which was only to ascertain the right which was disputed: but the second offence is a wilful contempt and injustice, and therefore punished, very properly, with not only damages, but also forfeiture. And herein, the right being once settled, is never again disputed; but only the fact is tried, whether there be any second surcharge or no: which gives this neglected proceeding a great advantage over the modern method by action on the case, wherein the *quantum* of common belonging to the defendant must be proved upon every fresh trial, for every repeated offence. This injury, by surcharging, can, properly speaking, only happen where the common is appendant or appurtenant, and of course limited by law; or where, when in gross, it is expressly limited and certain; for where a man hath common in gross, *sans nombre*, or without stint, he cannot be a surcharger. However, even where a man is said to have common without stint, still there must be left sufficient for the lord's own beasts. 1 *Rol. Abr.* 399. For the law will not suppose that, at the original grant of the common, the lord meant to exclude himself.

There is yet another disturbance of common, when the owner of the land, or other person, so incloses or otherwise obstructs it, that the commoner is precluded from enjoying the benefit, to which he is by law entitled. This may be done either by erecting fences, or by driving the cattle off the land, or by ploughing up the soil of the common. *Cro. Eliz.* 198. Or it may be done by erecting a warren therein, and stocking it with rabbits in such quantities, that they devour the herbage, and thereby destroy the common. For in such case, though the commoner may not destroy the rabbits, yet the law looks upon this as an injurious disturbance of his right, and has given him remedy by action against the owner. *Cro. Jac.* 195. This kind of disturbance does indeed amount to a disseisin, and if the commoner chuses to consider it in that light, the law has given him an assise of novel disseisin, against the lord, to recover the possession of his common. *F. N. B.* 179. Or it has given a writ of *quod permittat*, against any stranger, as well as the owner of the land, in case of such a disturbance to the plantiff as amounts to a total deprivation of his common; whereby the defendant shall be compelled to permit the plaintiff to enjoy his common as he ought. *Finch. L.* 275. But if the commoner does not chuse to bring a real action to recover seisin, or to try the right, he may (which is the easier and more usual way) bring an action on the case for his damages, instead of an assise, or a *quod permittat*. *Cro. Jac.* 195.

If any commoner incloses, or builds on the common, every commoner may have an action for the damage. Where turf is taken away from the common, the lord only is to bring the action: but it is said the commoners may have an action for the injury, by entering on the common, &c. 2 *Leon.* 201. If a commoner who hath a free-

hold in his common be ousted of, or hindered therein, that he cannot have it so beneficially as he used to do; whether the interruption be by the lord or any stranger, he may have an assise against him: but if the commoner hath only an estate for years, then his remedy is by action on the case. And if it be only a small trespass, that is little or no loss to the commoner, but he hath common enough besides, the commoner may not bring any action. 4 *Rep.* 37. *Dyer* 316.

A commoner cannot dig clay on the common, which destroys the grass, and carrying it away doth damage to the ground: so that the other commoners cannot enjoy the common, *in tam amplo modo* as they ought. *Godb.* 344. Also a commoner may not cut bushes, dig trenches, &c. in the common, without a custom to do it. 1 *Nelf.* 462. If he makes any thing *de novo*, he is a trespasser: he can do nothing to impair the common; but may reform a thing abused, fill up holes, &c. 1 *Brownl.* 208. A commoner may abate hedges erected on a common; for though the lord hath an interest in the soil, by abating the hedges, the commoner doth not meddle with it. 2 *Mod.* 65. Any man may by prescription have common and feeding for his cattle in the king's highway, although the soil doth belong to another. But the occupation of common by usurpation, will not give title to him that doth occupy it unless he hath had it time beyond memory.

Upon agreement between two commoners to enclose a common, a party having interest not privy to the agreement, will not be bound; but one or two wilful persons shall not hinder the public good. *Chan. Rep.* 48. Commons must be driven yearly at Michaelmas, or within fifteen days after: infected horses, and stone-horses under size, are not to be put into commons, under forfeitures, by 32 *Hen.* VIII. c. 13. New erected cottages, though they have four acres of ground laid to them, ought not to have common in the waste. 2 *Inst.* 740. In law proceedings, where there are two distinct commons, the two titles must be shewn: cattle are to be alleged commonable; and common out to be in lands commonable: and the place is to be set forth where the messuage and lands lie to which the common belongs. 1 *Nelf.* 462. Common appendant, because it is of common right, shall be apportioned by the commoner's purchase of part of the land in which he hath such common: but common appurtenant shall be extinct by the commoner's purchase of part of the land. Both common appendant and appurtenant shall be apportioned by alienation of part of the land to which the common is appendant or appurtenant. *Co. Lit.* 122. *Owen* 122. *Cro. Eliz.* 594.

A release of common in one acre, is an extinguishment of the whole common. If A. hath common in the lands of B. as appurtenant to a messuage, and after B. enfeoffs A. of the said lands, whereby the common is extinguished; and then A. leases to B. the said messuage and lands, with all commons, &c. used or occupied with the said messuage; this is a good grant of a new common for the time. *Cro Eliz.* 570. If several persons are seised of several parts of a common, and a commoner purchases the inheritance of one part, his entire common is extinct. 1 *And.* 159. When a man hath common appendant for a certain number of cattle, and to a certain parcel of land, if he sell part of it, the common is not extinguished; for the purchaser shall have common *pro rata*: but it is otherwise in common appurtenant. 8 *Rep.* 78. *Nelf.* 460.

By 13 Geo. III. c. 81, in every parish where there are common-field lands, all the arable lands lying in such fields, shall be cultivated by the occupiers, under such rules as three-fourths of them in number and value, (with the consent of the land and tithe owners, the latter not to receive any fines, only rents,) shall appoint by writing under their hands: the expence to be borne proportionably, under the management of a field-master, or field-reeve, to be appointed annually in May. Persons having right of common, but not having land in such fields, and persons having sheep-walks, may compound for such right, by written agreement, or may, with their consent, have parts allotted them to common upon. And the balks, slades, and meres, may be ploughed up. Lords of manors, with the consent of three-fourths of the commoners, on the wastes and commons within their manors, may demise (for not more than four years) any part of such wastes, &c. not exceeding one-twelfth part; and the clear rents reserved for the same, shall be applied in improving the residue of such wastes. In every manor where there are stinted commons, in lieu of demising part thereof, assessments on the lords of such manors, and the owners and occupiers of such commons, may be made, and the money employed in the improvement of the commons, under the direction of the majority; which (or in some instances two-thirds) may regulate the depasturing, opening, shutting-up, breaking, and unstocking, the commons, and the kind of cattle to be allowed the commoners. All rights relative to commons, previous to this act, are saved; except as against persons who become subject to regulations made under the statute.

COMMON OF ESTOVERS, or *estouviers*, that is necessaries, from *estoffer*, to furnish. A liberty of taking necessary wood for the use or furniture of a house, or farm, from off another's estate. 2 *Comm.* 35. Or in the language of the law, for house-bote, plough-bote, and hay-bote. See BOTE. What botes are necessary, tenants may take, notwithstanding no mention be made thereof in their leases; but if a tenant take more house-bote than is needful, he may be punished for waste. *Termes de Ley.* Tenant for life may take upon the land demised reasonable estovers, unless restrained by special covenant: and every tenant for three years hath three kinds of estovers incident to his estate. When a house, having estovers appendant or appurtenant, is blown down by wind, if the owner rebuilds it in the same place and manner as before, his estovers shall continue: so if he alters the rooms and chambers, without making new chimnies; but if he erect any new chimnies, he will not be allowed to spend any estovers in such new chimnies. 4 *Rep.* 87. 4 *Leon.* 383. If one have a dwelling-house whereunto common of estovers doth belong, and the house by fire is burnt down, and a new one built near to the place, or in the place in another form, the estovers are gone; but if the old house be only some of it down, it is otherwise; and in all cases where the alterations to a house do no prejudice to the tertenant or owner of the land or wood, the estovers will remain. *F. N. B.* 180. Where a man hath estovers for life, if the owner cut down all the wood, that there is none left for him, he may bring an assise of estovers; and if the tenant have but an estate for years, or at will, he may have an action on the case. *Moor Ca.* 65. If the tenant who hath common of estovers, shall use them to any other purpose than he ought, he that owns the wood may bring trespass against him: as where one grants twenty loads of wood to be taken yearly in such a wood, ten loads to burn, and ten to repair pales; here he may cut and take the wood for the pales, though they need no amending, but then he must keep it for that use. 9 *Rep.* 113.

COMMON OF PISCARY, is a liberty of fishing in another man's water. Common of piscary to exclude the owner of the soil, is contrary to law: though a person by prescription may have a separate right of fishing in such water, and the owner of the soil be excluded; for a man may grant the water, without passing the soil; and if one grant *separaliam piscariam*, neither the soil nor the water pass, but only a right of fishing. 1 *Inst.* 4, 122. 5 *Rep.* 34.

COMMON OF TURBARY, is a licence to dig turf upon the ground of another, or in the lord's waste. This common is appendant or appurtenant to an house, and not to lands; for turfs are to be burnt in the house: and it may be in gross; but it does not give any right to the land, trees, or mines. It cannot exclude the owner of the soil. 1 *Inst.* 4, 122. There is also a common of digging for coals, minerals, stones, &c. All these bear a resemblance to common of pasture in many respects; though in one point

point they go much farther; common of pasture being only a right of feeding on the herbage or vesture of the soil which renews annually; but common of turbary and those just mentioned, are a right of carrying away the very soil itself. These several species of common do however all originally result from the same necessity as common of pasture; viz. for the maintenance and carrying on of husbandry: common of piscary being given for the sustenance of the tenant's family; common of turbary and fire bote for his fuel; and house-bote, plough-bote, cart-bote, and hedge-bote, for repairing his house, his instruments of tillage, and the necessary fences of his grounds. 2 *Comm.* 34, 5. See the article INCLOSURE.

COM'MON, *adv.* Commonly; ordinarily.—I am more than *common* tall. *Shakespeare.*

In COM'MON. Equally to be participated by a certain number.—By making an explicit consent of every commoner necessary to any one's appropriating to himself any part of what is given *in common*, children or servants could not cut the meat which their father or master had provided for them *in common*, without assigning to every one his peculiar part. *Locke.*—Equally with another; indiscriminately.—In a work of this nature it is impossible to avoid puerilities; it having that *in common* with dictionaries, and books of antiquities. *Arbuthnot.*—In law, a distinction of tenancy.—Estates may be held in four different ways; in severalty, in joint tenancy, in coparcenary, and *in common*. Tenants *in common* are such as hold by several and distinct titles, but by unity of possession. *Blackstone*

To COM'MON, *v. n.* To have a joint right with others in some common ground.

COM'MON LAW, *s.* Those customs and usages which have, by long prescription, obtained in this nation the force of laws. It is distinguished from the statute law, which owes it authority to acts of parliament.—The municipal law of England may with sufficient propriety be divided into two kinds, the unwritten or *common law*, the written or statute law. *Blackstone.*

COM'MON LAW'YER, *s.* One versed in the common law.—Canonists, civilians, and *common lawyers*, do all admit this distinction. *Spelman.*

COM'MON PLEAS, *s.* [*communia placita*, Lat.] One of the king's courts now constantly held in Westminster hall; but in ancient time was moveable, as appears by Magna Charta, c. 11. Before this charter of king John and Henry III. there were but two courts, called the king's courts, viz. the king's-bench and the exchequer, which were then stiled *curia domini regis*, and *aula regis*, because they followed the court of the king; and, upon the grant of the great charter, the court of common pleas was erected and settled in one certain place, *i. e.* Westminster-hall; and, after that, all the writs ran *quod sit coram justiciariis meis apud Westm.* whereas before, the party was required by them to appear *coram me vel justiciariis meis*, without any addition of place, &c. But sir Edward Coke is of opinion, in his preface to the eighth report, and 1 Inst. 71. b. that the court of common pleas existed as a distinct court before the conquest; and was not created by Magna Charta, at which time there were *justiciarii de banco*, &c. Though before this act, common pleas might have been held in *banco regis*; and all original writs were returnable there. According to Madox, the origin of the court of common pleas is of a much later date than that assigned by lord Coke. He so far agrees with lord Coke, as to admit that the Magna Charta of Henry III. rather confirmed than erected the bank or common pleas; and that such a court was in being several years before the Magna Charta of 17 of king John, though it was then first made stationary: but, in other respects, lord Coke and Mr. Madox differ widely; for the latter thinks that, some time after the conquest, there was one great and supreme judicature, called the *curia regis*, which he supposes to have been of Norman, and not Anglo-Saxon, original, and to have exercised jurisdiction over common, as well as other, pleas; that the common pleas and exchequer were gradually separated from the *curia regis*, and became jurisdictions wholly distinct from it; and that the separation of the common pleas began in the reign of Richard I. or early in the reign of king John, and was completed by Henry III. *Mad. Hist. Exch.* 63. 539. fo. ed.

Writs returnable in this court, are now *coram justiciariis nostris apud Westm.* But original writs, &c. returnable in the court of king's-bench, are, *coram nobis ubicunque fuerimus in Angliâ.* The jurisdiction of the court of common pleas is general, and extends itself throughout England; it holds plea of all civil causes at common law, between subject and subject, in actions real, personal, and mixed; and it seems to have been the only court for real causes. In personal and mixed actions it hath a concurrent jurisdiction with the king's-bench; but it hath no cognizance of pleas of the crown; and common pleas are all pleas that are not such.

The court of common pleas does not possess any original jurisdiction; nor has it, like the court of king's-bench, any mode of proceeding in common cases peculiar to itself. Its authority is founded on original writs issuing out of the court of chancery; which original writs are the king's mandates for the court to proceed in the determination of the causes mentioned therein. The reason of original writs issuing out of chancery is, because when the courts were united, which was formerly the case, the chancellor held the seal; therefore, when they were divided, he, still keeping the seal, sealed all original writs. *Gilb. H. C. P.* In all personal actions, therefore, brought by and against common persons, the only way of proceeding in this court is by original. There is, indeed, one other way of proceeding in this court, in common cases, which is sometimes used; and which is called proceeding by original *quare clausum fregit*. This method of proceeding is grounded, in point of law, upon the same kind of original writ as the usual proceeding by capias is, the only difference between them being in the mesne process after the original is sued out, or at least supposed so to be. Instead of the process to compel the appearance of the defendant being by capias against his person, it is in this case by summons and distress against his goods. In a word, it is the same as the ancient mode of proceeding in this court was before the general introduction of the capias. See the article CAPIAS. The advantage and use of this mode of proceeding by original *quare clausum fregit*, is where the defendant has effects which can be distrained, but he himself cannot be met with to be personally served; the process by capias requiring personal service, which is not required in the process by summons. All actions belonging to this court come hither either by original, as arrests and outlawries, or by privilege or attachment, for or against privileged persons; or out of inferior courts, not of record, by *pone*, *recordare*, *accedas ad curiam*, writ of false judgment, &c. Actions popular, and actions penal, of debt, &c. upon any statute, are cognizable by this court; and besides having jurisdiction for punishment of its officers and ministers, the court of common pleas may grant prohibitions, to keep temporal and ecclesiastical courts within due bounds. In this court are four judges, created by letters patent; the seal of the court is committed to the custody of the chief justice.

The other officers of the common pleas are the custos brevium, three prothonotaries and their secondaries, the clerk of the warrants, clerk of the essoins, fourteen filazers, four exigenters, a clerk of the juries, the chirographer, clerk of the king's silver, the clerk of the treasury, clerk of the seal, of outlawries, and the clerk of the inrollment of fines and recoveries, clerk of the errors, &c. The custos brevium is the chief clerk in this court, who receives and keeps all writs returnable therein; and all records of nisi prius, which are delivered to him by the clerks of the assize of every circuit, &c. and he files the rolls together, and carries them into the treasury of records: he also makes out exemplifications, and copies of all

all writs and records, &c. The prothonotaries enter and enrol all declarations, pleadings, judgments, &c. and they make out all judicial writs, writs of execution, writs of privilege, procedendos, &c. The secondaries are assistants to the prothonotaries in the execution of their offices; and they take minutes, and draw up all orders and rules of court. The filazers, who have the several counties of England divided among them, make out all mesne process, as capias, alias, pluries, &c. between the original writ and the declaration; and they make all writs of view, &c. The exigenters, appointed for several counties, make out all exigents and proclamations in order to outlawry. The clerk of the warrants enters all warrants of attorney, inrols deeds of bargain and sale, and estreats all issues. The clerk of the essoins keeps the roll of the essoins, wherein he enters them, and non-suits, &c. The clerk of the juries makes out all writs of *habeas corpora jurator'*, for juries to appear; and he enters the continuances till the verdict given. The clerk of the treasury keeps the records of the court, and makes exemplifications of records, copies of issues, judgments, &c. The clerk of the seals seals all writs and mesne process; also writs of outlawry and supersedeas, and all patents. The clerk of the outlawries makes out the writs of *capias utlagatum*. The clerk of the errors is for the allowance of writs of error. The clerk of the inrolments of fines and recoveries, returns all writs of covenant, writs of entry and seisin, and inrols and exemplifies fines, &c. The clerk of the king's silver enters the substance of the writ of covenant; and the chirographer ingrosses all fines, and delivers the indentures to the parties. To these offices may be added, a proclamator, a keeper of the court, cryer, and tipstaffs; besides the warden of the fleet. There are also attornies of this court, whose number is unlimited; and none may plead at the bar of the court, in term-time, or sign any special pleadings, but serjeants at law.

COM'MON PRAYER, *s.* [*preces publicæ*, Lat.] The established liturgy or prayers used in our church. It is the particular duty of clergymen every Sunday, &c. to use the public form of prayer, prescribed by the book of common prayer; and if any incumbent be resident upon his living, as he ought to be, and keep a curate, he is obliged, by the act of uniformity, once every month at least, to read the common prayers of the church, according as they are directed by the book of common prayer, in his parish church, in his own person, or he shall forfeit five pounds for every time he fails therein. 13 & 14 *Car. II.* c. 4. Also by that statute the book of common prayer is to be provided in every parish, under the penalty of three pounds a-month; and the common prayer must be read before every lecture; the whole appointed for the day, with all the circumstances and ceremonies, &c. Ministers, before all sermons, are to move the people to join in a short prayer for the catholic church, and the whole congregation of Christian people, &c. for the king and royal family; the ministers of God's word, nobility, magistrates, and whole commons of the realm, &c. and conclude with the Lord's prayer. Refusing to use the common prayer, or using any other open prayers, is punishable by 1 Eliz. c. 2.

COM'MONABLE, *adj.* What is held in common.—Much good land might be gained from forests and chases, and from other *commonable* places, so as there be care taken that the poor commoners have no injury. *Bacon.*—In law, allowable to be turned on a common.—*Commonable* beasts are beasts of the plough, or such as manure the ground. Common appurtenant is where the owner of the land has a right to put in other beasts, besides such as are generally *commonable*, as hogs, goats, and the like. *Blackstone.*

COM'MONAGE, *s.* The right of feeding on a common; the joint right of using any thing in common with others.

COM'MONALTY, *s.* [*communauté*, Fr.] The common people; the people of the lower rank.—There is in every state, as we know, two portions of subjects; the nobles, and the *commonalty.* *Bacon.*—The bulk of mankind.—I myself too will use the secret acknowledgment of the *commonalty*, bearing record of the God of Gods. *Hooker.*—All below nobility.—The *commonalty*, like the nobility, are divided into several degrees. *Blackstone.*

COM'MONER, *s.* One of the common people; a man of low rank, of mean condition. A man not noble;

This *commoner* has worth and parts,
Is prais'd for arms, or lov'd for arts;
His head aches for a coronet;
And who is bless'd that is not great? *Prior.*

A member of the house of commons.—There is hardly a greater difference between two things, than there is between a representing *commoner* in his public calling, and the same person in common life. *Swift.*—One who has a joint right in common ground.—Much land might be gained from commonable places, so as there be care taken that the poor *commoners* have no injury. *Bacon.*—A student of the second rank at the university of Oxford; one that eats at the common table. A prostitute:

Behold this ring,
Whose high respect, and rich validity,
Did lack a parallel: yet, for all that,
He gave it to a *commoner* o' th' camp. *Shakespeare.*

COMMONI'TION, *s.* [*commonitio*, Lat.] Advice; warning; instruction.

COM'MONLY, *adv.* Frequently; usually; ordinarily; for the most part.—A great disease may change the frame of a body, though, if it lives to recover strength, it *commonly* returns to its natural constitution. *Temple.*

This hand of your's requires
Much castigation, exercise devout;
For here's a strong and sweating devil here,
That *commonly* rebels. *Shakespeare.*

Sociably, [from *communiter*, Lat.] a latinism peculiar to *Spenser.*

COM'MONNESS, *s.* Equal participation among many.—Nor can the *commonness* of the guilt obviate the censure, there being nothing more frequent than for men to accuse their own faults in other persons. *Government of the Tongue.*—Frequent occurrence; frequency.—Blot out that maxim, *res nolunt diu male administrari*: the *commonness* makes me not know who is the author; but sure he must be some modern. *Swift.*

To COM'MONPLACE, *v. a.* To reduce to general heads.—I do not apprehend any difficulty in collecting and *commonplacing* an universal history from the historians. *Felton.*

COM'MONPLACE, *adj.* Ordinary.—Every fool, who flatterns away his whole time in nothings, utters some trite *commonplace* sentence, to prove the value and fleetness of time. *Chesterfield.*

COM'MONPLACE BOOK, *s.* A book in which things to be remembered are ranged under general heads.—I turned to my *commonplace-book*, and found his case under the word *coquette.* *Tatler.*

The advantages of making a commonplace-book are many; it not only makes a man read with accuracy and attention, but induces him insensibly to think for himself, provided he considers it not so much as a register of sentiments that strike him in the course of reading, but as a register of his own thoughts upon various subjects. Many valuable thoughts occur even to men of no extraordinary genius. These, without the assistance of a commonplace-book, are generally lost both to himself and others. There are various methods of arranging commonplace-books; but that recommended by Mr. Locke, is as good as any that have hitherto been contrived.

COM'MONS, *s.* The vulgar; the lower people; those who inherit no honours:

These

These three to kings and chiefs their scenes display,
The rest before th' ignoble *commons* play. *Dryden.*

The lower house of parliament, by which the people are represented, and of which the members are chosen by the people. See the article PARLIAMENT.

How now for mitigation of this bill
Urg'd by the *commons?* Doth his majesty
Incline to it, or no? *Shakespeare.*

Food; fare; diet: so called from colleges, where it is eaten in common:

Meanwhile she quench'd her fury at the flood,
And with a lenten sallad cool'd her blood:
Their *commons*, though but coarse, were nothing scant;
Nor did their minds an equal banquet want. *Dryden.*

Doctors COM'MONS. See COLLEGE of CIVILIANS.

COMMONWE'AL, or COMMONWEALTH, *s.* [from *common* and *weal*, or *wealth.*] A polity; an established form of civil life.—Two foundations bear up public societies; the one inclination, whereby all men desire sociable life; the other an order agreed upon, touching the manner of their union in living together: the latter is that which we call the law of a *commonweal. Hooker.*—There is no body in the *commonwealth* of learning who does not profess himself a lover of truth. *Locke.*—The public; the general body of the people:

Such a prince,
So kind a father to the *commonweal.* *Shakespeare.*

A government in which the supreme power is lodged in the people; a republic.—*Commonwealths* were nothing more, in their original, but free cities; though sometimes, by force of order and discipline, they have extended themselves into mighty dominions. *Temple.*—Any thing done for the benefit of society is understood in our law to be *bonum publicum*, and is a thing much favoured; and therefore the law doth tolerate many things to be done for common good, which otherwise might not be done: and hence it is, that monopolies are void in law; and that bonds and covenants to restrain free trade, tillage, or the like, are adjudged void. 11 *Co. Rep.* 50. *Plowd.* 25.

COM'MORANCE, or COMMORANCY, *s.* Dwelling; habitation; abode; residence.—An archbishop, out of his diocese, becomes subject to the archbishop of the province where he has his abode and *commorancy. Ayliffe.*

COM'MORANT, *adj.* [*commorans*, Lat.] Resident; dwelling; inhabiting.—The abbot may demand and recover his monk, that is *commorant* and residing in another monastery. *Ayliffe.*

COM'MORTH, or COMORTH, *s.* [*comortha*, Lat. from the Brit. *cymmorth*, i. e. *subsidium.*] A contribution which was gathered at marriages, and when young priests said or sung the first masses, &c. 4 Hen. IV. c. 27. But 26 Hen. VIII. c. 6, prohibits the levying any such in Wales, or the Marches, &c. *Cowel.*

COMMO'SIS, *s.* [from κομμι, gum.] The first layer of gummy matter with which bees line their hives. It also signifies that art which is employed in concealing natural imperfections with respect to beauty; this is distinguished from the cosmetic art, which consists in preserving the beauty which is natural.

COMMOTAU', or CHOMSTON, a town of Bohemia, in the circle of Saatz. It was taken by Zisca in 1421, who put the inhabitants, male and female, to death for their brave defence. In 1648, it surrendered to the Swedes at discretion: large quantities of alum are prepared here. It is ten miles north-west of Saatz, thirty-eight south of Dresden, and forty-two north-west of Prague.

COMMO'TE, *s.* [from *com*, Lat. and *motte*, a parcel of land, Fr.] In Wales, half a cantred or hundred, containing fifty villages. Wales was anciently divided into three provinces; and each of these were again subdivided into cantreds, and every cantred into commotes. *Doderige*, 2. Commote also signifies a great seigniory or lordship, and may include one, or divers manors. *Co. Lit.* 5.

COMMO'TION, *s.* [*commotio*, Lat.] Tumult; disturbance; combustion; sedition; public disorder; insurrection.—When ye shall hear of wars and *commotions*, be not terrified. *Luke*, xxi. 9.—The Iliad consists of battles, and a continual *commotion*; the Odyssey in patience and wisdom. *Broome.*—Perturbation; disorder of mind; heat; violence; agitation:

Some strange *commotion*
Is in his brain; he bites his lips, and starts. *Shakespeare.*

Disturbance; restlessness.—Sacrifices were offered when an earthquake happened, that he would allay the *commotions* of the water, and put an end to the earthquake. *Woodward.*

COMMO'TIONER, *s.* One that causes commotions; a disturber of the peace. *A word not in use.*—The people, more regarding *commotioners* than commissioners, flocked together, as clouds cluster against a storm. *Hayward.*

To COMMO'VE, *v. a.* [*commoveo*, Lat.] To disturb; to agitate; to put into a violent motion; to unsettle. *Not used.*

Straight the sands,
Commov'd around, in gathering eddies play. *Thomson.*

To COMMUN'E, *v. n.* [*communico*, Lat.] To converse; to talk together; to impart sentiments mutually.—Ideas, as ranked under names, are those that, for the most part, men reason of within themselves, and always those which they *commune* about with others. *Locke.*

So long as Guyon with her *communed*,
Unto the ground she cast her modest eye;
And ever and anon, with rosy red,
The bashful blood her snowy cheeks did dye. *Spenser.*

COMMU'NI CUSTO'DIA, *s.* A writ which anciently lay for the lord, whose tenant holding by knight's service died, and left his eldest son under age, against a stranger that entered the land, and obtained the ward of the body. *F. N. B.* 89. *Reg. Orig.* 161. Since the statute 12 Car. II. c. 24, hath taken away wardships, this writ is become of no use.

COMMU'NIA PLACITA NON TENENDA IN SCACCARIO, an ancient writ directed to the treasurer and barons of the exchequer, forbidding them to hold plea between common persons (i. e. not debtors, to the king, who alone originally sued and were sued there) in that court, where neither of the parties belong to the same. *Reg. Orig.* 187. But little obedience would perhaps be now paid to such a writ, was any officer to dare to issue it: for the court of exchequer seems by prescription to have attained a concurrent jurisdiction in civil suits, with the other courts in Westminster-hall. See EXCHEQUER.

COMMU'NIBUS LO'CIS, a term in frequent use among philosophical writers, implying some medium, or mean relation between several places. Dr. Keil supposes the ocean to be one quarter of a mile deep, *communibus locis*, q. d. at a medium, or taking one place with another. COMMUNIBUS ANNIS has the same import with regard to years, that *communibus locis* has with regard to places. Mr. Derham observes that the depth of rain, *communibus annis*, or one year with another, were it to stagnate on the earth, would amount in Townley in Lancashire, to 42¼ inches; at Upminster in Essex, to 19¼; at Zurich, 32¼; at Pisa, 43¼; and at Paris, to 19 inches.

COMMUNICABI'LITY, *s.* The quality of being communicable; capability to be imparted.

COMMU'NICABLE, *adj.* That which may become the common possession of more than one: with *to.*—Sith eternal life is *communicable unto* all, it behoveth that the word of God be so likewise. *Hooker.*—That which may be recounted; that of which another may share the knowledge: with *to*;

Nor let thine own inventions hope
Things not reveal'd, which th' invisible King,
Only omniscient, hath suppress'd in night,
To none *communicable* in earth or heav'n. *Milton.*

That which may be imparted:

The happy place
Rather inflames thy torment, representing
Lost bliss, *to* thee no more *communicable.* *Milton.*

Communicative.—Be *communicable* with your friends. *B. Jonson.*

COMMU'NICANT, *s.* One who is present, as a worshipper, at the celebration of the Lord's Supper; one who participates of the blessed sacrament.—A constant frequenter of worship, and a never-failing monthly *communicant. Atterbury.*

To COMMUNICA'TE, *v. a.* [*communico*, Lat.] To impart to others what is in our own power; to give to others as partakers; to confer a joint possession; to bestow.—Where God is worshipped, there he *communicates* his holy blessings and holy influences. *Taylor.*

Which of the Grecian chiefs consorts with thee?
But Diomede desires my company,
And still *communicates* his praise with me. *Dryden.*

To reveal; to impart knowledge.—I learned diligently, and do *communicate* wisdom liberally: I do not hide her riches. *Wisd.* vii. 13.—It had anciently the preposition *with* before the person to whom communication, either of benefit or knowledge, was made.—Charles the Hardy would *communicate* his secrets *with* none; and, least of all, those secrets which troubled him most. *Bacon.*—He *communicated* those thoughts only *with* the lord Digby, the lord Colepeper, and the chancellor. *Clarendon.*—Now it has only *to*: Clarendon uses both *with* and *to*.—Let him, that is taught in the word, *communicate unto* him that teacheth. *Galatians*, vi. 6.—His majesty frankly promised, that he could not, in any degree, *communicate to* any person the matter, before he had taken and *communicated to* them his own resolutions. *Clarendon.*

To COMMU'NICATE, *v. n.* To partake of the blessed sacrament.—The primitive Christians communicated every day. *Taylor.*—To have something in common with another; as, *the houses communicate*; there is a passage between them, common to both, by which either may be entered from the other.—The whole body is nothing but a system of such canals, which all *communicate* with one another, mediately or immediately. *Arbuthnot.*

COMMUNICA'TION, *s.* The act of imparting benefits or knowledge.—Both together serve completely for the reception and *communication* of learned knowledge. *Holder.*—Common boundary or inlet; passage or means, by which from one place there is a way without interruption to another.—The map shews the natural *communication* Providence has formed between the rivers and lakes of a country at so great a distance from the sea. *Addison.*—The Euxine sea is conveniently situated for trade, by the *communication* it has both with Asia and Europe. *Arbuthnot.*—Interchange of knowledge; good intelligence between several persons.—Secrets may be carried so far, as to stop the *communication* necessary among all who have the management of affairs. *Swift.*—Conference; conversation.—Abner had *communication* with the elders of Israel, saying, ye sought for David in times past to be king over you: now then do it. 2 *Samuel*, iii. 17.

"Evil COMMUNICATIONS corrupt good manners." *Les mauvaises compagnies corrompent les bonnes mœurs*, say the French; *Le cattive compagnie corrompono i costumi*, the Italians. This proverb contains a wholesome admonition to youth to be careful with whom they converse. Evil conversation, or, as the proverb terms it, communication, is as epidemic as the plague. The malignity of the one, as well as the other, steals so insensibly upon us, that it is hardly perceived till almost past cure; and youth more especially ought to avoid one with as much solicitude as they would the other, and the more, as it is an ever-reigning plague, and often risest where least suspected.

COMMU'NICATIVE, *adj.* Inclined to make advantages common; liberal of benefits or knowledge; not close, not selfish.—We have paid for our want of prudence, and determine for the future to be less *communicative. Swift.*

COMMU'NICATIVENESS, *s.* The quality of being communicative, of bestowing or imparting benefits or knowledge.—He is not only the most communicative of all beings, but he will also communicate himself in such measure as entirely to satisfy; otherwise some degrees of *communicativeness* would be wanting. *Norris.*

COMMU'NION, *s.* [*communio*, Lat.] Intercourse; fellowship; common possession; participation of something in common; interchange of transactions.—Consider, finally, the angels, as having with us that *communion* which the apostle to the Hebrews noteth; and in regard whereof angels have not disdained to profess themselves our fellow-servants. *Hooker.*—We maintain *communion* with God himself, and are made in the same degree partakers of the divine nature. *Fiddes.*

Thou, so pleas'd,
Canst raise thy creature to what height thou wilt,
Of union, or *communion*, deified. *Milton.*

The common or public celebration of the Lord's Supper; the participation of the blessed sacrament.—They resolved, that the standing of the *communion* table in all churches should be altered. *Clarendon.*—Tertullian reporteth, that the picture of Christ was engraven upon the *communion* cup. *Peacham on Drawing.*—A common or public act.—Men began publicly to call on the name of the Lord; that is, they served and praised God by *communion*, and in public manner. *Raleigh.*—Union in the common worship of any church.—Bare *communion* with a good church can never alone make a good man; if it could, we should have no bad ones. *South.*

COMMU'NITY, *s.* [*communitas*, Lat.] The commonwealth; the body politic.—The love of our country is impressed on our mind for the preservation of the *community. Addison.*

How could *communities*,
Degrees in schools, and brotherhood in cities,
But by degree stand in authentic place? *Shakespeare.*

Common possession; the state contrary to property or appropriation.—This text is far from proving Adam sole proprietor; it is a confirmation of the original *community* of all things. *Locke.*

Sit up and revel,
Call all the great, the fair, and spirited dames
Of Rome about thee, and begin a fashion
Of freedom and *community*. *Ben Jonson.*

Frequency; commonness. *Not in use*:

He was but, as the cuckow is in June
Heard, not regarded; seen, but with such eyes,
As, sick and blunted with *community*,
Afford no extraordinary gaze. *Shakespeare.*

COMMUTABI'LITY, *s.* The quality of being capable of exchange.

COMMU'TABLE, *adj.* That may be exchanged for something else; that may be bought off, or ransomed.

COMMUTA'TION, *s.* Change; alteration.—An innocent nature could hate nothing that was innocent: in a word, so great is the *commutation*, that the soul then hated only that which now it loves, *i. e.* sin. *South.*—Exchange; the act of giving one thing for another.—The whole universe is supported by giving and returning, by commerce and *commutation*. *South.*—The use of money, in the commerce and traffic of mankind, is that of saving the *commutation* of more bulky commodities. *Arbuthnot.*—

Ransom;

Ransom; the act of exchanging a corporal for a pecuniary punishment.—The law of God had allowed an evasion, that is, by way of *commutation* or redemption. *Brown.*

COMMUTA'TION, *s. angl. of*, in astronomy, is the distance between the sun's true place seen from the earth, and the place of a planet reduced to the ecliptic: which therefore is found by taking the difference between the sun's longitude, and the heliocentric longitude of the planet.

COMMU'TATIVE, *adj.* Relative to exchange; as, *commutative justice*, that honesty which is exercised in traffic, and which is contrary to fraud in bargains.

To COMMU'TE, *v. a.* [*commuto*, Lat.] To exchange; to put one thing in the place of another; to give or receive one thing for another.—This will *commute* our tasks; exchange these pleasant and gainful ones, which God assigns, for those uneasy and fruitless ones we impose on ourselves. *Decay of Piety.*—To buy off, or ransom one obligation by another.—Some *commute* swearing for whoring; as if forbearance of the one were a dispensation for the other. *L'Estrange.*

To COMMU'TE, *v. n.* To atone; to bargain for exemption.—Those institutions which God designed for means to further men in holiness, they look upon as a privilege to serve instead of it, and to *commute* for it. *South.*

COMMU'TUAL, *adj.* [*con* and *mutual.*] Mutual; reciprocal. Used only in poetry:

There, with *commutual* zeal, we both had strove
In acts of dear benevolence and love;
Brothers in peace, not rivals in command. *Pope.*

COMNE'NA (Ann), daughter of Alexus Comnenus, emperor of the East; memorable for her great learning and virtue, and for her History of the Life and Actions of her Father, which is highly esteemed. She flourished about the year 1117. The history, which is in fifteen books, was first published very imperfectly by Heschelius in 1610; and afterwards printed in the collection of the Byzantine historians, with a diffuse and incorrect Latin version by the Jesuit Possimus, but with excellent notes by the learned Du Fresne.

COMNE'NO, a town of European Turkey, in the province of Albania: thirty-six miles south-east of Albasano.

CO'MO, a town of Italy, now capital of the department of Lario, in the Cisalpine republic, was built by the Gauls, under the conduct of Brennus, at the south end of a lake to which it gives name. It is pleasantly situated in a plain, almost surrounded with mountains, large, populous, and commercial; it is the see of a bishop, suffragan of Goritz, and contains twelve parish churches, and 18,000 inhabitants. The town is surrounded by a wall, guarded with picturesque towers, and backed by a conical eminence, on which stand the ruins of an ancient castle. The houses are neatly built of stone; and the cathedral is a handsome edifice of white marble, hewn from the neighbouring quarries. The inhabitants have established several manufactures of cotton and silk, and carry on some trade with the Grisons. This town was the birth-place of the younger Pliny, and the inhabitants have placed his statue on the outside of one of the churches, with a Latin inscription, bearing the date of 1499. Paulus Jovius was also born here. Twenty miles north of Milan. Lat. 45. 44. N. lon. 26. 34. E. Ferro.

CO'MO (Lake of), a lake of Italy, mentioned above, about nine leagues in length from north to south, and hardly one wide; towards the south it is divided into two branches, at the end of one stands Como, and at the end of the other Lecco. The river Adda passes through it, and several towns and villages are situated on its banks, which are adorned with vines, chesnuts, and almond-trees.

COMOCLA'DIA, *s.* [κομη, hairy, and κλαδος, a branch; from the boughs forming a bush or head.] In botany, a genus of the class triandria, order monogynia, natural order of terebintaceæ. The generic characters are—Calyx: perianthium one-leafed, three-parted, spreading, coloured; divisions roundish. Corolla: petals three, ovate, acute, flat, very spreading. Stamina: filaments three, subulate; shorter than the corolla; antheræ roundish, incumbent. Pistillum: germ ovate; style none; stigma obtuse, simple. Perianthium: drupe, oblong, crooked, marked above with three dots. Seed: nut membranaceous, the figure of the drupe. *Essential Character.*—Calyx, three-parted; corolla, three-parted; drupe, oblong, with a two-lobed nucleus.

Species. 1. Comocladia integrifolia: leaves entire. Seldom more than twenty feet in height; trunk erect, seldom growing to any considerable thickness, dividing into few branches, adorned at the end with pinnated smooth leaves like a frond, having at most eight leaflets on each side of a round rib two feet in length, with an odd one at the end; these are ovate-lanceolate, acuminate, slightly wrinkled by the transverse veins, the edges a little revolute, petioled, four inches long: from the axillas hang loose panicled racemes, a foot and a half in length, divided into about twenty-four partial lateral alternate racemes; and these more or less compounded, the whole forming an ample panicle. Flowers very numerous, small, sessile, without scent, of a deep red colour: many of them have the calyx and corolla four-parted, with four stamens. The whole tree abounds in a watery sap, slightly glutinous, which grows black in the air, and dies the hands a deep black that can scarcely be washed out. Native of Domingo and Jamaica; flowering in December, January, and February. The fruit is eatable, but not inviting; and the wood is hard, of a fine grain, and reddish colour.

2. Comocladia dentata: leaflets spiny-toothed. Very like the foregoing species. If the tree be ever so slightly wounded, it has a strong smell of dung. The natives have a notion that it is dangerous to sleep under it. Native of Cuba.

3. Comocladia ilicifolia: leaflets angular-spiny. Native of the West-Indies, as Antigua, &c.

Propagation and Culture. These plants are propagated by seeds, when they can be obtained from the places of their growth, which should be sown in pots, and plunged into a hot-bed; the plants, when fit to remove, should be each planted in a small pot, and plunged into a tan-bed, and in the autumn should be plunged into the bark-bed in the stove, and treated as other tender plants.

COMONA'VA, a town of European Turkey, in the province of Macedonia: sixty miles north-north-east of Akrida.

COMO'RA, or GOMARA ISLANDS, islands in the Eastern Indian Ocean, between the northern extremity of the island of Madagascar and the continent of Africa. They are four in number, viz. Comora, or Angazija, Joanna, or Anjoan, Mayotto, and Mohila. Lat. 11. 50. to 13. S. lon. 41. to 45. E. Greenwich.

COMO'RA, or GOMARA, an island of Africa, which gives name to a cluster in the Eastern Indian Sea, about six leagues long, and three wide, but little known. Lat. 11. 50. S. lon. 43. E. of Greenwich.

COMO'RA, or COMORN, a town of Hungary, and capital of a country to which it gives name, situated at the conflux of the Waag and the Danube, strongly fortified, and defended by a fortress, so that it has never been taken. It was chiefly inhabited by Hungarians, or Rascians, who follow the Greek church. In 1783, it was almost wholly destroyed by an earthquake: thirty-six miles south-east of Presburg, and sixty-four south-east of Vienna.

COM'PACH, a river of Carinthia, which runs into the Moll, near Vellach.

COM'PACT, *s.* [*pactum*, Lat.] A contract; an accord; an agreement; a mutual and settled appointment between two or more, to do or to forbear something. It had anciently the accent on the last syllable.—In the beginnings of speech there was an implicit *compact*, found-

ed upon common consent, that such words, voices, or gestures, should be signs whereby they would express their thoughts. *South.*

To COMPA'CT, *v. a.* [*compingo, compactum*, Lat.] To join together with firmness; to unite closely; to consolidate.—This disease is more dangerous, as the solids are more strict and *compacted*, and consequently more so as people are advanced in age. *Arbuthnot.*

Now the bright sun *compacts* the precious stone,
Imparting radiant lustre like his own. *Blackmore.*

To make out of something:

If he, *compact* of jars, grow musical,
We shall have shortly discord in the spheres. *Shakespeare.*

To league with:

Thou pernicious woman,
Compact with her that's gone, think'st thou thy oaths,
Though they would swear down each particular fact,
Were testimonies! *Shakespeare.*

To join together; to bring into a system.—We see the world so *compacted*, that each thing preserveth other things, and also itself. *Hooker.*

COMPA'CT, *adj.* [*compactus*, Lat.] Firm; solid; close; dense; of firm texture.—Is not the density greater in free and open spaces, void of air and other grosser bodies, than within the pores of water, glass, crystal, gems, and other *compact* bodies? *Newton.* Composed; consisting:

The lunatic, the lover, and the poet,
Are of imagination all *compact.* *Shakespeare.*

Joined; held together.—In one hand Pan has a pipe of seven reeds, *compact* with wax together. *Peacham.*—Brief, and well connected; as, a compact *discourse.*—Where a foreign tongue is elegant, expressive, close, and *compact*, we must study the utmost force of our language. *Felton.*

COMPACT'EDNESS, *s.* Firmness; density.—Those atoms are supposed infrangible, extremely compacted and hard; which *compactedness* and hardness is a demonstration that nothing could be produced by them. *Cheyne.*

COMPACT'LY, *adv.* Closely; densely; with neat joining; with good compacture.

COMPACT'NESS, *s.* Firmness; closeness; density.—The best lime mortar will not have attained its utmost *compactness*, till fourscore years after it has been employed in building. This is one reason why, in demolishing ancient fabrics, it is easier to break the stone than the mortar. *Boyle.*

COMPAC'TURE, *s.* Structure; manner in which any thing is joined together; compagination. A good word, but not in use:

And over it a fair portcullis hong,
Which to the gate directly did incline,
With comely compass, and *compacture* strong,
Neither unseemly short, nor yet exceeding long. *Spenser.*

COMPA'GES, *s.* [Lat.] A system of many parts united.—The organs in animal bodies are only a regular *compages* of pipes and vessels, for the fluids to pass through. *Ray.*

COMPAGINA'TION, *s.* [*compago*, Lat.] Union; structure; junction; connection; contexture.—The intire or broken *compagination* of the magnetical fabric under it. *Brown.*

COM'PANABLENESS, *s.* The quality of being a good companion; sociableness. *Not in use.*—His eyes full of merry simplicity, his words of hearty *companableness.* *Sidney.*

COM'PANIABLE, *adj.* Social; having the qualities of a companion; sociable; maintaining friendly intercourse.—Towards his queen he was nothing uxorious, but *companiable* and respective. *Bacon.*

COMPA'NION, *s.* [*compagnon*, Fr.] One with whom a man frequently converses, or with whom he shares his hours of relaxation. It differs from *friend*, as *acquaintance* from *confidence.*—Some friend is a *companion* at the table, and will not continue in the day of thy affliction. *Ecclus.* vi. 10.

With anxious doubts, with raging passions torn,
No sweet *companion* near with whom to mourn. *Prior.*

A partner; an associate.—Epaphroditus, my brother and *companion* in labour, and fellow soldier. *Phil.* ii. 25.

Bereav'd of happiness, thou may'st partake
His punishment, eternal misery;
Which would be all his solace and revenge,
Thee once to gain *companion* of his woe. *Milton.*

A familiar term of contempt; a fellow.—It gives boldness to every petty *companion* to spread rumours to my defamation, where I cannot be present. *Raleigh.*

COMPA'NIONABLE, *adj.* Fit for good fellowship; social; agreeable.—He had a more *companionable* wit, and swayed more among the good fellows. *Clarendon.*

COMPA'NIONABLY, *adv.* In a companionable manner.

COMPA'NIONSHIP, *s.* Company; train:

Alcibiades, and some twenty horse,
All of *companionship.* *Shakespeare.*

Fellowship; association:

If it be honour in your wars to seem
The same you are not, which, for your best ends,
You call your policy; how is 't less, or worse,
That it shall hold *companionship* in peace
With honour as in war? *Shakespeare.*

COM'PANY, *s.* [*compagnie*, Fr. either from *con* and *pagus*, one of the same town; or *con* and *panis*, one that eats of the same mess.] Persons assembled together; a body of men:

Honest *company*, I thank you all,
That have beheld me give away myself
To this most patient, sweet, and virtuous, wife. *Shakesp.*

Persons assembled for the entertainment of each other; an assembly of pleasure.—A crowd is not *company*; and faces are but a gallery of pictures, where there is no love. *Bacon.*—Persons considered as assembled for conversation; or as capable of conversation and mutual entertainment.—Knowledge of men and manners, the freedom of habitudes, and conversation with the best *company* of both sexes, is necessary. *Dryden.*—The state of a companion; the act of accompanying; conversation; fellowship.—It is more pleasant to enjoy the *company* of him that can speak such words, than by such words to be persuaded to follow solitariness. *Sidney.*

Nor will I wretched thee
In death forsake, but keep thee *company.* *Dryden.*

A number of persons united for the execution or performance of any thing; a band.—Shakespeare was an actor, when there were seven *companies* of players in the town together. *Dennis.*—Persons united in a joint trade or partnership. A number of some particular rank or profession; a body corporate; a subordinate corporation. A subdivision of a regiment of foot; so many as are under one captain.—Every captain brought with him thrice so many in his *company* as was expected. *Knolles.*

To bear COMPANY. *To keep* COMPANY. To accompany; to associate with; to be companion to.—Those Indian wives are loving fools, and may do well to *keep company* with the Arrias and Portias of old Rome. *Dryden.*

Admitted to that equal sky,
His faithful dog shall bear him *company.*

To keep COMPANY. To frequent houses of entertainment.—The love of company and of social pleasures is natural, and attended with some of the sweetest satisfactions of human life; but, like every other love, when it proceeds beyond the limits of moderation, it ceases to produce

produce its natural effect, and terminates in disgustful satiety. The foundation-stone, and the pillar on which we build the fabric of our felicity, must be laid in our own hearts. Amusement, mirth, agreeable variety, and even improvement, may be sometimes sought in the gaiety of mixed company, and in the usual diversions of the world; but, if we found our general happiness on these, we shall do little more than raise castles in the air, or build houses on the sand. As the human mind cannot always be on the stretch, nor the hands always employed in labour, recreation becomes both agreeable and necessary. Of all recreations, that of the company of a few chosen companions must be allowed to be the most manly and most improving: but, as in those hours of recreation we are most in danger of being misled, being generally at such seasons more off our guard than usual, the greatest care should be taken in making choice of whom to associate with; for, according to our choice of them, both our character and disposition will receive a tincture, as waters passing through minerals partake of their taste and efficacy. This is a truth so universally received, that it is become a proverb both in the natural and moral world, "that a man is known by his company." As by chemistry we learn, that discordant mixtures produce nothing but broil and fermentation till one of them gets the ascendency of the rest; so from scripture we learn, that two cannot walk together except they be agreed. From which we may see, how impossible it is for any one to be thought a person of real goodness and integrity, whilst he chooseth for his companions the abandoned and licentious. By herding with such, he will not only lose his character, but his virtue; for, whatever fallacious distinction he may be pleased to make between the men and their vices, in the end the first generally qualifies the last; and by ceasing to hate them he will soon learn both to love and practise them. In short, the society of sensual men is peculiarly ensnaring. The malignity of their contagion doth not appear all at once. Their frolics at first appear harmless; then when partaken of, they leave a longing relish behind them; and one appointment makes way for another, one expence leads on to a second; and so time and fortune are wasted away to very bad purpose.

To derive the proper pleasure and improvement from company, it ought to be select, and to consist of persons of character, respectable both for their morals and their understandings. Mixed and undistinguished society tends only to dissipate our ideas, and induce a laxity of principles and practice. The pleasure it affords is of a coarse, mixed, noisy, and rude, kind. Indeed, it commonly ends in weariness and disgust, as even they are ready to confess who yet constantly pursue it, as if their chief good consisted in living in a crowd. Among those, indeed, who are exempted by their circumstances from professional and official employments, and who professedly devote themselves to a life of pleasure, little else seems to constitute the idea of it, but an unceasing succession of company, public or private. The dress, and other circumstances preparatory to the enjoyment of this pleasure, scarcely leave a moment for reflection. Day after day is spent in the same toilsome round, till a habit is formed, which renders dissipation necessary to existence. One week without it would probably induce a lowness of spirits, which might terminate in despair and suicide. When the mind has no anchor, it will suffer a kind of shipwreck; it will sink in whirlpools, and be dashed on rocks. What, indeed, is life or its enjoyments, without settled principles, laudable purposes, mental exertions, and internal comfort? It is merely a vapour, or, to drop the language of figure on so serious a subject, it is a state worse than non-entity, since it possesses a restless power of action, productive of nothing but misery. It is recommended, therefore, to all who wish to enjoy their existence, that they should acquire a power not only of bearing, but of taking a pleasure in, temporary solitude. Every one must, indeed, sometimes be alone. Let him not repine when he is alone, but learn to set a value on the golden moments. It is then that he is enabled to study himself and the world around him. It is then that he has an opportunity of seeing things as they are, and of removing the deceitful veil, which almost every thing assumes in the busy scene of worldly employments. The soul is enabled to retire into herself, and to exert those energies which are always attended with sublime pleasure. She is enabled to see the dependent, frail, and wretched, state of man as the child of nature; and, incited by her discovery, to implore grace and protection from the Supreme Governor of the universe. There is no doubt but man is made for action, and that his duties and pleasures are often most numerous and most important amidst the busy hum of men. Many vices, and many corrupt dispositions, have been fostered in a solitary life. Monkery is not favourable to human nature or human happiness; neither is unlimited dissipation. In short, let there be a sweet interchange of retirement and association, of repose and activity. A few hours spent every day by the votaries of pleasure in serious meditation, would render their pleasure pure, and more unmixed with misery. It would give them knowledge, so that they would see how far they might advance in their pursuit without danger; and resolution, so that they might retreat when danger approached. It would teach them how to live, a knowledge which indeed they think they possess already; and it would also teach them, what they are often too little solicitous to learn,—HOW TO DIE.

COMPANY, *s.* in commerce, an association of merchants, united under a joint stock, or regulated by a charter, for the purpose of trading exclusively to remote parts of the world, bartering one commodity for another, and hence diffusing the growth and produce of different countries over every part of the habitable globe. Of these companies the following are the principal belonging to Great Britain:

1. The HAMBURGH COMPANY, the oldest trading establishment in the kingdom; though not always known by that name. It was first called the *Company of Merchants trading to Calais, Holland, Zealand, Brabant, and Flanders:* then it acquired the general title of *Merchant-adventurers of England*; as being composed of all the English merchants who traded to the Low Countries, the Baltic, and the German Ocean: lastly, it was called the *Company of Merchant-adventurers of England trading to Hamburgh.* This company was first incorporated by Edward I. in 1296; and established again, by charter, in 1406, under the reign of Henry IV. This charter was afterwards augmented by Henry VII. who first gave them the title of *Merchant-adventurers to Calais, Holland,* &c. gave them a power of proclaiming free fairs at Calais; and ordered, that to be reputed a member of the society, each person should pay twenty marks sterling; and that the several members should attend the general courts, appointed by the directors, whether at London, Calais, or elsewhere. A petition being made to queen Elizabeth, in 1564, for an explanation of certain articles in the charter of Henry VII. and a confirmation of the rest granted by other kings; that princess, by a charter of the same year, declares that, to end all disputes, they shall be incorporated anew, under the title of the *Company of Merchant-adventurers of England*; that all who were members of the former company should, if they desired it, be admitted members of this; that they should have a common seal; that the city of Hamburgh and neighbouring cities should be reputed within their grant, together with those of the Low Countries; and twenty-two years after this first charter, queen Elizabeth granted them a second, confirming the former, erecting in each city within their grant a standing council. The revolutions which happened in the Low Countries towards the end of the sixteenth century, and which laid the foundation of the republic of Holland, having hindered the company from continuing their commerce with their ancient freedom; it was obliged to turn it almost wholly to the side of Hamburgh, and the cities on the German

German ocean: from which circumstance it got the name of the *Hamburgh Company*; though the ancient title of *Merchant-adventurers* is still retained in all their writings.

2. The Russia Company, first projected towards the end of the reign of Edward VI. executed in the first and second years of Philip and Mary; but had not its perfection till its charter was confirmed by act of parliament under Elizabeth, in 1566. It had its rise from certain adventurers, who were sent in three vessels on the discovery of new countries; and to find out a north-east passage to China; these, sailing into the White Sea, and making up to the port of Archangel, were well received by the Muscovites; and, at their return, solicited letters patent to secure to themselves the commerce of Russia, for which they had formed an association. By their charter the association was declared a body politic, under the name of the *Company of Merchant-adventurers of England, for the Discovery of Lands, Territories, Islands, &c. unknown, or unfrequented.* Their privileges were, to have a governor, four consuls, and twenty-four assistants, for their commerce; for their policy, to make laws, inflict penalties, send out ships to make discoveries, take possession of them in the king's name, set up the banner royal of England, plant them; and lastly, the exclusive privilege of trading to Archangel, and other ports of Muscovy, not frequented by the English. This charter was confirmed in the eighth year of Elizabeth; wherein it was enacted, that in regard the former name was too long, they should now be called *Company of English Merchants for discovering new Trades*; under which name, they should be capable of acquiring and holding all kind of lands, manors, rents, &c. not exceeding a hundred marks per ann. and not held of her majesty; that no part of the continent, island, harbour, &c. not known or frequented before the first enterprize of the merchants of their company, situated to the north, or north-west, or north east, of London; nor any part of the continent, islands, &c. under the obedience of the emperor of Russia, or in the countries of Armenia, Media, Hyrcania, Persia, or the Caspian Sea, should be visited by any subjects of England, to exercise any commerce, without the consent of the said company, on pain of confiscation. This company subsisted with reputation almost a century, till the time of the civil wars. It is said, the czar then reigning, hearing of the murder of Charles I. ordered all the English to be expelled; which the Dutch taking the advantage of, settled in their room. After the restoration, the remains of the company re-established part of their commerce at Archangel, but never with the same success as before. This company subsists still, under the direction of a governor, four consuls, and assistants.

3. The Eastland Company, incorporated by queen Elizabeth, in 1579. By the first article the company is erected into a body politic, under the title of the *Company of Merchants of the East*; to consist of Englishmen, real merchants, who have exercised the business thereof, and trafficked through the Sound, before the year 1568, into Norway, Sweden, Poland, Livonia, Prussia, Pomerania, &c. as also Revel, Koningsberg, Dantzick, Copenhagen, &c. excepting Narva, Muscovy, and its dependencies, which were in the charter of the Russia company. Their charter was confirmed by Charles II. in 1629, with this addition, that no person, of what quality soever, living in London, should be admitted a member, unless he were free of the city. This company was complained of as a monopoly, and curtailed by legal authority in 1672; and since the declaration of rights in 1689, exist only in name; but still continue to elect their annual officers, who are a governor, a deputy, and twenty-four assistants.

4. The Turkey, or Levant Company, had its rise also under queen Elizabeth, in 1581. James I. confirmed its charter in 1605, adding new privileges. During the civil wars, there happened some innovations in the government of the company; many persons having been admitted members, not qualified by the charters of queen Elizabeth and king James, or that did not conform to the regulations prescribed. Charles II. upon his restoration, endeavoured to set it upon its ancient basis; to which end, he gave them a charter, containing not only a confirmation of their old one, but also several new articles of reformation. By this, the company is erected into a body politic, capable of making laws, &c. under the title of the *Company of Merchants of England trading to the Seas of the Levant.* The number of members is not limited, but is ordinarily about three hundred. The company has a court or board at London, which is composed of a governor, deputy-governor, and fifteen directors or assistants; who are all actually to live in London or the suburbs. They have also a deputy-governor in every city and port, where there are any members of the company. The assembly at London sends out the vessels employed in this commerce, regulates the tariff for the price at which the European merchandizes sent to the Levant are to be sold, and for the quality of those returned. It raises taxes on merchandizes, to defray impositions, and the common expences of the company; presents the ambassador which the king is to keep at the Porte, and elects two consuls for Smyrna and Constantinople, &c.

5. The Company of Merchants trading to Africa, established in 1750, was subjected to the obligation of maintaining forts and garrisons. It was expressly charged at first with the maintenance of all the British forts and garrisons that lie between Cape Blanc and the Cape of Good Hope, and afterwards with that of those only which lie between Cape Rouge and the Cape of Good Hope. In the ninth year of king William III. the trade to a great portion of Africa, was in the hands of a royal African company, which under a charter from Charles II. enjoyed an exclusive trade from the port of Sallee in South Barbary to the Cape of Good Hope, both inclusive, with all the islands near adjoining to those coasts. A new arrangement of this trade was made by 9 and 10 Will. III. c. 26; by which the trade was opened; but this act continued in force only thirteen years; and not being renewed, the whole trade reverted again to the exclusive claim of the company. This African trade was put on a new footing by 23 Geo II. c. 31; which made it lawful for all the king's subjects freely to trade between the port of Sallee in South Barbary and the Cape of Good Hope. Thus was the trade taken out of the hands of the Royal African Company. The act then goes on to provide, that all persons trading to that coast between Cape Bianco and the Cape of Good Hope, should be a body corporate by the name of the *Company of Merchants trading to Africa*; the admission to which company was made very easy, namely, by the payment of only forty shillings. The trade between the port of Sallee and Cape Blanco was left open to all persons whatsoever. By 25 Geo. II. c. 40, all the forts, castles, and factories, on the coast, from the port of Sallee to the Cape of Good Hope, belonging to the old company, were transferred to, and vested in, the new company, for the like purpose of protecting and facilitating the trade. By 4 Geo. III. c. 20, the fort of Senegal, ceded by France to Great Britain, was in like manner vested in the new company. The fort of Senegal had been ceded to France by the peace of 1783, and the French king guaranteed to Great Britain the possession of Fort James and the river Gambia, both lying between the fort of Sallee and Cape Rouge. On that occasion it was thought more beneficial for the trade, that the forts, settlements, and factories, between those ports which, by 5 Geo. III. c. 44, (repealing the above act of 4 Geo. III. c. 20,) had been vested in the king, should be re-vested in the company; this was accordingly done by 23 Geo. III. c. 65. The same freedom of trading there was, notwithstanding, continued to all the king's subjects. By 27 Geo. III. c. 19. some regulations were made as to importing from Gibraltar, merchandize the produce of the emperor of Morocco's dominions.

6. The South-Sea Company. During the long war with France in the reign of queen Anne, the payment of the sailors of the royal navy being neglected, they received

ceived tickets instead of money, and were frequently obliged, by their necessities, to sell these tickets to avaricious men at a discount of forty and sometimes fifty per cent. By this and other means, the debts of the nation unprovided for by parliament, and which amounted to nine millions four hundred and seventy-one thousand three hundred and twenty-one pounds, fell into the hands of these usurers. On which Mr. Harley, at that time chancellor of the exchequer, and afterwards earl of Oxford, proposed a scheme to allow the proprietors of these debts and deficiencies six per cent. per annum, and to incorporate them for the purpose of carrying on a trade to the South Sea; and they were accordingly incorporated under the title of the *Governor and Company of Merchants of Great Britain, trading to the South Seas, and other parts of America, and for encouraging the Fishery*, &c. Though this company appeared to be formed for the sake of commerce, the ministry never thought seriously, during the course of the war, about making any settlement on the coast of South America, which was what flattered the expectations of the people; nor was it ever carried into execution by this company. Some other sums were lent to the government in the reign of queen Anne, at six per cent. In the third of George I. the interest of the whole was reduced to five per cent. and the company advanced two millions more to the government at the same interest. By the statute of the sixth of George I. it was declared, that they might redeem all or any of the redeemable national debts; in consideration of which, the company were empowered to augment their capital according to the sums they should discharge; and for enabling them to raise such sums for purchasing annuities, exchanging for ready money new exchequer bills, carrying on their trade, &c. they might, by such means as they should think proper, raise such sums of money as in a general court of the company should be judged necessary. The company were also empowered to raise money on the contracts, bonds, or obligations, under their common seal, on the credit of their capital stock. The fatal South Sea scheme, transacted in 1720, was executed upon the last-mentioned statute. The company had at first set out with good success, and the value of their stock, for the first five years, had risen faster than that of any other company; and the king, after purchasing ten thousand pounds stock, had condescended to be their governor. Things were in this situation, when, taking advantage of the above statute, the famous South Sea bubble was projected. The pretence was, to raise a fund for carrying on a trade to the South Sea, and purchasing annuities, &c. paid to the other companies; and proposals were printed and distributed shewing the advantages of this design. The sum necessary for carrying it on, together with the profits that were to arise from it, were divided into a certain number of shares or subscriptions, to be purchased by persons disposed to adventure therein. And the better to carry on the deception, the directors engaged to make very large dividends; and actually declared, that every hundred pounds original stock would yield fifty pounds per annum, which occasioned so great a rise of their stock, that a share of one hundred pounds was sold for upwards of eight hundred pounds. But the consequences of this infamous scheme were destructive to a vast number of persons, who were completely fleeced and ruined: for particulars whereof, see BUBBLE, vol. iii. p. 467.

The stock-jobbing speculations of this company were succeeded by mercantile projects, which, Dr. Smith, in his Wealth of Nations, observes, were not much better conducted. The first trade which they engaged in, was that of supplying the Spanish West Indies with negroes, of which (in consequence of what was called the Assiento contract granted them by the treaty of Utrecht) they had the exclusive privilege. But as it was not expected that much profit could be made by this trade, both the Portuguese and French companies, who had enjoyed it upon the same terms before them, having been ruined by it, they were allowed, as compensation, to send annually a ship of a certain burden to trade directly to the Spanish West Indies. Of the ten voyages which this ship was allowed to make, they are said to have gained considerably by one, that of the Royal Caroline in 1731, and to have been losers by almost all the rest. In 1734, the company petitioned the king, that they might be allowed to dispose of this trade, on account of the little profit which they made by it, and to accept of such equivalent as they could obtain from the king of Spain. In 1724, they undertook the whale-fishery. Of this, indeed, they had no monopoly; but, as long as they carried it on, no other British subjects appear to have engaged in it. Of the eight voyages which their ships made to Greenland, they were gainers by one, and losers by all the rest. After their eighth and last voyage, when they had sold their ships, stores, and utensils, they found that their whole loss, upon this branch, capital and interest included, amounted to upwards of two hundred and thirty-seven thousand pounds. In 1722, the company petitioned parliament to be allowed to divide their immense capital of thirty-three millions eight hundred thousand pounds, the whole of which had been lent to government, into two equal parts; the one half to be put upon the same footing with other government annuities, and not to be subject to the debts contracted, or losses incurred, by the directors of the company, in the prosecution of their mercantile projects; the other half to remain, as before, a trading stock, and to be subject to those debts and losses. The petition was too reasonable not to be granted. In 1733, they again petitioned the parliament, and obtained leave, that three-fourths of their trading stock might be turned into annuity stock, and only one-fourth remain as trading stock, or exposed to the hazards arising from the bad management of their directors. In 1748, all the demands of the company upon the king of Spain, in consequence of the Assiento contract, were, by the treaty of Aix-la-Chapelle, given up for what was supposed an equivalent. An end was put to their trade with the Spanish West Indies, the remainder of their trading stock was turned into an annuity stock, and the company then ceased in every respect to be a trading company. It is now under the direction of a governor, sub-governor, deputy-governor, and twenty-one directors; but no person is qualified to be governor, his majesty excepted, unless such governor has, in his own name and right, five thousand pounds in the stock; the sub-governor is to have four thousand pounds, the deputy-governor three thousand pounds, and a director two thousand pounds, in the same stock. In every general court, each member, having in his own name and right five hundred pounds in stock, has one vote; if two thousand pounds, two votes; if three thousand pounds, three votes; and if five thousand pounds, four votes.

7. The EAST-INDIA COMPANY. This important company, from a very untoward beginning, has become the first and greatest commercial association in the world. They are named the *United Company of Merchants of England trading to the East Indies*, in 6 An. c. 17. but more explicitly, according to their charter, and the adjustment of their rights, by 9 & 10 Will. III. c. 44. as trading "into and from the East-Indies, in the countries and parts of Asia and Africa, and in, to, and from, the islands, ports, havens, cities, creeks, towns, and places, of Asia, Africa, and America, or any of them, beyond the Cape of Good Hope, to the Straights of Magellan, where any trade or traffic of merchandize is or may be used or had, and to and from every of them." The passage by sea to the peninsula of India, known by the name of *Hindoostan*, or *Mogul Empire*, and the eastward part of the continent of Asia, the present seats of our Asiatic trade, was not discovered till about the latter end of the fifteenth century; and, of the various attempts made from hence by individuals, to open a trade thither, none proved successful until queen Elizabeth, in the year 1600, established the first

first incorporated company by the name of the *London East-India Company*. After a long series of disasters and losses, this company obtained from the powers of India, at a great expence, the privilege of a limited trade in certain parts of India and Persia, and of making small settlements or houses of trade called *factories* for the residence of their factors and servants. In those times the charters of the crown, and the powers which they conveyed, were not thought to require parliamentary sanction; nor was it till after the restoration that the rights or authorities derived under them to the company were first called in question. By the interruptions, however, of private speculative adventurers, who had begun to resist the exclusive claims of the old company, under their charters, on the ground of their wanting the sanction of parliamentary authority, and by occasional failures of investments of goods from abroad, and the then not unfrequent losses of ships in their passage, the commerce of the company was often chequered with disasters and disappointments. Notwithstanding these discouragements, the company formed by degrees various factories and houses of trade both in India and Persia. When by this means they had at length become more successful, various attempts were made to induce the crown, and even parliament itself, to interpose and revoke the charters of the company; some on presumption that every man had an equal right to trade in the East as well as in the West Indies; while others hoped to effect it on proposals of terms of advantage in point of public finance, that they might themselves be erected into an exclusive company.

Such was the state of things in 1693, when the company, by an accidental failure in the payment of a small duty which had been imposed on their capital stock, gave an opening to government to determine their charters, rendered void by that default; and though in the same year the crown, to obviate all doubts, revived their powers and exclusive privileges by a new charter, the company were obliged to submit to a condition, that their capacity of trading should in future be determinable on three years notice. The legal obstacle to the erecting a new company being thus removed, the stat. 9 & 10 Will. III. c. 44. was passed for borrowing two millions on a loan at eight per cent. towards carrying on the war; and, as an encouragement to subscribers, it was declared, that they should be incorporated by a charter from the king into a general society, with liberty for each individual member to trade to India, and the other limits of the old company's exclusive charter; so that the value of his exports exceeded not his share of this loan or capital: and that such of the subscribers as should choose to convert their subscriptions into a joint stock, should be at liberty so to do, and be incorporated by a separate charter by the name of the *English East-India Company*; with the privilege of trading with and to the amount of such joint stock. All persons but those incorporated, and such as they should licence, were prohibited from this trade, except the old company, who had time given them to wind up their commercial affairs. The act reserved a power to determine the charters both of the general society and the new company after September 1711, on re-payment of the loan and three years notice. The bulk of the subscribers having agreed to trade as a separate company, with a joint stock, the old company, to whose prejudice the two new corporations were to be erected, found means to become members for a very large proportion of the loan of two millions. With an interest thus acquired they joined with the English company, and, by means of their superior knowledge and possessions, they obtained a decided influence in the general courts of the new company, and thus paved the way to that union which afterwards took place in 1702; and which, in 1708, was confirmed by 6 Ann. c. 17. By the terms of this union the warehouses at home and shipping, and also all the settlements and factories of the old company in the East Indies, Persia, and China, including the islands of Bombay and St. Helena, with their dependencies, and all their rights and privileges, however derived, became vested in the united company, except their body politic, which was surrendered to the crown. The curious reader may wish to learn what became of the general society, whose members were individually authorized to trade, as far as the value of their subscriptions in goods exported from hence. All that can be discovered of them is, that though they were actually incorporated by the king's charter, and were therefore legally authorized to send ships to India or China, it does not with certainty appear that any one ship was ever fitted out by them; and that the superior advantages of being concerned in the trade to be carried on with a joint stock were so evident, that, at the time of the union of the two companies, out of the whole loan of two millions, only seven thousand two hundred pounds then remained the property of the separate traders of the general society; and that this sum also was soon absorbed in the united company, whose capital or trading stock by which their dividend of profits was to be governed, thereupon became fixed at two millions.

The first enlargement of the company's term took place in 1708, (6 *Ann.* c. 17.) when the united company bargained with the public to advance one million two hundred thousand pounds as a loan, but without any interest, (or, which operated as the same thing, at a reduced interest of five per cent. on the two loans conjointly,) for an extension of their term, in the exclusive trade, of fifteen years; and thus their nominal trading capital on which the dividend was made, became advanced to three millions two hundred thousand pounds. In 1712 the company petitioned parliament, (on the ground that the term which remained unexpired in their trade, was too short to admit their risking the expences of regaining and securing the pepper trade, which had been engrossed by the Dutch,) that their corporate capacity might be continued, though the debt due to them from the public should be redeemed. In consequence of this petition, the stat. 10 Ann. c. 28. passed for repealing all former provisoes and powers of determining their trade or incorporation, but with power for the public to redeem the debt at any time after September 1733. And thus the united company were supposed to have obtained a perpetuity, as well in the exclusive trade, as in all their chartered rights and capacities. They, however, submitted themselves, in that respect, to the pleasure of parliament in 1730, when the stat. 3 G. II. c. 14. was passed for continuing to them their exclusive trade till 1766; for which they gave the public a premium of two hundred thousand pounds, without any return of either principal or interest; and also agreed to a reduction of the rate of interest to four per cent. on the debt of three millions two hundred thousand pounds, and to accept of payment of the principal by instalments of five hundred thousand pounds. In 1744 they contracted for and obtained, by 17 Geo. I. c. 17. a farther addition of fourteen years in the exclusive trade; for which they lent to the public one million at three per cent. And, in 1750, they agreed, by 23 Geo. II. c. 22. to a farther reduction of the rate of interest on the former debt, to three per cent. Thus grew the debt of four millions two hundred thousand pounds from the public to the united company, carrying with it an annuity of one hundred and twenty-six thousand pounds. This was called the three per cent. East India annuities; and are now consolidated with the three per cent. bank annuities. See the article National Debt. But the company's capital or nominal sum, by which their dividends were governed, continued as before at three millions two hundred thousand pounds; the million last lent having been raised by their bonds, and therefore not added to their former capital.

The next renewal was made by contract with the public, by 21 Geo. III. c. 65. when a farther term, determinable in 1794, was granted in the exclusive trade, on payment of four hundred thousand pounds, in discharge of all claims on the company by the public, previous

vious to March 1, 1781. But it was provided that, after payment of a yearly dividend of eight per cent. to the holders of India stock, the surplus of all the net proceeds of their trade and revenues should be applied, three-fourths to the use of the public, and the remaining one fourth to the use of the company. The debts incurred by the company, in the wars subsisting in India at and after that period, prevented any such surplus from arising; and therefore no participation of revenue took place under this act. On the contrary, the pressure of those debts, and the compulsory clauses of an act of 1784, by which the company were obliged to keep a stock of teas always in their warehouses, sufficient for one year's consumption, rendered it necessary for them to enlarge their actual trading capital, by new subscriptions to five millions of pounds, for which they had the sanction of parliament granted them by stat. 26 Geo. III. c. 62. In 1783, the public agreed to forego any participation of the funds of the company, until certain debts should be discharged; and, by the relief-act of 1784, the participation, as settled in 1781, was to be resumed as soon as the debts therein specified were paid, and the bond debt reduced to a million and a half

The mode of conducting the East-India business is as follows: the books of the company are at all times open for the admission of every description of persons, natives or foreigners, who may desire to become members, and have money to adventure. It knows no distinction of professions, religions, or even sexes, and in the general courts there is the most perfect equality; every one present has the same right with another to speak his sentiments and give his advice. A difference is made only in voting, which, when taken by the holding up of hands, requires five hundred pounds stock; and, when by ballot, one thousand pounds stock for a single vote, three thousand pounds for two votes, six thousand pounds for three votes, and ten thousand pounds for four votes, which is the largest number of votes any member is allowed to possess; two thousand pounds stock qualifies any member to become a candidate for the office of a director or chairman. In the beginning of the year 1794, the number of votes was about one thousand seven hundred; that of actual voters, however, not much exceeding one thousand four hundred. A proprietor of stock to the amount of one thousand pounds, whether man or woman, native or foreigner, has a right to give a vote in the general courts. The directors are twenty-four in number, including the chairman and deputy-chairman, who may be re-elected in turn, six each year for four years successively. The meetings, or courts of directors, are to be held at least once a-week, but are commonly oftener, being summoned as occasion requires. Out of the body of directors are chosen several committees, who have the peculiar inspection of certain branches of the company's business; as the committee of correspondence; committee of buying; committee of treasury; house committee; committee of warehouse; committee of shipping; committee of accounts; committee of law-suits; committee to prevent the growth of private trade; and a committee of secrecy.

The bulk of the company's exports consists of camblets, cloth, and other woollens; metals, (particularly tin, lead, and copper;) naval and military stores; and silver in bullion. The company reserved to themselves the exclusive export of cloth, woollens, copper, bullion, and military stores; and also clocks, toys, and other articles ornamented with jewels. Other articles exported from hence are chiefly purchased in India by Europeans for their own consumption, and are carried abroad (in what is called private trade) by the commanders and officers of the company's ships. The company may licence whom they please to trade in the East Indies. The officers and subordinates of their ships, being thirty in number for every ship, are allowed the benefit of it, both in export and import, according to their different ranks. This is called *private trade*; and what they pay for this permission, and in lieu of freight, is called *company's duties*, and forms an article of the company's profits. The servants abroad are also frequently permitted to remit home their fortunes in merchandize, for which they pay a freight to the company. This latter trade is distinguished from the former by the name of *privileged trade*. Besides this, abundance of British goods are sent to India by illicit trade carried on directly from Great Britain; and also by clandestine trade from various parts of Europe, in British ships under foreign colours. The goods imported by the company from India, consist chiefly of muslins, callicoes, and other piece goods, raw silk, cotton, indigo, pepper, saltpetre, opium, and various sorts of drugs; and from China, tea, coffee, and japan and china-ware; the other articles are comparatively of a trifling value. Sugar has occasionally been imported in small quantities, which appear to be annually increasing. The whole average amount of the customs and inland duties on the import trade of India and China to Great Britain, may be estimated at upwards of a million per annum; and the sale amount thereof at nearly six millions per annum.

The temporary rights of the company consist, 1. Of the sole and exclusive trade with India, and other parts within the limits already described; so that none other of the king's subjects can go thither or trade there except it be by leave of the company, or pursuant to the directions of 33 Geo. III. c. 52. 2. They have the administration of the government and revenues of the territories in India, acquired by their conquests during their term in the exclusive trade, subject, nevertheless, to the various checks and restrictions contained in those several statutes which vest that administration in them. The rights which the company possess in perpetuity, are, to be a body corporate and politic, with perpetual succession. 3 *Geo.* II. c. 14. 17 *Geo.* II. c. 17. 21 *Geo.* III. c. 65. To purchase, acquire, and dispose at will, of lands and tenements in Great Britain. In their charter of 10 Will. III. the value in Great Britain was not restricted; but, by 3 Geo. II. c. 14. the value therein is not to exceed ten thousand pounds per annum. By the charter of king William, to make settlements to any extent, within the limits of their exclusive trade; build forts and fortifications; appoint governors; erect courts of judicature; coin money; raise, train, and muster, forces at sea and land; repel wrongs and injuries; make reprisals on the invaders or disturbers of their peace; and continue to trade within the same limits, with a joint stock, for ever, although their exclusive right of trading shall be determined by parliament. These rights, it appears, the company hold under the immediate authority of parliament; they embrace all those of the old chartered company which subsisted from the year 1600 to 1708, when, as has been already observed, they became vested or absorbed with all their fortresses, settlements, and factories, and other property, real and personal, in the present united company. They are a perpetual corporation; and, although their exclusive right to the trade, and their power of administering the government and revenues of India, were to be determined, they would still remain an incorporated company in perpetuity; with the exclusive property and possession of Calcutta and Fort William, Madras and Fort St. George, Bombay, Bencoolen, and St. Helena, and various other settlements and landed estates in India; and also a right of trading thither with a joint stock, together with all their repositories and other conveniences adapted to their commerce and the preservation of their merchandize, both abroad and at home. The only privileges they can be constitutionally deprived of, are, those of trading to the exclusion of others, and of governing the countries and collecting and appropriating the revenues of India. 33 *Geo.* III. c. 52.

The other statutes now in force relative to the trade and concerns of the East-India company, are, 9 & 10 Will. III. c. 44. by which persons trading to the East Indies are first to give security for causing all goods laden on-

on their account in India, to be brought, without breaking bulk, to some part of England or Wales, and there to be unladen and put on land. The amount of this security is regulated by 6 Ann. c. 3. By 13 Geo. III. c. 63. "for establishing certain rules and orders for the management of the affairs of the company, as well in India as in Europe," considerable alterations were made in the constitution of the company. It was enacted that the court of directors should in future be elected for four years; six members annually; but none to hold their seats longer than four years. That no person should vote at the election of the directors, who had not possessed their stock twelve months. This statute also increased the qualifications for a vote from five hundred pounds to one thousand pounds. The statute ordained that the mayor's court of Calcutta should in future be confined to small mercantile causes, to which only its jurisdiction extended before the territorial acquisitions. That, in lieu of this court, a new one should be established at Fort William, under the title of the Supreme Court of Judicature, consisting of a chief justice and three puisne judges; and that these judges be appointed by the crown. That a superiority be given to the presidency of Bengal over the other presidencies in India. That the power of nominating and removing the governor-general and council at Fort William and Bengal, should be vested in the directors. By 26 Geo. III. c. 25. it is declared, that his majesty's approbation of the appointment of the governor-general and council of Fort William is not necessary. The salaries of the judges were also fixed at eight thousand pounds to the chief justice, and six thousand pounds a-year to each of the other three. The appointment of the governor-general and council were fixed, the first at twenty-five thousand pounds, and the four others at ten thousand pounds each, annually. It has been said, we know not on what foundation, that no proportionable benefit has resulted from this act to the company; that, on the contrary, this court of justice occasioned much discontent to the natives, as well as dissatisfaction to the company's servants. This being a political question, the discussion of it is by no means applicable to the purposes of this work.

By 24 Geo. III. c. 25. three things were intended: 1. The establishing a power of controul in this kingdom, by which the executive government in India is connected with that over the rest of the empire. 2. The regulating the conduct of the company's servants in India, in order to remedy the evils that had prevailed there. 3. The providing for the punishment of crimes which might reflect disgrace upon Great Britain. Under this statute, six persons are to be nominated by the king, as commissioners for the affairs of India, of whom one of the secretaries of state, and the chancellor of the exchequer for the time being, shall be two, and the president is to have the casting vote, if equally divided. New commissioners are to be appointed at the pleasure of the crown. The members of this board of controul are sworn to execute the several powers and trusts reposed in them, without favour or affection, prejudice or malice. The court of directors are to deliver to this board, for their approbation or alteration, all minutes, orders, and resolutions, of themselves, and of the courts of proprietors; and copies of all letters, orders, and instructions, proposed to be sent abroad. None to be sent until after such previous communication, on any pretence whatever. The directors are to appoint the servants abroad; but power is given to the king, by his secretary of state, to re-call the governors and members of the councils, and all inferior magistrates. The council of Bengal are subjected to the direction of the company at home; and in all cases, except those of immediate danger and necessity, restrained from acting without orders from England. Another object of this act is, to redress the grievances of the natives of India; to provide for the payment of the debts of the nabob of Arcot, which are a burden on his country; discriminating at the same time those which were justly incurred, from those which were forced upon him by the injustice and extortion of British oppressors; to ascertain the indeterminate rights and pretensions, on which so many differences arose between him and the rajah of Tanjore; and to deliver the zemindars, and other native landholders of India, from oppression; and to secure to them their possessions by permanent rules of moderation and justice.

A material part of this bill is directed also against the abuses said to have prevailed in the civil and military departments; enjoining a thorough revisal of their establishment, together with the suppression of such places as are found to be useless, and of such expences as may be conveniently avoided. And, in order to prevent any delusive show of retrenchment, or any future deviation, this reform is directed to be constantly submitted in its whole state and progress to parliament. Cadets and writers were heretofore sent to India in such numbers as to remain a burden upon the company's establishments. These are reduced to a certain complement not to be exceeded. A system of succession by seniority is established by the act, to prevent the servants of the company from rising, merely through interest, without merit; leaving, however, to the councils abroad the power of bringing forward, for reasons to be by them assigned, any persons of extraordinary merit or capacity.

Security having been heretofore derived to delinquents in India, from the circumstance of their offences being committed within the territories of Indian princes, so as not to come within the cognizance of the British government; this act provides against such evasions in future, by declaring the offence equally punishable in whatever territory of India it is committed. The act of receiving presents is declared to be in itself extortion, and punishable accordingly. The offences of disobeying orders, and bargaining for offices, are pronounced to be misdemeanors; and it is provided that offenders shall not compound for them with the company; nor ever be restored to appointments in their service. Collectors and receivers are bound by oath not to receive any private gratuity over and above the legal tribute. With a view to prevent, or more easily punish, the misconduct of the company's servants, several regulations were made by this statute for the discovery of their property on their return to England from India; but which were all repealed by 26 Geo. III. c. 57.

The attorney general, or court of directors, may exhibit an information against any person guilty of the crime of extortion, or other misdemeanors committed in the East Indies, after January 1, 1785; which information is to be tried by commissioners selected from both houses of parliament. The election of these commissioners is regulated by 26 Geo. III. c. 57. which in substance directs as follows: The lords are to ballot for twenty-six of their house, and the commons for forty of their number; their names are again to be put into a box, to be drawn out by lot, in presence of three judges, (one of the court of king's-bench, one of common-pleas, and one of the exchequer,) and of the parties; and the defendant may peremptorily challenge thirteen peers and twenty commoners; and he, as well as the prosecutor, may challenge as many as they please for cause shewn. The first five names of the peers, and the first seven names of the commoners, which shall be drawn without challenging, shall be returned by the three judges to the lord chancellor, to insert their names, with those of the three judges in a special commission, for them, or any ten of them, of whom one of the judges always to be one, to hear and determine every such information, and pronounce judgment thereon; such judgment to be enforced by the authority of the court of king's-bench, and to be effectual and conclusive to all intents and purposes whatsoever. This, as well as the former act also, contains many other directions relative to the trial, as also relative to the dispensing justice, both in criminal and civil cases in India. In consequence

consequence of the regulations adopted under this statute, it has been asserted, we believe with truth, that the administration of our Indian possessions and trade has become regular and efficient; the credit of the company has increased; the price of India stock has advanced; the trade of the company has been almost doubled; the duties paid to the public augmented; tranquillity for many years maintained, and a necessary and politic war supported with dignity, and terminated in 1799, with success, honour, and conquest.

The stat. 33 Geo. III. c. 52. the commencement of which in India was appointed to take place on the 1st of February, 1794, commonly called Mr. Pitt's India bill, being of the greatest importance on this subject, is here presented in the form which seemed best adapted to elucidate the purposes for which it was passed. As it concerns, 1. The controul in Great Britain. 2. The governments abroad. 3. Patronage and rule of promotion. 4. The general trade. 5. Limitations on the exclusive trade to and from India. 6. What shall be deemed illicit or clandestine trade. 7. Appropriations of the company's revenue. 8. The method of suing for forfeitures and penalties, and proceeding as to seizures. 9. Regulations of general justice in India.

1. The act provides for the continuation of the board of controul in all its parts, except that the person first named in the king's commission is to be president; and, instead of the commissioners being limited to six privy counsellors, the number is indefinite, resting in the king's pleasure; of which, however, the two principal secretaries of state, and the chancellor of the exchequer, are to be three; and his majesty may, if he pleases, add to the list two commissioners not of the privy council. The king may give five thousand pounds a-year among such of the commissioners as he pleases; which, together with the salary of the secretary and officers, and other expences of the board, are to be paid by the India company, and not, as formerly, by the civil list; the whole not to exceed sixteen thousand pounds per annum. Oaths are prescribed for the commissioners and their officers. The office of a commissioner, or chief secretary, is not to be deemed a new office to disable them from sitting in parliament; nor is the appointment of a commissioner not having a salary, or of a chief secretary to vacate a seat. Three commissioners must be present to form a board. The powers of the board are in substance the same as under former acts of parliament. They are to superintend, direct, and controul, all acts, operations, and concerns, which relate to the civil or military government and revenues of the British territorial possessions in India, subject to the restrictions after mentioned. They and their officers are to have access to the papers and records of the company, and to be furnished with copies or extracts of such of them as shall be required. They are also to be furnished with copies of all proceedings of general courts, and courts of directors, within eight days; and with copies of all dispatches from abroad, relating to matters of government or revenue, immediately after their arrival. No orders on those subjects are to be sent by the company to India, until approved by the board, and, when the commissioners vary or expunge any part of the dispatches proposed by the directors, they are to give their reasons: and all dispatches are to be returned to the court of directors in fourteen days. The directors may state their objections to any alterations, and the commissioners are to reconsider them; and, if they interfere with what the directors deem matters of commerce, the directors may apply to the king in council to determine betwixt them. But the board are restricted from the appointment of any of the company's servants. If the directors, on being called upon to propose dispatches, on any subject relating to government or revenue, shall fail to do so within fourteen days, the board may originate their own dispatches on that subject. The board are not to authorise any increase of salaries, or any allowance or gratuity to be granted to persons employed in the company's service, except the same shall be first proposed by the company; and their intention and reason for such grants are to be certified to both houses of parliament, thirty days before the salary can commence. The directors are to appoint three of their members to be a committee of secresy, through whom dispatches relating to government, war, peace, or treaties, may be sent to and received from India. This committee and their clerks be sworn to secrecy. Orders of directors concerning the government or revenues of India, once approved by the board, are not subject to revocation by the general court of proprietors.

2. The forms of government over the presidencies of Bengal, Fort St. George, and Madras, are continued in all their essential parts. For Bengal by a governor general and three members of council. For each of the others, a governor and three members. These latter, with respect to treaties with the native powers of India, levying war, making peace, collecting and applying revenues, levying and employing forces, or other matters of civil or military government, are to be under the controul of the government-general of Bengal; and are in all cases whatever to obey their orders, unless the directors shall have sent to those settlements any orders repugnant thereto not known to the government-general; of which in that case they are to give the government-general immediate advice. The court of directors are to appoint to these several governments; namely, the governor-general, the two other governors, and the members of all the councils; and likewise the commander in chief of all the forces, and the three provincial commanders in chief. None of the commanders in chief are, *ex officio*, to be of the council, but they are not disqualified from being so, if the directors shall think fit to appoint them; and, when they are members of the council, they are to have precedence of the other counsellors. The civil members of council are to be appointed from the list of civil servants who have resided twelve years in the service in India. The directors may appoint to any of these offices provisionally, but without salary, till the persons appointed shall actually succeed in possession. Any vacancy of governor-general, or governor, when no provisional successor is on the spot, is to be filled by the senior of the civil counsellors till a successor shall arrive; and the vacant seat in council thereby occasioned, shall be temporarily supplied from among the senior merchants, at the nomination of the acting governor-general, or governor, if only one counsellor shall then remain; and, on other occasions, the governor general and governors may supply vacancies in council from the list of senior merchants, until successors duly appointed shall arrive to take their seats. In all these cases the salaries and allowances are to follow the acting members while in office. If the directors fail to appoint to vacancies in two calendar months after notification thereof, the king may supply them, and the directors shall not remove any person so appointed. In all other cases the directors have the power of recalling or dismissing any servants; and the like general power is vested in the crown. Appointments made before the act not to be disturbed. The commander in chief of all the forces, when at either of the subordinate settlements, is to have a seat at the council board, but is to have no salary in respect thereof; and, if the provincial commander is a member of that council, he may continue to deliberate, but his voice shall be suspended as long as the other shall remain. Provision is made for supplying the place of any member of council disabled from attending by illness. The departure of any governor, or member of government, or commander in chief, from India, with intent to come to Europe, or any written resignation delivered in by them, shall be deemed an avoidance of office, and the coming into any part of Europe, shall be a sufficient indication of that intent. No salary shall be payable to any officer or his agent during absence, unless employed on actual service; and if any officer, unless absent

sent on service, never returns, the salary is to be deemed to have ceased from the day of his quitting the settlement. The act also prescribes the order and method of conducting business at the several council boards. Powers are given to the governor-general, or governor, to act contrary to the opinions of the other members of council, taking upon themselves the sole responsibility. Provision is made in case of the absence of the governor general, and his visiting any subordinate presidency; and, in case he shall be in the field without a council, all the governments and officers shall obey his orders, and he alone shall be responsible. All the governments are laid under restrictions to prevent war or extension of dominion in India, unless hostilities against the company or their allies shall render war unavoidable. The members of subordinate governments, acting contrary to this act, or to the directions of the government-general, may be suspended or dismissed by that government, and further punished. The subordinate presidencies are also required to communicate all matters of importance to the superior government with all dispatch. The governor-general, and other governors, are vested with powers of apprehending persons, suspected of illicit correspondence with the enemies of the company or of Great Britain. Witnesses are to be examined, and cross examined, and their evidence recorded; and the parties may either be tried in India, or sent home: in the latter case, the depositions of the witnesses are also to be sent home, and are to be received in evidence, subject to impeachment in respect to the competency of the witnesses. To the acting president of the several council boards is given a casting vote, in all cases of equality of voices.

3. The directors are to appoint so many cadets and writers only, as to supply vacancies according to returns from abroad. Their ages to be from fifteen to twenty-two, unless any cadet shall have been one year in the king's service, and then his age is not to exceed twenty-five years. All shall have promotion by seniority of service only. Three years service qualifies a civil servant for a place of five hundred pounds a year; six years for one of fifteen hundred pounds a-year; nine years for one of three thousand pounds a-year; and twelve years for one of four thousand pounds or upwards. None to take two offices, where the joint emoluments shall exceed this rule. Nearly the same regulations are made by this statute relative to receiving presents, disobedience of orders, and bargaining for offices, as have been already mentioned in 24 Geo. III. c. 25. All the king's subjects are made amenable to all courts of competent jurisdiction abroad and at home, for all crimes committed by them in India. The company may compound civil actions, but are absolutely restricted from compounding or remitting any judgment or sentence whatever in criminal cases. Servants of the company, after five years absence, cannot return with their rank, nor serve again, unless detained by sickness; or, unless it be by leave of the company, on a ballot of three parts in four of the general court. In case of sickness, the directors are the judges in the civil service; and, in the military, the directors and the board of controul jointly.

4. The company's term is extended for twenty years, from March 1, 1794, subject to be determined at or after that period, on three years previous notice by parliament, signified by the speaker of the house of commons; subject, however, as to the trade to and from India to the following limitations, in favour of such private merchants as may choose to trade there. In other respects, and to and from China, and other places beyond the Cape of Good Hope, the former restrictions against private traders are continued in force; and, if the exclusive trade thus limited, shall be hereafter discontinued, the company are still to retain their corporate capacity with power to trade, with a joint stock in common with other people. If, however, any new settlement shall be obtained from the Chinese government, separate from the continent of Asia, an export trade thither is preserved to private merchants under certain regulations; and there is also a clause to preserve to the southern whalers the benefit of their carrying trade into the Pacific Ocean, by the way of Cape Horn, to the northward of the equator, limited to 180 degrees west longitude of London: and ships from Nootka-Sound are to be licensed to trade from thence with Japan and China; but are not to bring any goods of the produce or manufacture of those countries to Great Britain.

5. All persons may export and import goods to and from India in the company's ships, except that they shall not export military stores, ammunition, masts, spars, cordage, anchors, pitch, tar, or copper; nor import India callicoes, dimities, muslins, or other piece-goods, made or manufactured with silk or cotton, or with silk or cotton mixed, or with other mixed materials, unless it be done by leave of the company. If the market shall not be sufficiently supplied with excepted articles of import or export, (with an exception of military stores and copper,) the board of controul may open that trade also to individuals. If the company should not export fifteen hundred tons of copper annually, private traders may export copper, in the company's ships, to the amount of the deficiency. The company were to furnish private traders, till 1796, with three thousand tons of shipping yearly, computed on the same principle as the company's own tonnage is computed. The quantity might be increased by order of the board of controul, to meet the demands of the private traders; and, if the board order more than the company approve, they may appeal from the order to the king in council. And the company are restricted from charging any higher freight than five pounds per ton outwards, and fifteen pounds per ton inwards; except in time of war, or in circumstances incidental to war, or preparations for war, when they may charge an increased rate of freight, in a due proportion to the rates at which they shall take up their own shipping; but the proposed increase can only be made by the consent of the board of controul, before whom the directors were also required, in 1794, and in every third year afterwards, to lay a statement of the affairs of shipping; and to abide by their order, touching any continuance, increase, or abatement, of the rate of freight on private trade. Private traders are required to notify to the company's secretary at home, and to the proper officers in India, at a time limited, the quantity of tonnage wanted by them for the ensuing season, with the place of destination, and the time when the goods will be ready for shipping. At home, this notice is to be given before the 31st of August for the ships of the ensuing season, and before the 15th of September they are to deposit the sum for the tonnage, or give security to the directors for payment of it. Before the 30th of October they are to deliver a list of the sorts and quantities of the goods intended to be sent. In failure of having them ready, by the day specified in the notice, they are to forfeit their deposit or the security, and also their tonnage for that turn. Similar rules are prescribed for shipping goods, &c. in India; but it is left to the governments there to fix the times, and to name the officers, to whom notices are to be given. The company is to have the benefit of all forfeited and vacant tonnage; and, if more is demanded for private trade than the quantity limited, every person is to have his due proportion, and notice is to be given him thereof seven days before the day for making the deposits. All private trade is to be registered in the company's books, and, in default of being registered, it is to be considered as illicit trade, and punishable accordingly.

The restrictions of the law against the company's servants, or others, from acting as factors for foreigners, or lending money to foreign companies, or on bottomry of their ships, or assisting them with remittances by bills, are repealed. And all legal impediments to the recovery of debts, under any pretence that they were incurred illicitly,

licitly, and against the letter of these abrogated laws, are removed; and all persons in India, not specially prohibited by the company, or restricted by their covenants, are authorized to act as mercantile agents for any who may choose to employ them; and if there shall be a want of factors (properly qualified and authorized) the company are to licence free merchants, with the approbation of the board of controul, so that there may be always a proper supply of agents for conducting the private trade abroad. But the becoming factors is not to exempt any persons from being amenable to the general authorities of the governments in India; and all agents are restricted from going beyond ten miles from some principal settlement, without special leave. As a further relief to private traders, the duty of five per cent. granted by an act of king William, on goods imported in private trade, is, in respect to the India trade, repealed; and the company's former charge of two per cent. discontinued; and in lieu of these, and in satisfaction of the expences of unshipping, hoyage, cartage, warehouse-room, sorting, lotting, and selling, private goods, the company is to have three pounds per cent. on the gross amount of the sales of private trade, the customs thereon included. The repeal or the allowance thus substituted, is however not to extend to special engagements made between the company, and any of their officers, touching their privileges. For the ease of manufacturers, who may import any articles of raw materials, rules or by-laws are to be framed and established for bringing them to as early a sale as possible; and for preventing any undue preference in the sales of the same commodity amongst any of the importers, whether the goods belong to the company or to individuals, the sales are to be open and public, by inch of candle, and the whole consignment bought in by the private importer, is to be delivered out to him, on payment only of the duties and other dues thereon. All other goods imported in private trade, are to be sold and treated as heretofore, according to the by-laws of the company; and all goods in private trade are to pay to government the same customs as goods imported by the company on their own account. And inasmuch as the allowance of three per cent. and the rates of freight, will be insufficient to indemnify the company their actual charges upon private trade, the legislature has exempted the company from actions for losses or embezzlements which a common carrier might, in ordinary cases, be liable by law to make good to the owner. But the act provides, that the company's officers, and all persons through whose means or negligence any loss shall happen, shall be liable to make it good to the owner; and it gives a further remedy to the owner, in certain cases, to recover satisfaction, by enabling him to prosecute under the written engagements or securities taken by the company for the safe keeping of their own merchandize. All the laws prohibiting the import of goods from any other place than that of their growth, and for continuing all prohibitory laws, in respect to the consumption or wearing of foreign manufactures are continued. See the article NAVIGATION-ACTS.

6. All the old laws for preventing clandestine trade with India, and from lending to or assisting, or being concerned with foreign companies, or foreign traders, are wholly abrogated; and the following provisions are substituted in their place; observing that the penalties are made to extend only to such of his majesty's subjects as belong to Great Britain, Guernsey, Jersey, Alderney, Sark, Man, Faro Isles, or to the colonies, islands, or plantations, in America or the West Indies; and that all vessels and goods forfeited, may be seized by any of the company's officers in India or China. Persons going unlawfully to India, and trafficking there, forfeit ships, vessels, goods, and merchandize, and double the value thereof: one-fourth to the informers, and three-fourths to the company, they paying thereout the costs of prosecution. Persons unlawfully going to India, shall be deemed unlawful traders, and subject to the foregoing penalties and forfeitures, and may also be prosecuted as for a crime and misdemeanor, and be liable to fine and imprisonment. One moiety of the fine goes to the king, the other to the company, if they prosecute, or else to any other informer. Persons unlawfully resorting to India, may be seized and sent home for trial; and on arrival, they are to give bail, or be committed to prison. Persons dismissed the service, or whose licences shall have expired, if they continue in India, are to be considered as illicit traders, and are made subject to penalties and forfeitures of goods, as such. Goods shipped clandestinely, or such as are restricted by the act, and goods unshipped at sea, shall be seized and forfeited, with double the value, and the master, or other officer, knowingly permitting or suffering the same, shall forfeit all his wages to the company; to be deducted out of the monies payable to the owners, and be disabled from again acting in the service. Any who shall solicit for, or accept a foreign commission to sail to, and trade in, India, shall forfeit five hundred pounds, half to the company, and half to the prosecutor, or the whole to the company if they shall prosecute. All governors and counsellors are prohibited from trading, except for the company; and all collectors, supervisors, and others employed in the revenues of Bengal, Bahar, and Orissa, or their agents, or any in trust for them, are prohibited from inland trade, except for the company. The judges of the supreme court of judicature in Bengal, are absolutely prohibited from traffic; and none without the permission of the company, shall trade in salt, beetle-nut, tobacco, or rice, on pain of forfeiture of the goods, and treble the value, one moiety to the company, and the other to the prosecutor. None shall send goods from India to the continent of Europe, by any other channel than as allowed by the act, on pain of forfeiture of double the value: but this restriction is not to extend to matters of agency, only on the account *bonâ fide* of any foreign company, or foreign merchant.

7. *Appropriation.*—First, in India. The territorial revenues are to be applied in the first place, in defraying all charges of a military nature. Secondly, In payment of the interest of the debts there already, or hereafter to be incurred. Thirdly, In payment of the civil and commercial establishments. Fourthly, In payment of not less than one million per annum for the company's investments of goods to Europe, and remittances and investments to China; and the surplus, if any, is to be applied in the discharge of debts, or such other purposes as shall be directed from home. The sum allowed for investments, may from time to time be increased to the extent of the diminution made in the annual amount of the interest of debts, which shall be paid in India, or transferred home; for which transfer, provision is made to an extent of five hundred thousand pounds a-year, by bills of exchange to be drawn upon the company; and if the creditors shall not subscribe to that amount, other persons may subscribe, and the money advanced by them for bills is to be applied in discharge of such debts, and this rule is to be continued till the India debt shall be reduced to two millions. The company may increase these transfers home, but the governments abroad are restricted from exceeding the above amount without their orders.

Secondly, at home. The net produce of the company's funds at home, after payment of current charges, are thus appropriated. First, in payment of a ten per cent. annual dividend, on the present or any increased amount of the capital stock of the company. Secondly, of five hundred thousand pounds per annum to be set apart on the first of March, and the first of September, half-yearly; and applied in the discharge of the before-mentioned bills of exchange, for the aforesaid reduction of the India debt. Thirdly, of a like annual sum of five hundred thousand pounds to the exchequer, to be applied by parliament for the use of the public, and to be paid on the first of January, and the first of July, half-yearly, by equal instalments. And, lastly, the surplus may be applied

plied in the more speedy reduction of the India debt, till reduced to two millions; or in discharging debts at home, so as not to diminish the bond debt below one million five hundred thousand pounds. Subject to these appropriations, and after the debt in India is reduced to two millions, and the bond debt at home to one million five hundred thousand pounds, one-sixth part of the ultimate surplus is to be applied to an increase of dividend of the capital stock, and the remaining five-sixths is to be made a guarantee fund, or collateral security for the company's capital stock, and their dividend of ten per cent. until such fund, by the monies paid by the company, and the interest thereof, shall have amounted to twelve millions; and after that time, the said five-sixths of the surplus is to belong to the public in full right. These five-sixths are to be paid into the bank, and laid out in the purchase of redeemable annuities, in the names of the commissioners for the reduction of the national debt, who are also to receive the dividends, and lay them out in like manner, until twelve millions have been invested. That being accomplished, the annual dividends of the stock purchased therewith, are, in the first place, to make good any defalcation in the company's revenues, to pay the ten per cent. dividend, and subject thereto, those dividends are to belong to the public. If on the company's exclusive trade being determined, their own assets shall prove insufficient to make good their debts, and also their capital stock rated at two hundred pounds per cent. the excess of such guarantee fund is to make good the deficiency, as far as it will extend; and in the event of the company discontinuing their trade altogether, the excess is to belong to the public. But if the company shall continue to trade with a joint stock, then the overplus, and the annual dividends thereof, are to remain as a like guarantee for a dividend of ten per cent. and for the capital rated at two hundred pounds per cent. as long as the company shall trade with a joint stock; but subject to the making good any such deficiencies, the said fund is to be deemed the property of the public. If the bond debt at home, or the debts abroad, after being reduced to the sums before limited, shall be again increased, the former appropriation is to be revived until those debts shall be again diminished to their respective standards before limited. Any deficiency in the funds to make good the five hundred thousand pounds to the exchequer in any year, is to be made good in the excesses of subsequent years; unless it happens in time of war, or by circumstances incidental to war; in which case the deficiencies are not to be carried forward as a debt on the annual funds of the company, nor to be brought forward as a debt to be paid by the company, unless only in the event of their assets, on the conclusion of the exclusive trade affording more than sufficient to make good the capital stock rated at two hundred pounds per cent. but any excess of such assets beyond that amount, is liable to make good the deficiency of any such payments to the public; no interest is to be computed in the mean time on such deficiency. The securities given by the cashiers of the bank, are to extend to the monies they may receive under this act, and the treasury is to direct the allowances for management; and if the company make default in any payments, directed by the act, they may be sued, and shall pay fifteen pounds per cent. damages, with costs of suit. The statute directs the manner in which receipts shall be given; and a power is lodged in the treasury, to give the company further time for payment in cases of exigency. And it is declared, that neither the claims of the public, nor of the company, to the territories in India, shall be prejudiced by the statute, beyond the prolongation of the term in the exclusive trade. The statute also contains a clause of mutual acquittal of all out-standing demands between the crown and the company, to the 24th of December, 1792. The statute recognizes the rights of the company to a sum of four hundred and sixty-seven thousand eight hundred and ninety-six pounds seven shillings and fourpence in money, and nine thousand seven hundred and fifty pounds East-India stock, (which sums constitute the separate fund of the company, established under the act of 1781;) and it is observed, that it will be more for the general interest of the company to continue that money employed in trade, computing an interest upon it, and to make it a fund for a permanent increase to their dividend of ten shillings per cent. than to draw it from their trading capital for any sudden distribution. And it then authorizes and limits the company to make a dividend from this separate fund, and the interest thereof, after the rate of ten shillings per cent. per annum during their further term in the exclusive trade; and at the end of the term, it gives them a power of disposing of the remainder of this fund as they shall think fit. The company are not to grant any pensions or new salaries beyond two hundred pounds per annum, to any one person, without the consent of the board of controul; and they are to lay before parliament annually, a list of all their establishments abroad and at home, in which all pensions and new salaries are to be particularly noticed; and also complete accounts of all their affairs, receipts, and outgoings, of the preceding year, with estimates for the following year.

8. The statute gives a right of suing by action, bill, or information, in any of the courts of Westminster, (in which case the venue is to be laid in London or Middlesex,) or in the supreme court of judicature in Bengal, or the mayor's court at Madras or Bombay; and in such suits the legality of seizures of persons, ships, or goods, is made cognizable. In cases of misdemeanors, the offenders are punishable by fine and imprisonment, and if abroad, they may be sent home, as part of the punishment; and a *capias*, for arresting the accused party, is given in the first instance, which may be compounded for by bail. For securing to the crown the duties for goods unlawfully trafficked with, in the cases of forfeiture of goods, the attorney-general may prosecute the offenders, or their partners, by bills in a court of equity, waving penalties, and the defendants shall make full discovery of their illicit traffic upon oath, and shall be decreed to pay all the duties thereupon to government, and thirty pounds per cent. on the value of the goods to the company, and shall be relieved against all other forfeitures. The company may, in like manner, proceed against offenders by bill in equity, and if they fail they shall pay costs. Defendants are to pay costs to the crown and to the company, when the decree shall be against them. Other usual regulations are made as to informers, pleading, &c.

9. The jurisdiction of the supreme court of judicature at Fort William, in causes of admiralty, is made to extend to the high seas at large; whereby a defect in 13 Geo. III. c. 63. for constituting that court, is cured. For increasing the number of magistrates in Bengal, Madras, and Bombay, the supreme court of judicature in Bengal is to issue commissions of the peace, in pursuance of orders issued in council for that purpose; and any of the justices, so appointed, may by order in council, sit also in the courts of oyer and terminer, taking the oaths of justices in England, (excepting the oath prescribed by the act of 18 Geo. II. relating to qualification by estate.) The proceedings and judgments of justices may be removed to the court of oyer and terminer by certiorari, but cannot be set aside for want of form but on the merits only. The justices may also associate with the judges in causes appealed, when called upon so to do. The governments abroad may appoint coroners to take inquests upon the bodies of persons coming to an untimely end, and appoint fees to be paid for that duty. The justices of the peace may appoint scavengers, and raise money by assessments for cleansing, watching, and repairing, the streets of Calcutta, Madras, and Bombay; they may also licence houses for retailing spirituous liquors, and fix the limits of those towns; and none are to retail spirits but such

such as they shall so licence, under the penalties of the laws of Great Britain. A special oath is prescribed to be taken in future by the directors of the company, prohibitory of their acting as directors when concerned in buying from, or selling to, the company any goods; and prohibitory of their being concerned in any shipping employed by the company, or accepting any present for any appointment of office, or of being concerned in any private trade contrary to the act. For an account of the British territory in India, the company's wars with the natives, and the progress of the British arms in Asia up to the conquest and partition of the dominions of Tippoo Sultaun, see the article HINDOOSTAN.

8. HUDSON'S BAY COMPANY. The vast countries which surround Hudson's Bay abound with animals whose furs and skins are excellent, being far superior in quality to those found in less northerly regions. In 1670, therefore, a charter was granted by Charles II. to the governor and company of adventurers of England trading to Hudson's Bay: they were to have the sole trade and commerce of and to all the seas, bays, straits, creeks, lakes, rivers, and sounds, in whatsoever latitude, that lie within the entrance of the Streights commonly called *Hudson's Streights*; together with all the lands, countries and territories upon the coasts of such seas, bays, and streights, which were then possessed by any English subject, or the subjects of any other Christian state; together with the fishing of all sorts of fish, of whales, sturgeon, and all other royal fish, together with the royalty of the sea. The company have several forts, which the French, in May 1782, took and destroyed, to repair which cost the company five hundred thousand pounds. This commerce affords immense profits to the company, and some advantages to Great Britain; for the commodities we exchange with the Indians for their skins and furs, are all manufactured in Britain; and, as the Indians are not very nice in their choice, such things are bartered of which we have the greatest plenty, and which, in the mercantile phrase, are drugs with us. On the other hand, the skins and furs we bring from Hudson's Bay, enter largely into our manufactures, and afford us materials for trading with many nations of Europe to great advantage. These circumstances tend to prove incontestably the immense benefit that would redound to Great Britain, by extending the trade to Hudson's Bay, since this charter has never received any parliamentary confirmation or sanction. The only attempt made to trade with Labrador has been directed towards the fishery, the annual produce of which exceeds forty-nine thousand pounds.

9. SIERRA LEONA COMPANY, established by 31 G. III. c. 55. for carrying on a trade between Great Britain and the coasts and countries of Africa; for which purpose a colony is established on the peninsula of Sierra Leona. This company is intended to supersede, in time, the necessity of the African slave-trade, by raising sugars there by native Africans; it being one of the conditions of the act, that the company shall not deal in or employ slaves. The grant to this company is for thirty-one years, from July 1, 1791. Besides sugars, the company have undertaken the growth of spices, coffee, cotton, indigo, rice, and every other species of tropical produce, by which they might encourage the native negroes to industry, reclaim them from their savage ferocity, humanize their minds, and teach them the arts of civilized life. In the third year after the establishment of this colony, they were attacked by a squadron of republican French, soon after the revolutionary war began, who demolished all the buildings on the settlement, destroyed the company's shipping, and drove their servants and settlers into the woods, defacing the plantations, and setting their stores on fire. The directors, however, in 1795, restored the colony to its former state, and have projected a town on the peninsula, called *Free-town*, which now bids fair to encrease and flourish.

ARTILLERY COM'PANY. See the article ARTILLERY, vol. ii. p. 236.

To COM'PANY, *v. a.* To accompany; to attend; to be companion to; to be associated with:

Thus, through what path soe'er of life we rove,
Rage *companies* our hate, and grief our love. *Prior.*

To COM'PANY, *v. n.* To associate one's self with.—I wrote to you not to *company* with fornicators. 1 *Cor.* v. 9.—To be a gay companion. *Obsolete:*

For there thou needs must learn to laugh, to lye,
To face, to forge, to scoff, to *company*. *Spenser.*

COM'PARABLE, *adj.* Worthy to be compared; of equal regard; worthy to contend for preference.—This present world affordeth not any thing *comparable* unto the public duties of religion. *Hooker.*—There is no blessing of life *comparable* to the enjoyment of a discreet and virtuous friend. *Addison.*

COM'PARABLY, *adv.* In a manner or degree worthy to be compared.—There could no form for such a royal use be *comparably* imagined, like that of the aforesaid nation. *Wotton.*

COMPA'RATES, *s.* In logic, the two things compared to one another.

COMPA'RATIVE, *adj.* [*comparativus*, Lat.] Estimated by comparison; not positive; not absolute.—The blossom is a positive good; although the remove of it, to give place to the fruit, be a *comparative* good. *Bacon.*

Thou wert dignified enough,
Ev'n to the point of envy, if 'twere made
Comparative for your virtues, to be stiled
The under hangman of his realm. *Shakespeare.*

Having the power of comparing different things.—Beauty is not known by an eye or nose; it consists in a symmetry, and it is the *comparative* faculty which notes it. *Glanville.*—[In grammar.] When an adjective is expressed either with augmentation or with a degree of diminution, it is called *comparative*.

COMPA'RATIVE, *s.* One that makes himself another's equal.—Gerard ever was his full *comparative*. *Beaum. and Fletcher.*

And stand the push
Of ev'ry beardless vain *comparative*. *Shakespeare.*

COMPA'RATIVE ANATOMY, a term used by anatomists to imply the dissection of brute animals: for particulars of which see ANATOMY, vol. i. p. 652.

COMPA'RATIVELY, *adv.* In a state of comparison; according to estimate made by comparison; not positively.—In this world, whatever is called good, is *comparatively* with other things of its kind, or with the evil mingled in its composition; so he is a good man that is better than men commonly are, or in whom the good qualities are more than the bad. *Temple.*

To COMPA'RE, *v. a.* [*comparo*, Lat.] To make one thing the measure of another; to estimate the relative goodness or badness, or other qualities, of any one thing, by observing how it differs from something else.—They measuring themselves by themselves, and *comparing* themselves among themselves, are not wise. 2 *Cor.* x. 12.—No man can think it grievous, who considers the pleasure and sweetness of love, and the glorious victory of overcoming evil with good; and then *compares* these with the restless torment, and perpetual tumults, of a malicious and revengeful spirit. *Tillotson.*—It may be observed, that when the comparison intends only similitude or illustration by likeness, we use *to* before the thing brought for illustration; as, he *compared* anger *to* a fire.—Solon *compared* the people *unto* the sea, and orators and counsellors to the winds; for that the sea would be calm and quiet, if the winds did not trouble it. *Bacon.*—When two persons or things are compared, to discover their relative proportion of any quality, *with* is used before the thing used as a measure.—

measure.—If he *compares* this translation *with* the original, he will find that the three first stanzas are rendered almost word for word. *Addison.*

He carv'd in ivory such a maid, so fair,
As nature could not *with* his art *compare*. *Dryden.*

To compare is in Spenser used after the Latin *comparo*, for to get; to procure; to obtain:

But, both from back and belly, still did spare,
To fill his bags, and riches to *compare*. *Fairy Queen.*

To vie:

And with her beauty bounty did *compare*,
Whether in her should have the greater share. *Spenser.*

COMPA'RE, *s.* The state of being compared, comparative estimate; comparison; possibility of entering into comparison:

Beyond *compare* the Son of God was seen
Most glorious. *Milton.*

Simile; similitude; illustration by comparison:

True swains in love shall, in the world to come,
Approve their truths by Troilus; when their rhymes,
Full of protest, and oath, and big *compare*,
Want similies. *Shakespeare.*

COMPA'RISON, *s.* [*comparaison*, Fr.] The act of comparing.—Natalis Comes, comparing his parts with those of a man, reckons his claws among them, which are much more like those of a lion: so easy it is to drive on the *comparison* too far to make it good. *Grew.*—The state of being compared.—Objects near our view are apt to be thought greater than those of a larger size that are more remote; and so it is with pleasure and pain: the present is apt to carry it, and those at a distance have the disadvantage in the *comparison*. *Locke.*—A comparative estimate; proportion.—If men would live as religion requires, the world would be a most lovely and desirable place, in *comparison* of what now it is. *Tillotson.*—A simile in writing or speaking; an illustration by similitude.—As fair and as good a kind of hand-in-hand *comparison*, had been something too fair and too good for any lady. *Shakespeare.*—[In grammar.] The formation of an adjective through its various degrees of signification; as, *strong, stronger, strongest.*

COMPA'RISON, or SIMILE, is a figure frequently employed both by poets and prose-writers, for the ornament of language. A metaphor is a comparison likewise implied, but not expressed as such, as when we say, "Achilles is a lion," meaning, that he resembles one in courage or strength. A comparison is, when the resemblance between two objects is expressed in form, and generally pursued more fully than the nature of a metaphor admits; as when we say, "The actions of princes are like those great rivers, the course of which every one beholds, but their springs have been seen by few." This slight instance will show, that a happy comparison is a kind of sparkling ornament, which adds not a little lustre and beauty to discourse; and hence such figures are termed by Cicero, *orationis lumina*. The pleasure derived from comparisons is just and natural. There are three different sources whence it arises. First, from the pleasure which nature has annexed to that act of the mind by which we compare any two objects together, trace resemblances among those that are different, and differences among those that resemble each other; a pleasure, the final cause of which is, to prompt us to remark and observe, and thereby to make us advance in useful knowledge. Among natural objects these similies mostly abound, as we may instance by comparing the morning dew to pearls, or to a falling tear:

Thus the dew, which sometimes on the buds
Was wont to swell, like round and orient pearls,
Stood now within the pretty flow'rets eyes,
Like tears that did their own disgrace bewail. *Shakespeare.*

Or, to carry the allusion higher, we may instance the following, on the dazzling brightness of a summer cloud:

As though an angel, in his upward flight,
Had left his mantle floating in mid-air.
Plays by an anonymous author.

Secondly, the pleasure of comparison arises from the illustration which the simile employed gives to the principal object; from the clearer view of it which it presents; or the more strong impression of it which it stamps upon the mind, as instanced in the following:

She never told her love;
But let concealment, like a worm in the bud,
Feed on her damask cheek: she pin'd in thought;
And with a green and yellow melancholy,
She sat like patience on a monument,
Smiling at grief! *Shakespeare.*

Thirdly, it arises from the introduction of a new, and commonly a splendid object, associated to the principal one of which we treat; and from the agreeable picture which that object presents to the fancy; new scenes being thereby brought into view, which, without the assistance of this figure, we could not have enjoyed; this will be obvious from the following passage:

As when a vulture on Imaus bred,
Whose snowy ridge the roving Tartar bounds,
Dislodging from a region scarce of prey
To gorge the flesh of lambs, or yeanling kids,
On hills where flocks are fed, flies toward the springs
Of Ganges or Hydaspes, Indian streams,
But in his way lights on the barren plains
Of Sericana, where Chineses drive
With sails and wind their cany waggons light:—
So on this windy sea of land, the fiend
Walk'd up and down alone, bent on his prey. *Milton.*

All comparisons whatever may be reduced under two heads, *explaining* and *embellishing* comparisons. For, when a writer likens the object of which he treats to any other thing, it always is, or at least always should be, with a view either to make us understand that object more distinctly, or to dress it up, and adorn it. All manner of subjects admit of explaining comparisons. Let an author be reasoning ever so strictly, or treating upon the most abstruse point in philosophy, he may very properly introduce a comparison, merely with a view to make his subject better understood. Of this nature is the following in Mr. Harris's Hermes, employed to explain a very abstract point, the distinction between the powers of sense and imagination in the human mind: "As wax would not be adequate to the purpose of signature, if it had not the power to retain as well as to receive the impression, the same holds of the soul with respect to sense and imagination. Sense is its receptive power; imagination its retentive. Had it sense without imagination, it would not be as wax, but as water, where, though all impressions be instantly made, yet as soon as they are made they are instantly lost." In comparisons of this nature, the understanding is concerned much more than the fancy; and therefore it is sufficient that they be clear, and useful; that they tend to render our conception of the principal object more distinct: and that they do not lead our view aside, and bewilder it with any false light.

But embellishing comparisons, introduced not so much with a view to inform and instruct, as to adorn the subject of which we treat, are those, indeed, which most frequently occur. Resemblance is the foundation of comparison. Resemblance must not, however, be taken in too strict a sense, for actual similitude and likeness of appearance. Two objects may sometimes be very happily compared to one another, though they resemble each other, strictly speaking, in nothing; only, because they agree in the effects which they produce upon the mind; because they raise a train of similar, or, what may be

4 called

called, concordant ideas; so that the remembrance of the one, when recalled, serves to strengthen the impression made by the other. To describe the nature of soft and melancholy music, Ossian says, "The music of Carryl was, like the memory of joys that are past, pleasant and mournful to the soul." This is happy and delicate. Yet, surely, no kind of music has any resemblance to a feeling of the mind, such as the memory of past joys. Had it been compared to the voice of the nightingale, or the murmur of the stream, as it would have been by some ordinary poet, the likeness would have been more strict; but, by founding his simile upon the effect which Carryl's music produced, the poet, while he conveys a very tender image, gives us, at the same time, a much stronger impression of the nature and strain of that music: "Like the memory of joys that are past, pleasant and mournful to the soul."

In general, whether comparisons be founded on the similitude of the two objects compared, or on some analogy and agreement in their effects, the fundamental requisite of a comparison is, that it shall serve to illustrate the object, for the sake of which it is introduced, and to give us a stronger conception of it. Some little excursions of fancy may be permitted, in pursuing the simile; but they must never deviate far from the principal object. If it be a great and noble one, every circumstance in the comparison must tend to aggrandize it; if it be a beautiful one, to render it more amiable; if terrible, to fill us with more awe. But in the use of comparisons there are two rules to be observed: the propriety of their introduction, and the nature of the objects whence they are taken. First, as to the propriety of their introduction, it must be considered that comparisons are not the language of strong passion. No; they are the language of imagination rather than of passion; of an imagination sprightly, indeed, and warmed; but undisturbed by any violent or agitating emotion. Strong passion is too severe to admit this play of fancy. It has no leisure to cast about for resembling objects; it dwells on that object which has seized and taken possession of the soul. It is too much occupied and filled by it, to turn its view aside, or to fix its attention on any other thing. An author, therefore, can scarcely commit a greater fault, than, in the midst of passion, to introduce a simile. Metaphorical expression may be allowable in such a situation; though even this may be carried too far; but the pomp and solemnity of a formal comparison is altogether a stranger to passion. It changes the key in a moment; relaxes and brings down the mind; and shews us a writer perfectly at his ease, while he is personating some other, who is supposed to be under the torment of agitation. Our writers of tragedies are very apt to err here. In some of Mr. Rowe's plays, these flowers of similies have been strewed unseasonably. Mr. Addison's Cato, too, is justly censurable in this respect: as, when Portius, just after Lucia had bid him farewel for ever, and when he should naturally have been represented as in the most violent anguish, makes his reply in a studied and affected comparison:

Thus o'er the dying lamp th' unsteady flame
Hangs quiv'ring on a point, leaps off by fits,
And falls again, as loth to quit its hold.
Thou must not go; my soul still hovers o'er thee,
And can't get loose. *Addison.*

Every one must be sensible, that this is quite remote from the language of nature on such occasions. However, as comparison is not the style of strong passion, so neither, when employed for embellishment, is it the language of a mind wholly unmoved. It is a figure of dignity, and always requires some elevation in the subject, in order to make it proper: for it supposes the imagination to be uncommonly enlivened, though the heart be not agitated by passion. In a word, the proper place of comparisons lies in the middle region between the highly pathetic, and the very humble style. This is a wide field, and gives ample range to the figure; which, however, must be sparingly adopted, for it is a sparkling ornament, and all things that sparkle, dazzle and fatigue, if they recur too often. Similies should, even in poetry, be used with moderation; but, in prose writings, much more: otherwise, the style will become disagreeably florid, and the ornament lose its virtue and effect. Neither must comparisons be drawn from things, which have too near and obvious a resemblance to the object with which we compare them. The great pleasure of the act of comparing lies, in discovering likenesses among things of different species, where we would not, at the first glance, expect a resemblance. There is little art or ingenuity in pointing out the resemblance of two objects, that are so much akin, or lie so near to one another in nature, that every one sees they must be alike. When Milton, in the following lines, compares Satan's appearance, after his fall, to that of the sun suffering an eclipse, and affrighting the nations with portentous darkness, we are struck with the happiness and the dignity of the similitude:

He, above the rest,
In shape and stature proudly eminent,
Stood like a tow'r; his form had not yet lost
All her original brightness, nor appear'd
Less than archangel ruin'd, and th' excess
Of glory obscur'd: as when the sun new-risen
Looks through the horizontal misty air
Shorn of his beams; or, from behind the moon
In dim eclipse, disastrous twilight sheds
On half the nations, and with fear of change
Perplexes monarchs. *Paradise Lost.*

But when he compares Eve's bower in Paradise, to the arbour of Pomona; or Eve herself, to a dryad, or wood-nymph, we receive little entertainment: as every one sees, that one arbour must, of course, in several respects, resemble another arbour, and one beautiful woman another beautiful woman.

Among similies faulty through too great obviousness of the likeness, must likewise be ranked those which are taken from objects become trite and familiar in poetical language. Such are the similies of a hero to a lion, of a person in sorrow to a flower drooping its head, of violent passion to a tempest, of chastity to snow, of virtue to the sun or the stars, and many more of this kind, with which we are sure to find modern writers, of second-rate genius, abounding plentifully; handed down from every writer of verses to another, as by hereditary right. These comparisons were, at first, perhaps, very proper for the purposes to which they are applied. In the ancient original poets, who took them directly from nature, not from their predecessors, they had beauty. But they are now beaten; our ears are so accustomed to them, that they give no amusement to the fancy. There is, indeed, no mark by which we can more readily distinguish a poet of true genius, from one of a barren imagination, than by the strain of their comparisons. All who call themselves poets affect them; but, whereas a mere versifier copies no new image from nature, which appears, to his uninventive genius, exhausted by those who have gone before him, and, therefore, contents himself with humbly following their track; to an author of real fancy, nature seems to unlock, spontaneously, her hidden stores; and the eye, "quick glancing from earth to heaven," discovers new shapes and forms, new likenesses between objects unobserved before, which render his similies original, expressive, and lively. As comparisons ought not to be founded on likenesses too obvious, still less ought they to be founded on those which are too faint and remote. For these, instead of assisting, strain the fancy to comprehend them, and throw no light upon the subject. It is also to be observed, that a comparison which, in the principal circumstances, carries a sufficiently near resemblance, may become unnatural and obscure, if pushed too far. Nothing is more opposite to the design of this figure,

figure, than to hunt after a great number of coincidences in minute points, merely to ſhew how far the poet's wit can ſtretch the reſemblance. The object from which a compariſon is drawn, ſhould never be an unkown object, or one of which few people can form clear ideas: *Ad inferendam rebus lucem*, ſays Quinctilian, *repertæ ſunt ſimilitudines. Præcipuè, igitur, eſt cuſtodiendum ne id quod ſimilitudinis gratiâ aſcivimus, aut obſcurum ſit, aut ignotum. Debet enim id quod illuſtrandæ alterius rei gratiâ aſſumitur, ipſum eſſe clarius eo quod illuminatur.* Compariſons have been introduced into diſcourſe, for the ſake of throwing light on the ſubject. We muſt, therefore, be much on our guard, not to employ, as the gound of our ſimile, any object which is either obſcure or unknown. That, ſurely, which is uſed for the purpoſe of illuſtrating ſome other thing, ought to be more obvious and plain, than the thing intended to be illuſtrated. Compariſons, therefore, founded on philoſophical diſcoveries, or on any thing with which perſons of a certain trade only, or a certain profeſſion, are converſant, attain not their proper effect. They ſhould be taken from thoſe illuſtrious, noted objects, which moſt of the readers either have ſeen, or can ſtrongly conceive. In this reſpect modern poets are very apt to be guilty. The ancients took their ſimilies from that face of nature, and that claſs of objects, with which they and their readers were acquainted. Hence lions, and wolves, and ſerpents, were fruitful and very proper ſources of ſimilies amongſt them; and theſe having become a ſort of conſecrated claſſical images, are very commonly adopted by the moderns; injudiciouſly, however, for the propriety of them is now in a great meaſure loſt. It is only at ſecond hand, and by deſcription, that we are acquainted with many of thoſe objects; and, to moſt readers of poetry, it were more to the purpoſe to deſcribe lions, or ſerpents, by ſimilies taken from men, than to deſcribe men by lions. We now can more eaſily form the conception of a fierce combat between two men, than between a bull and a tyger. Every country has a ſcenery peculiar to itſelf; and the imagery of every good poet will exhibit it. In compoſitions of a ſerious or elevated kind, ſimilies ſhould never be taken from low or mean objects. Theſe are degrading; whereas ſimilies are commonly intended to embelliſh and to dignify; and, therefore, unleſs in burleſque writings, or where ſimilies are introduced purpoſely to vilify and diminiſh an object, mean ideas ſhould never be preſented to us. Some of Homer's compariſons have been taxed without reaſon on this account. For it is to be remembered, that the meanneſs or dignity of objects depends, in a great degree, on the ideas and manners of the age wherein we live. Many ſimilies, therefore, drawn from the incidents of rural life, which appear low to us, had abundance of dignity in thoſe ſimpler ages of antiquity.

To COMPA'RT, *v. a.* [*compartir*, Fr. from *con* and *partior*, Lat.] To divide; to mark out a general deſign into its various parts and ſubdiviſions.—I make haſte to the caſting and *comparting* of the whole work. *Wotton.*

COMPAR'TIMENT, *ſ.* [*compartiment*, Fr.] A diviſion of a picture, or deſign.—The circumference is divided into twelve *compartiments*, each containing a complete picture. *Pope.*

COMPARTI'TION, *ſ.* The act of comparting or dividing.—I will come to the *compartition*, by which the authors of this art underſtand a graceful and uſeful diſtribution of the whole groundplot of an edifice, both for rooms of office and entertainment. *Wotton.*—The parts marked out, or ſeparated; a ſeparate part.—Their temples and amphitheatres needed no *compartitions*. *Wotton.*

COMPART'MENT, *ſ.* [*compartiment*, Fr.] Diviſion; ſeparate part of a deſign.—The ſquare will make you ready for all manner of *compartments*, baſes, pedeſtals, and buildings. *Peacham.*

To COM'PASS, *v. a.* [*compaſſer*, Fr. *compaſſare*, Ital. *paſſibus metiri*, Lat.] To encircle; to environ; to ſurround; to incloſe: it has ſometimes *around*, or *about*, added.—The ſhady trees cover him with their ſhadow; the willows of the brook *compaſs* him *about*. *Job*, xl. 22.—Obſerve the crowds that *compaſs* him *around*. *Dryden.*

To dare that death, I will approach yet nigher;
Thus wert thou *compaſſed* with circling fire. *Dryden.*

To walk round any thing:

Old Chorineus *compaſs'd* thrice the crew,
And dipp'd an olive-branch in holy dew. *Dryden.*

To beleaguer; to beſiege; to block.—Thine enemies ſhall caſt a trench about thee, and *compaſs* thee round, and keep thee in on every ſide. *Luke* xix. 43.—To graſp; to incloſe in the arms; to ſeize. To obtain; to procure; to attain; to have in the power.—The church of Rome createth titular patriarchs of Conſtantinople and Alexandria; ſo loth is the pope to loſe the remembrance of any title that he hath once *compaſſed*. *Brerewood.*

In ev'ry work regard the writer's end,
Since none can *compaſs* more than they intend. *Pope.*

[In law.] To take meaſures preparatory to any thing; as, *to* compaſs *the death of the king*.

COM'PASS, *ſ.* Circle; round:

This day I breathed firſt; time is come round;
And where I did begin, there ſhall I end:
My life is run its *compaſs*. *Shakeſpeare.*

Extent; reach; graſp.—Animals in their generation are wiſer than the ſons of men; but their wiſdom is confined to a few particulars, and lies in a very narrow *compaſs*. *Addiſon.*

O Juliet, I already know thy grief;
It ſtrains me paſt the *compaſs* of my wits. *Shakeſpeare.*

Space; room; limits, either of time or ſpace.—You have heard what hath been here done for the poor, within the *compaſs* of one year, and towards the end of a long expenſive war. *Atterbury.*—Encloſure; circumference:

Old Rome from ſuch a race deriv'd her birth,
Which now on ſeven high hills triumphant reigns,
And in that *compaſs* all the world contains. *Dryden.*

A departure from the right line; an indirect advance; as, *to fetch a* compaſs *round the camp*.—Moderate ſpace; moderation; due limits.—Nothing is likelier to keep a man within *compaſs*, than the having conſtantly before his eyes the ſtate of his affairs, in a regular courſe of account. *Locke.*—The power of the voice to expreſs the notes of muſic:

From harmony, from heavenly harmony,
  This univerſal frame began:
  From harmony to harmony
Through all the *compaſs* of the notes it ran,
  The diapaſon cloſing full in man. *Dryden.*

[This is rarely uſed in the ſingular.] The inſtrument with which circles are drawn.—To fix one foot of their *compaſs* wherever they think fit, and extend the other to ſuch terrible lengths, without deſcribing any circumference at all, is to leave us and themſelves in a very uncertain ſtate. *Swift.*

In his hand
He took the golden *compaſſes*, prepar'd
In God's eternal ſtore, to circumſcribe
This univerſe, and all created things. *Milton.*

The inſtrument compoſed of a needle and card, called the mariner's compaſs:

  Rude as their ſhips was navigation then,
No uſeful *compaſs* or meridian known:
  Coaſting they kept the land within their ken,
And knew no north but when the pole-ſtar ſhone. *Dryd.*

He that firſt diſcovered the uſe of the mariner's *compaſs*, ſays Locke, did more for the ſupply and increaſe of uſeful commodities, than thoſe who built workhouſes.—This inſtrument conſiſts of a circular braſs box, which contains a paper card with the thirty-two points of the compaſs,

compass, or winds, fixed on a magnetic needle that always turns to the north, excepting only a small deviation. The needle with the card turns on an upright pin fixed in the center of the box. To the middle of the needle is fixed a brass conical socket or cap, by which the card hanging on the pin turns freely round the center. The top of the box is covered with a glass, to prevent the wind from disturbing the motion of the card. The whole is inclosed in another box of wood, where it is suspended by brass hoops or gimbals, to keep the card in a horizontal position during the motions of the ship. The whole must be so placed in the ship, that the middle section of the box, parallel to its sides, may be parallel to the middle section of the ship along its keel.

The invention of the compass was an inestimable present to the mariner, by giving him a sure direction through the pathless ocean. It is usually ascribed to Flavio Gioia, or Flavio of Malphi, about the year 1302; and hence it is that the territory of Principato, the part of the kingdom of Naples where he was born, has a compass for its arms. He divided his compass only into eight points. Others ascribe the invention to the Chinese; and Gilbert, in his book *de Magnete*, affirms that Marco Paolo, a Venetian, making a journey to China, brought back the invention with him in 1260. What strengthens this conjecture is, that at first they used the compass, in the same manner as the Chinese still do, viz. letting it float on a small piece of cork, instead of suspending it on a pivot. It is added, that their emperor Chiningus, a celebrated astrologer, had a knowledge of it 1120 years before Christ. But Ludi Vertomanus affirms, that when he was in the East Indies, about the year 1500, he saw a pilot of a ship direct his course by a compass, fastened and framed as those now commonly used. And Barlow, in his book called the Navigator's Supply, anno 1597, says, that in a personal conference with two East-Indians, they affirmed, that instead of our compass, they use a magnetical needle of six inches, and longer, upon a pin, in a dish of white earth filled with water; in the bottom of which they have two cross lines for the four principal winds, the rest of the divisions being left to the skill of their pilots. Also in the same book he says that the Portuguese, in their first discovery of the East Indies, got a pilot of Mahinde, who brought them from thence in thirty-three days, within sight of Calicut. But Fauchette relates some verses of Guoyot de Provence, who lived in France about the year 1200, which seem to make mention of the compass under the name of *marinette*, or *mariner's stone*; which shew it was used in France near one hundred years before either the Malphite or Venetian one. The French even lay claim to the invention, from the fleur-de-lys with which most people distinguish the north point of the card. With as much reason Dr. Wallis ascribes it to the English, from its name *compass*, by which name most nations call it, and which, he observes, is used in many parts of England to signify a circle.

The mariner's compass was long very rude and imperfect, but at length received great improvement from the invention and experiments of Dr. Knight, who discovered the useful practice of making artificial magnets; and whose steering compass is now in use in all our ships of war. The needle in this instrument is quite straight, and square at the ends; and consequently has only two poles, though about the hole in the middle the curves are somewhat confused. Needles of this construction, after vibrating a long time, will always point exactly in the same direction; and if drawn ever so little on one side, will return to it again, without any sensible difference. We may therefore conclude, that a regular parallelopiped is the best form for a needle, as well as the simplest, the holes for the caps being as small as possible. And, as the weight should be removed to the greatest distance from the center of motion, a circle of brass, of the same diameter of the card, may be added, which will serve also to support the card, which may then be made of thin paper, without any thing to stiffen it. This ring being fixed below the card, and the needle above it, the center of gravity is placed low enough to admit of the cap being put under the needle, whereby the hole in the needle becomes unnecessary. These observations will be easily understood, from viewing the several parts of the instrument, as delineated in the annexed engraving, where fig. 1. represents the card, with the needle, and its cap fixed upon it. Fig. 2. is a perspective view of the back-side of the card, where AB represents the turning down of the brass edge, C the under part of the cap, D and E two sliding weights to balance the card, and F, G, two screws that fix the brass edge, &c. to the needle. Fig. 3. is the pedestal that supports the card, containing a screwing needle, fixed in two small grooves to receive it, by means of the collet C, in the manner of a port-crayon; D, the stem, filed into an octagon, that it may be the more easily unscrewed. For its further illustration and application to use, see NAVIGATION.

The compass is sometimes disturbed by the electricity of its glass cover; the remedy for this inconvenience is to moisten the surface of the glass with a wet finger, which removes it immediately and effectually. The mariner's compass with a chart is much less dangerously moved than the common compass with a bare needle; and the deeper, or farther distant the needle hangs below the glass, the less disturbance it is likely to receive. But, notwithstanding the various contrivances that have been made to prevent the card from being much affected by the motions of the ship, they have always been found too delicate to encounter the shocks of a tempestuous sea. This defect, however, has been lately in a great measure overcome, by a compass constructed by Mr. M'Culloch, of London. We have given a representation of it in the plate, where fig. 4. is a section of this steering compass: *aa*, the common wooden-box, with its lid; *bb*, the brass compass-box; *cc*, the glass cover to ditto; *dd*, the hollow conical bottom; *ee*, the prop upon which the compass is supported instead of gimbals; the spherical top of which is finely polished, and the apex of the hollow cone fitted in a peculiar manner to receive it; *ff*, a quantity of lead run round the bottom and cone of the compass-box, to balance and keep it steadily horizontal; *gg*, the card and the magnetical needle, bent in such a manner that the point of the conical pivot on which it moves and is supported, may be brought very near to the center of gravity, as well as to the center of motion; *hh*, two guards, which, by means of two pins, *ii*, affixed to the compass-box, prevent it from turning round and deceiving the steersman. Fig. 5. is a perspective view of this steering compass, with the lid off and the front laid open; *hh*, the guards; *b*, the compass-box; *e*, the prop, &c.

The *azimuth* compass differs from the common sea compass in this; that there is fastened, on the round box wherein the card is, a broad circle AB, fig. 6. one-half whereof is divided into ninety degrees, and those subdivided diagonally into minutes; *b* is a moveable index, having a sight, *a*, erected thereon, and moving on a hinge. From the upper part of the sight to the middle of the index, is fastened a fine hypothenusal lutestring, to give a shadow on the line in the middle of the index. The circle AB is crossed at right angles with two threads, from the extremities whereof are drawn four lines on the inside of the round box; there are also four lines drawn at right angles to each other on the card. The round box fitted with its card, graduated circle, and index, is hung in the brass hoops BB, and these hoops fastened to the square box CC. An improvement on the azimuth compass has likewise been made by Mr. M'Culloch, as represented at fig. 7. in which *b* shews the compass-box; *h*, one of the guards; *e*, the prop, as in fig. 6. with this difference, that, instead of being screwed to the bottom of the wood-box, it stands in a brass socket, and may be turned round at pleasure; 1, a brass bar, upon which the sight-vanes are fixed; 2, a dark glass, which moves up or down on

or 3, the sight vane; 4, a magnifying glass, which is also moveable on the other vane; 5, the nonius or vernier; 6, a slide for moving the vernier so as to stop the card in taking the azimuth; 7, a double convex glass, by which the divisions on the vernier may be read with accuracy. Fig. 8. is a section representing another application of the magnetic needle and card, contructed by Mr. M'Culloch: *aa*, the common wood box; *bb*, the brass compass box; *cc*, the brass support for the circle and pendulum; *d*, the pendulum; *e*, the agate; *ff*, the magnetic needle and card; *gg*, the brass circle; *hh*, the glass cover and brass ring; *i*, the lead weight.

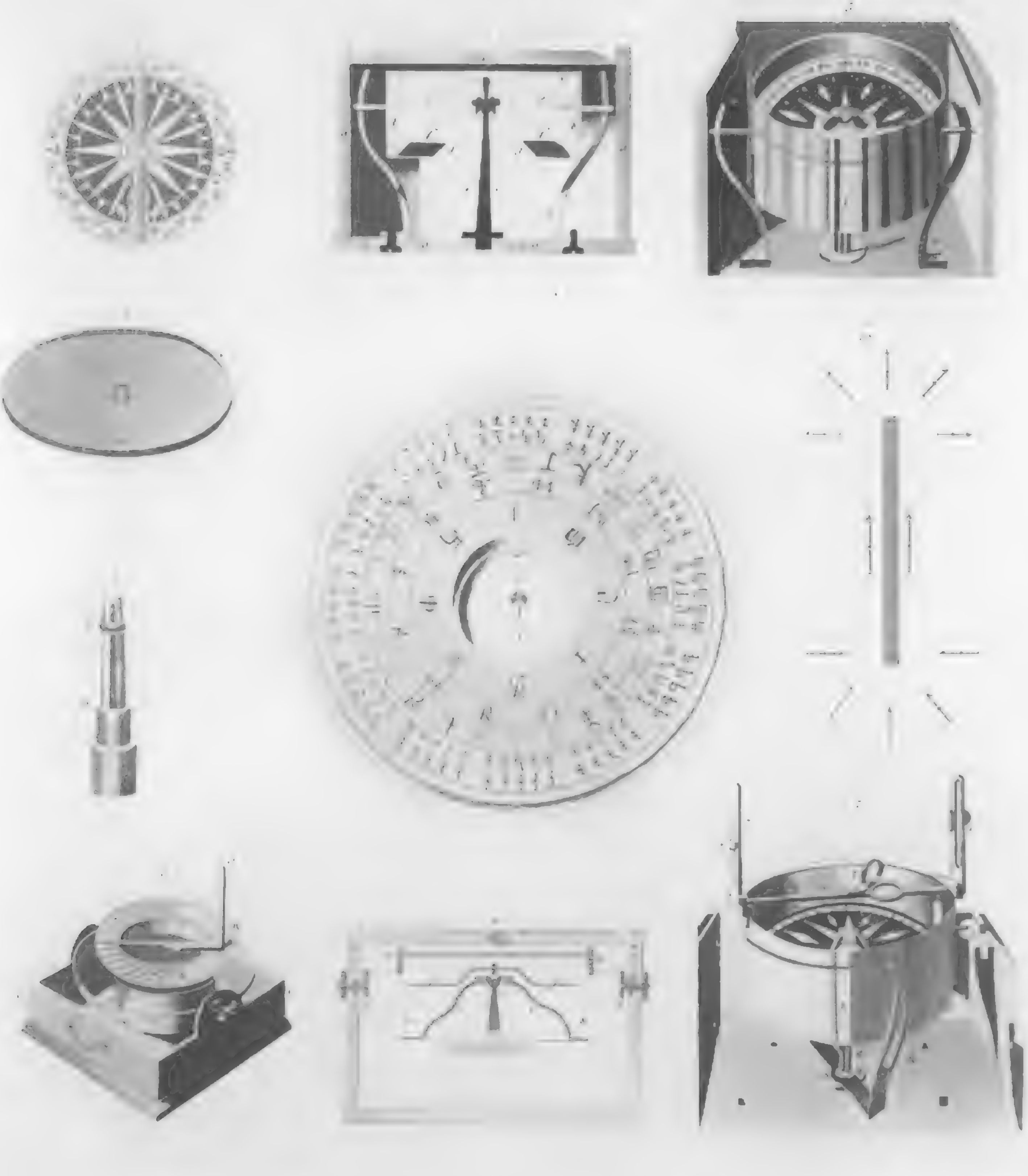
But, according to the observations of Mr. Bernard Romans, of Pensacola, neither of these compasses are to be fully relied on in a hollow or high sea. This he says is owing to the box being confined to only two motions, both vertical and at right angles with each other; by which confinement of the box, upon any succussion, more especially sudden ones, the card is always put into too much agitation, and, before it can well recover itself, another jerk prevents its pointing to the pole; nor is it an extraordinary thing to see the card unshipped by the violence of the ship's pitching. These inconveniences, he says, are to be remedied to the full, by giving the box a vertical motion at every degree and minute of the circle, and compounding these motions with a horizontal one of the box as well as of the card. By this unconfined disposition of the box, the effects of the jerks on the card are avoided, and it will always very steadily point to the pole. He informs us, in the Repertory, vol. iv. that he saw a compass of this kind, made in Holland, that underwent all the shocks and agitations of a hard gale, which lasted some days, and during which there was no other compass of the smallest service. Nicholson, however, seems to think that the compass is very little disturbed by tilting the box on one side, but very much by sudden horizontal changes of place; that a scientific provision against the latter is therefore the chief requisite to be attended to. He is likewise of opinion, that it would greatly improve the compass to make the needle flat and thin, and to suspend it, not, as is commonly done, with its flat side, but with its edge uppermost; for it being a well-known fact, that soft steel loses its magnetism sooner than hard, it is obvious, that unless both sides of a needle be equally hard (which is almost impossible if they be distant from each other), the magnetic power will, in process of time, deviate towards the harder side.

The use of the azimuth compass is to take the bearing of any celestial object, when it is in or above the horizon, that from the magnetical azimuth or amplitude, the variation of the needle may be detected and known. As there are thirty-two whole points quite around the circle, which contains 360 degrees, therefore each point of the compass contains the thirty-second part of 360, that is, $11\frac{1}{4}$ degrees, or $11^\circ 15'$; consequently the half point is $5^\circ 37' 30''$, and the quarter point $2^\circ 48' 45''$. These points of the compass are otherwise called *rhumbs*.

The Chinese Compass.

We are informed, by sir George Staunton, that the compass, among the Chinese, is in universal use. With them the magnetic needle is seldom made to exceed an inch in length, and is less than a line in thickness. It is poised with great nicety, and is remarkably sensible; by which is meant, that it appears to move at the least change of position, towards the east or west, of the box in which it is suspended; though, in fact, the nature of the magnet, and the perfection of the machine containing it, consist in the needle's privation of all motion, or its continuing to point always steadily towards the same portion of the heavens, however rapidly may be whirled the compass-box, or other objects surrounding it. This steadiness, in the Chinese compass, is accomplished by a particular contrivance, as described by Mr. Barrow, the astronomical and mathematical attendant on the earl of Macartney, in his embassy to China. "A piece of thin copper is strapped round the centre of the needle. This copper is riveted by its edges to the upper part of a small hemispherical cup, of the same metal, turned downwards. The cup, so inverted, serves as a socket to receive a steel pivot rising from a cavity made into a round piece of light cork, which thus forms the compass-box. The surfaces of the socket and pivot, intended to meet each other, are perfectly polished, to avoid, as much as possible, all friction. The cup has a proportionably broad margin, which, beside adding to its weight, tends from its horizontal position to keep the centre of gravity, in all situations of the compass, nearly in co-incidence with the centre of suspension. The cavity, in which the needle is thus suspended, is in form circular, and is little more than sufficient to receive the needle, cup, and pivot. Over this cavity is placed a thin piece of transparent talc, which prevents the needle from being affected by any motion of the external air; but permits the apparent motion of the former to be easily observed. The small and short needle of the Chinese has a material advantage over those of the usual size in Europe, with regard to the inclination or dip towards the horizon; which, in the latter, requires that one extremity of the needle should be made so much heavier than the other, as will counteract the magnetic attraction. This being different in different parts of the world, the needle can only be accurately true at the place for which it had been constructed. But in short and light needles, suspended after the Chinese manner; the weight, below the point of suspension, is more than sufficient to overcome the magnetic power of the dip or inclination, in all situations of the globe; and therefore such needles will never deviate from their horizontal position."—The circumstance of strapping or arming the needle with copper, appears to be the very improvement suggested by captain O'Brien Dudley, in the first volume of the Repertory of Arts; but he recommends soft iron for this purpose.

Upon the upper surface of the box are drawn, as represented in the engraving, fig. 9. several concentric lines or circles, according to the various sizes of the compass-box. This is seldom less than four inches in diameter. The circles are distinguished by different Chinese characters. Eight are marked on the first or innermost circle; four of which denote the cardinal points of east, west, north, and south; and four the bisecting intermediate points. The same eight characters also signify eight equal subdivisions of the natural day, or space during which the earth revolves upon its own axis in pursuing its course round the sun, every subdivision being of three hours. The characters denoting each of these are so placed as to point out nearly the position of the sun at these different portions of the day, beginning at sunrise, of which the character means also the eastern portion of the heavens. With this first circle of eight divisions agrees the first compass, as stated above, which is said to have appeared in Europe in the beginning of the fourteenth century; and which, by subsequent subdivisions, was improved into thirty-two points, as seamen became more expert and accurate in observation. In another circle of the Chinese compass are twenty-four divisions, in each of which a character is inserted, which marks at the same time, a twenty-fourth portion of the heavens, and a twenty-fourth part of the natural day. According to this division, each point, or twenty-fourth portion of the compass, comprehends an integral number of fifteen degrees out of three hundred and sixty, into which all circles of the celestial sphere have been agreed to be divided, probably since that early period when the number of days, in which the sun performed his apparent course, was supposed to be three hundred and sixty. The remaining circles round the Chinese compass contain the characters of the cycle of sixty years, by which this nation regulates its chronology, and other characters expressive of their philosophical and mythological doctrines, to which they are so attached



Different Constructions of the Compass

attached as to render this inftrument as familiar to the people afhore, as it is at fea.

The nature and the caufe of the qualities of the magnet have, at all times, been fubjects of contemplation among the Chinefe. Their theory, in this inftance, as in many others, is the reverfe of that of European philofophers. It is obvious that while the magnetic needle, fufpended by its centre, points at one extremity to the north, it neceffarily looks, at the other, to the fouth; but each retains its own polarity; and, if turned round by force, will refume, when left at liberty, its original ftation oppofite its refpective pole. Thus the power, which principally attracts the needle, may be fuppofed to refide toward either or both portions of the earth. In Europe it has been thought that the needle has its chief tendency to the north pole; but in China the fouth alone is confidered as containing the attractive power. The Chinefe name of the compafs is *ting-nan-ching*, or needle pointing to the fouth; and a diftinguifhing mark is fixed on the magnet's fouthern pole, as in the European compafs it is upon the northern one. The emperor Caung-fhee, grandfather to the late emperor Tchien-lung, who was in the habit of committing to paper his obfervations on a variety of fubjects, and who, having encouraged learned miffionaries at his court, had not been inattentive to their philofophical opinions, writes on this occafion: "I have heard Europeans fay, that the needle obeys the north. In our oldeft records it is faid, that it turns to the fouth; but as neither have explained the caufe, I fee little to be gained in adopting one opinion in preference to the other. The ancients, however, are firft in date; and the farther I proceed, the more I am convinced of their knowledge of the operations and mechanifm of nature. Moreover, as all action grows languid, and nearly is fufpended towards the north, it is lefs likely that the virtue, which gives motion to the magnetic needle, fhould proceed from that quarter."

OF THE VARIATION OF THE COMPASS.

The compafs was many years in ufe before it was known in anywife to deviate from the poles of the world. About the middle of the fixteenth century, fo confident were fome perfons that the needle invariably pointed due north, that they treated with contempt the notion of the variation, which about that time began to be fufpected. However, careful obfervations foon difcovered that in England, and its neighbourhood, the needle pointed to the eaftward of the true north line; and the quantity of this deviation being known, mariners became as well fatisfied as if the compafs had none; becaufe the true courfe could be obtained by making allowance for the true variation. This variation is different in different places, on land as well as at fea, and is continually varying in the fame place. For inftance, the variation is not the fame in London as at Paris, or at the Cape of Good Hope; and the declination at London, or at any other place, is not the fame now as it was twenty years ago. This variation is always reckoned from the north; that is, if the north end of a needle vary to the eaft of the north, the variation is faid to be eafterly; and if it vary to the weft, the variation is faid to be wefterly: hence, in fea-language, this variation is ufually called *north-eafting*, or *north-wefting*. The uncertainty of the quantity of this variation in different parts of the world, has been a great impediment to the perfecting of navigation; and philofophers have earneftly endeavoured to inveftigate its caufe, and, if poffible, to correct the errors it occafions.

The variation of the compafs is faid to have been firft difcovered by Columbus, the latter end of the fifteenth century. But the firft perfon who difcovered that it was real, and was the fame to all needles in the fame place, is generally allowed to be Sebaftian Cabot. This was about the year 1497. After the variation was difcovered by Cabot, it was thought, for a long time, to be invariably the fame at the fame places in all ages; but Mr. Gellibrand, about the year 1625, difcovered, that it had a variation of the variation, or was different at different times in the fame place. From fucceffive obfervations made afterwards, it appears, that this deviation was not a conftant quantity, but that it gradually diminifhed, and at laft, about 1657, it was found, that the needle pointed due north at London, and has ever fince been increafing to the weftward of the north. So that in any one place the variations have a kind of libratory motion, traverfing through the north to unknown limits eaftward and weftward. The prefent variation at London is about two points, or twenty-three degrees weft of the north.

Dr. Halley fuppofed, that the earth has within it a large magnetic globe, not fixed within to the external parts, having four magnetic poles, two fixed and two moveable, and by this he has endeavoured to account for the phenomena of the needle. His application of this theory to facts is in many refpects inadequate; and Mr. Euler has fhewn, that he can with two magnetic poles placed on the furface of the earth, account for all the phenomena, as well as Dr. Halley with four; but his theory has alfo various imperfections. This variation of the needle may be illuftrated by placing feveral touched needles round a magnetic bar; as delineated in the engraving at fig. 10. Now, if the earth be a great magnet, or if it have only a magnetic atmofphere, it is clear from this experiment, that magnetic needles placed on its furface would have different directions in different places, which is conformable to experience; and the apparent irregularities in the variation of the needle muft be occafioned by the fituation of the magnetic poles of the earth, or of magnetic matter near its furface. There are many inftances on record of very extenfive magnetic rocks, which affect the needle to very confiderable diftances. The ifland of Elbe in the Mediterranean is a very remarkable inftance of this. The ifland of Cannay alfo, on the weft of Scotland, has rocks which affect the needle at a great diftance. A fimilar effect is obferved near the Ferro iflands in the North Sea; the compafs has no determined direction when brought on fhore. In Hudfon's Straits, in latitude 63°, the needle has hardly any polarity. Bouguer obferved the fame thing in Peru. Nay, we believe that almoft all rocks, efpecially of whin or trappe ftone, contain iron in a proper ftate. All this refers only to the thin cruft through which the human eye has occafionally penetrated. Of what may be below we are ignorant; but when we fee appearances which tally fo remarkably with what would be the effects of great maffes of magnetical bodies, modifying the general and regularly progreffive action of a primitive magnet, whofe exiftence and motion is inconfiftent with nothing that we know of this globe, this manner of accounting for the obferved change of variation, has all the probability that we can defire. In Italy, father de la Torré obferved, that during a great eruption of Vefuvius, the variation was fixteen degrees in the morning, at noon it was fourteen degrees, and in the evening it was ten degrees, and that it continued in that ftate till the lava grew fo dark as no longer to be vifible in the night; after which it flowly increafed to thirteen and a half, where it remained. Daniel Bernoulli found the needle change its pofition forty-five minutes by an earthquake. Profeffor Muller, at Manheim, obferved that the declination of the needle in that place was greatly affected by the earthquake in Calabria. Such ftreams of lava as flowed from Hecla in the laft dreadful eruption, muft have made a transference of magnetic matter that would confiderably affect the needle. But no obfervations feem to have been made on the occafion; for we know that common iron-ftone, which has no effect on the needle, will, by mere cementation with any inflammable fubftance, become magnetic. In this way Dr. Knight fometimes made his artificial loadftones. We have faid fo much chiefly with the view of cautioning our readers againft too fanguine expectations from any pretenfions to the folution of this great problem. We may certainly

certainly gather from these observations, that even although the theory of the variation should be completed, we must expect (by what we already know of magnetism in general) that the disturbances of the needle, by local causes intervening between it and the great influence by which it is chiefly directed, may be so considerable as to affect the position of the compass needle in a very sensible manner; for we know that the metallic substances in the bowels of the earth are in a state of continual change, and this to an extent altogether unknown.

But, as the theory of Dr. Halley, in accounting for the variation of the compass, is now generally received, we shall here state his hypothesis: he supposes, as mentioned above, four magnetic poles or points of attraction; near each pole of the equator two; and that in those parts of the world which lie nearly adjacent to any one of these magnetic poles, the needle is governed by it; the nearest pole being always predominant over the more remote. The pole which he supposes nearest to us, he conjectures to lie in or near the meridian of the Land's-end of England, and not above seven degrees from the north pole; by this pole, the variations in all Europe and Tartary, and the North Sea, are chiefly governed; though still with some regard to the other northern pole, whose situation he supposes in the meridian passing about the middle of California, and about fifteen degrees from the north pole of the world, to which the needle has chiefly respect in all North America, and in the two oceans on either side of it, from the Azores westward to Japan, and farther. The two southern magnetic poles, he imagines, are rather more distant from the south pole of the world; the one about sixteen degrees from it, on a meridian twenty degrees to the westward of the Magellanic Streights, or ninety five degrees west from London; this pole commands the needle in all South America, in the Pacific Ocean, and the greatest part of the Ethiopic Ocean. The other magnetic pole seems to have the greatest power, and the largest dominion of all, as it is the most remote from the pole of the world, being little less than twenty degrees distant from it, in the meridian which passes through New Holland, and the island Celebes, about one hundred and twenty degrees east from London: this pole he thinks predominant in the south part of Africa, in Arabia, and the Red Sea, in Persia, India, and its islands, and all over the Indian sea, from the Cape of Good Hope eastward, to the middle of the Great South Sea that divides Asia from America.

Such, he observes, seems to be the present disposition of the magnetic virtue throughout the whole globe of the earth. He then shews how this hypothesis accounts for all the variations that have been observed of late. It is inferred that the direction of the needle, in the temperate and frigid zones, depends chiefly upon the counterpoise of the forces of two magnetic poles of the same nature; as also why, under the same meridian, the variation should be in one place twenty-nine degrees and a half west, and in another twenty degrees and a half east. In the torrid zone, and particularly about the equator, respect must be had to all the four poles, and their positions must be well considered, otherwise it will not be easy to determine what the variation should be, the nearest pole being always strongest; yet so, however, as to be sometimes counterbalanced by the united forces of two more remote ones. Thus, in sailing from St. Helena, by the isle of Ascension, to the equator, on the north-west course, the variation is very little easterly, and unalterable in that whole track; because the South-American pole, (which is much the nearest in the aforesaid places,) requiring a great easterly variation, is counterpoised by the contrary attraction of the North-American and the Asiatic south poles; each of which singly is, in these parts, weaker than the American south pole; and upon the north-west course the distance from this latter is very little varied; and as we recede from the Asiatic south pole, the balance is still preserved by an access towards the North-American pole. In this case no notice is taken of the European north pole, its meridian being a little removed from those of these places, and of itself requiring the same variations which are here found. After the same manner may the variations in other places about the equator be accounted for, upon Dr. Halley's hypothesis.

To observe the Variation of the Needle.—Draw a meridian line, as directed under MERIDIAN; then a style being erected in the middle of it, place a needle upon it, and draw the right line which it hangs over. Thus will the quantity of the variation appear. Or thus: as the former method of finding the variation cannot be applied at sea, others have been devised, the principal of which are as follow: suspend a thread and plummet over the compass, till the shadow pass through the center of the card; observe the rhumb, or point of the compass which the shadow touches when it is the shortest. For the shadow is then a meridian line; and consequently the variation is shewn. Or thus: observe the point of the compass upon which the sun, or some star, rises and sets; bisect the arch intercepted between the rising and setting, and the line of bisection will be the meridian line; consequently the variation is had as before. The same may also be obtained from two equal altitudes of the same star, observed either by day or night. Or thus: observe the rhumb upon which the sun or star rises and sets; and from the latitude of the place find the eastern or western amplitude; for the difference between the amplitude, and the distance of the rhumb observed, from the eastern rhumb of the card, is the variation sought. The use of the variation is to correct the courses a ship has steered by the compass, which must always be done before they are worked, or calculated. See the article NAVIGATION.

The Variation of the Variation, according to Dr. Halley's theory, is supposed to be owing to the difference of velocity in the motions of the internal and external parts of the globe. From the observations that have been cited, it seems to follow, that all the magnetical poles have a motion westward, but yet not exactly round the axis of the earth, for then the variations would continue the same in the same parallel of latitude, contrary to experience. From the disagreement of such a supposition with experiments, therefore, the learned author of the theory invented the following hypothesis: The external parts of the globe he considers as the shell, and the internal as a nucleus or inner globe; and between the two he conceives a fluid medium. That inner earth having the same common center and axis of diurnal rotation, may revolve with our earth every twenty-four hours; only the outer sphere having its turbinating motion somewhat swifter or slower than the internal ball; and a very minute difference in length of time, by many repetitions, becoming sensible; the internal parts will gradually recede from the external, and they will appear to move, either eastward or westward, by the difference of their motions. Now, supposing such an internal sphere having such a motion, the two great difficulties in the former hypothesis are easily solved; for if this exterior shell of earth be a magnet, having its pole at a distance from the poles of diurnal rotation; and if the internal nucleus be likewise a magnet, having its poles in two other places, distant also from the axis; and these latter, by a slow gradual motion, change their place in respect of the external; a reasonable account may then be given of the four magnetical poles before-mentioned, and also of the changes of the needle's variation.

Dr. Halley thinks that two of these poles are fixed, and the other two moveable; viz. that the fixed poles are the poles of the external cortex or shell of the earth; and the other the poles of the magnetical nucleus, included and moveable within the former. From these observations he infers, that the motion is westwards, and consequently that the nucleus has not precisely attained the same velocity with the exterior parts in their diurnal rotation; but so very nearly equals it, that in three hundred and sixty-

fixty-five revolutions the difference is fcarcely fenfible. That there is any difference of this kind, arifes from hence, that the impulfe by which the diurnal motion was impreffed on the earth, was given to the external parts, and from thence in time communicated to the internal; but fo as not yet perfectly to equal the velocity of the firft motion impreffed on the fuperficial parts of the globe, and ftill preferved by them. As to the precife period, obfervations are wanting to determine it, though the author thinks we may reafonably conjecture that the American pole has moved weftward forty-fix degrees in ninety years, and that its whole period is performed in about 700 years. But Whifton as well as Euler has controverted and cenfured this theory of Dr. Halley.

There is alfo a fmall variation of the variation of the magnetic needle, amounting only to a few minutes of a degree in the fame place, at different hours of the fame day, which is only difcoverable by nice obfervation, and is termed the *diurnal variation of the compafs*. Mr. George Graham made feveral obfervations of this kind in 1722 and 1723, profeffing himfelf altogether ignorant of the caufe of the phenomena he obferved. About the year 1750, Mr. Wargentin, fecretary of the Swedifh academy of fciences, took notice both of the regular diurnal variation of the needle, and alfo of its being difturbed at the time of the aurora borealis, as recorded in the Philof. Tranf. vol. 47, p. 126. In 1756, Mr. Canton commenced a feries of obfervations, amounting to near 4000, with an excellent variation-compafs, of about nine inches diameter. The number of days on which thefe obfervations were made, was 603, and the diurnal variation on 574 of them was regular, fo as that the abfolute variation of the needle weftward was increafing from about eight or nine o'clock in the morning, till about one or two in the afternoon, when the needle became ftationary for fome time; after that, the abfolute variation weftward was decreafing, and the needle came back again to its former fituation, or nearly fo, in the night, or by the next morning. The diurnal variation is irregular when the needle moves flowly eaftward in the latter part of the morning, or weftward in the latter part of the afternoon; alfo when it moves much either way after night, or fuddenly both ways in a fhort time. Thefe irregularities feldom happen more than once or twice in a month, and are always accompanied, as far as Mr. Canton obferved, with an aurora borealis. On this Mr. Canton lays down, and evinces by experiment, the following principle, viz. that the attractive power of the magnet (whether natural or artificial) will decreafe while the magnet is heating, and increafe while it is cooling. He then proceeds to account for both the regular and irregular variation. It is evident, he fays, that the magnetic parts of the earth in the north, on the eaft fide, and on the weft fide of the magnetic meridian, equally attract the north end of the needle. If then the eaftern magnetic parts be heated fafter by the fun in the morning, than the weftern parts, the needle will move weftward, and the abfolute variation will increafe: when the attracting parts of the earth on each fide of the magnetic meridian have their heat increafing equally, the needle will be ftationary, and the abfolute variation will then be greateft; but when the weftern magnetic parts are either heating fafter, or cooling flower, than the eaftern, the needle will move eaftward, or the abfolute variation will decreafe; and when the eaftern and weftern magnetic parts are cooling equally faft, the needle will again be ftationary, and the abfolute variation will then be leaft. By this theory, the diurnal variation in the fummer ought to exceed that in winter; and accordingly it is found by obfervation, that the diurnal variation in the months of June and July is almoft double of that in December and January.

The irregular diurnal variation muft arife from fome other caufe than that of heat communicated by the fun; and here Mr. Canton has recourfe to fubterranean heat, which is generated without any regularity as to time, and which will, when it happens in the north, affect the attractive power of the magnetic parts of the earth on the north end of the needle. That the air neareft the earth will be moft warmed by the heat of it, is obvious; and this has been often noticed in the morning, before day, by means of thermometers at different diftances from the ground. Mr. Canton has annexed to his paper on this fubject, a complete year's obfervations; from which it appears, that the diurnal variation increafes from January to June, and decreafes from June to December. See Philof. Tranf. vol. 51, p. 398.

With refpect to the influence of the aurora borealis on the compafs needle, Meffrs. Wilcke and Van Swinden have fhewn it to be fo evident, fo general, and fo conftant, that no one, who examined the affections of the one and the other with attention, could have any doubts on the fubject. It remained, however, for Mr. Dalton, in his Meteorological Obfervations, publifhed in 1793, to give a complete and fatisfactory account of this connexion. From various obfervations he has demonftrated, 1. When the aurora appears to rife only about 5° 10′, or 15° above the horizon, the needle is very little difturbed, and often infenfible. 2. When it rifes up to the zenith, and paffes it, there never fails to be a confiderable difturbance. 3. This difturbance confifts in a regular ofcillation of the compafs-needle, fometimes to the eaftward, then to the weftward, of the mean daily pofition, in fuch fort, that the greateft excurfions on each fide are nearly equal, and amount, at Manchefter, to about half a degree on each fide. 4. When the aurora ceafes, or foon after, the needle returns to its former ftation. From thefe facts alone, fays Mr. Dalton, independent of other obfervations, we cannot avoid inferring, that there is fomething magnetic in the higher regions of the atmofphere, that has a fhare in guiding the needle; and that the fluctuations of the needle, during the aurora, are occafioned by fome mutations that then take place in this magnetic matter in the incumbent atmofphere.

It has been obferved, that different needles, efpecially if touched with different loadftones, will differ a few minutes in their variation. Dr. Lorimer (in the Supp. to Cavallo's Magnetifm) adduces fome ingenious obfervations on this fubject. It muft be allowed, fays he, according to the obfervations of feveral ingenious gentlemen, that the collective magnetifm of this earth arifes from the magnetifm of all the ferruginous bodies contained in it, and that the magnetic poles fhould therefore be confidered as the centres of the powers of thofe magnetic fubftances. Thefe poles muft therefore change their places according as the magnetifm of fuch fubftances is affected; and if with Mr. Canton we allow, that the general caufe of the diurnal variation arifes from the fun's heat in the forenoon and afternoon of the fame day, it will naturally occur, that the fame caufe, being continued, may be fufficient to produce the general variation of the magnetic needle for any number of years. For we muft confider, that ever fince any attentive obfervations have been made on this fubject, the natural direction of the magnetic needle in Europe has been conftantly moving, from weft to eaft, and that in other parts of the world it has continued its motion with equal conftancy.

As we muft therefore admit, fays Dr. Lorimer, that the heat in the different feafons depends chiefly on the fun, and that the months of July and Auguft are commonly the hotteft, while January and February are the coldeft months of the year; and that the temperature of the other months falls into the refpective intermediate degrees; fo we muft confider the influence of heat upon magnetifm to operate in the like manner, viz. that for a fhort time it fcarcely manifefts itfelf; yet in the courfe of a century, the conftancy and regularity of it becomes fufficiently apparent. It would therefore be idle to fuppofe, that fuch an influence could be derived from an uncertain or fortuitous caufe. But if it be allowed to depend

pend upon the constancy of the sun's motion, and this appears to be a cause sufficient to explain the phenomena, we should (agreeably to Newton's first law of philosophizing) look no farther. As we therefore consider, says he, the magnetic powers of the earth to be concentrated in the magnetic poles, and that there is a diurnal variation of the magnetic needle, these poles must perform a small diurnal revolution proportional to such variation, and return again to the same point nearly. Suppose then that the sun in his diurnal revolution passes along the northern tropic, or along any parallel of latitude between it and the equator, when he comes to that meridian in which the magnetic pole is situated, he will be much nearer to it, than in any other; and in the opposite meridian he will of course be the farthest from it. As the influence of the sun's heat will therefore act most powerfully at the least, and less forcibly at the greatest distance, the magnetic pole will consequently describe a figure something of the elliptical kind; and as it is well known that the greatest heat of the day is some time after the sun has passed the meridian, the longest axis of this elliptical figure will lie north-easterly in the northern, and south-easterly in the southern hemisphere. Again, as the influence of the sun's heat will not from those quarters have so much power, the magnetic poles cannot be moved back to the very same point, from which they set out; but to one which will be a little more northerly and easterly, or more southerly and easterly, according to the hemispheres in which they are situated. The figures therefore which they describe, may more properly be termed elliptoidal spirals.

In this manner the variation of the magnetic needle in the northern hemisphere may be accounted for. But with respect to the southern hemisphere we must recollect, that though the lines of declination in the northern hemisphere have constantly moved from west to east, yet in the southern hemisphere, it is equally certain that they have moved from east to west, ever since any observations have been made on the subject. Hence then the lines of magnetic declination, or Halleyan curves, as they are now commonly called, appear to have a contrary motion in the southern hemisphere, to what they have in the northern; though both the magnetic poles of the earth move in the same direction, that is from west to east.

In the northern hemisphere there was a line of no variation, which had east variation on its eastern side, and west variation on its western side. This line evidently moved from west to east during the two last centuries; the lines of east variation moving before it, while the lines of west variation followed it with a proportional pace. These lines first passed the Azores or Western Islands, then the meridian of London, and after a certain number of years still later, they passed the meridian of Paris. But in the southern hemisphere there was another line of no variation, which had east variation on its western side, and west variation on its eastern; the lines of east variation moving before it, while those of the west variation followed it. This line of no variation first passed the Cape des Aiguilles, and then the Cape of Good Hope; the lines of 5°, 10°, 15°, and 20°, west variation following it, the same as was the case in the northern hemisphere, but in the contrary direction.

We may farther mention the idea of Dr. Gowin Knight, which was, that this earth had originally received its magnetism, or rather that its magnetical powers had been brought into action, by a shock, which entered near the southern tropic, and passed out at the northern one. His meaning appears to have been, that this was the course of the magnetic fluid, and that the magnetic poles were at first diametrically opposite to each other. Though, according to Mr. Canton's doctrine, they would not have long continued so; for from the intense heat of the sun in the torrid zone, according to the principles already explained, the north pole must have soon retired to the north-eastward, and the south pole to the south-eastward. It is also curious to observe, that on account of the southern hemisphere being colder upon the whole than the northern hemisphere, the magnetic poles would have moved with unequal pace: that is, the north magnetic pole would have moved farther in any given time to the north-east, than the south magnetic pole could have moved to the south-east. And, according to the opinions of the most ingenious authors on this interesting subject, it is generally allowed, that at this time the north magnetic pole is considerably nearer to the north pole of the earth than the south magnetic pole is to the south pole of the earth. It may farther be added, that several ingenious sea-officers are of opinion, that in the western parts of the English channel the variation of the magnetic needle has already begun to decrease; having in no part of it ever amounted to twenty-five degrees. There are however other persons who assert that the variation is still increasing in the Channel, and as far westward as the fifteenth degree of longitude and fifty-one degrees of latitude, at which place they say that it amounts to about thirty degrees.

The *dip* is a variation which differs from all the preceding. If a compass-needle, which is accurately balanced and suspended, so as to turn freely in a vertical plane, be rendered magnetical, the north pole will be depressed, and the south pole elevated above the horizon: this property is called *the inclination* or *dip of the needle*. As it is very difficult to balance a needle accurately, the poles are generally reversed by a magnet, so that its two ends may dip alternately, and the mean of the two is taken. This property was discovered by Robert Norman, about the year 1576. The dip is said to be subject to a variation. At this time in London it is about seventy-two degrees; from some late observations it appears to diminish about fifteen minutes in four years. The nature of this phenomenon is pleasingly illustrated by carrying a small dipping needle from one end of a magnetic bar to the other; when it stands over the south pole, the north end of the needle will be directed perpendicularly to it; as the needle is moved, the dip will grow less, and when it comes to the magnetic centre it will be parallel to the bar; afterwards the south end will dip, and the needle will stand perpendicular to the bar, when it is directly over the north pole.

Of the Compass Variation Chart.

Dr. Halley having collected a multitude of observations made on the variation of the needle in many parts of the world, was hence enabled to draw, on a Mercator's chart, certain lines, shewing the variation of the compass in all those places over which they passed, in the year 1700, when he published the first chart of this kind, called the *variation chart*. From the construction of this chart it appears, that the longitude of any of those places may be found by it, when the latitude and the variation in that place are known. Thus, having found the variation of the compass, draw a parallel of latitude on the chart through the latitude found by observation; and the point where it cuts the curved line, whose variation is the same with that observed, will be the ship's place. A similar project of thus finding the longitude, from the known latitude and inclination or dip of the needle, was before proposed by Henry Bond, in his treatise intitled The Longitude Found, printed in 1676.

This method, however, is attended with two considerable inconveniences: first, That wherever the variation lines run east and west, or nearly so, this way of finding the longitude becomes imperfect, as their interfection with the parallel of latitude must be very indefinite; and among all the trading parts of the world, this imperfection is at present found chiefly on the western coasts of Europe, between the latitudes of forty-five degrees and fifty-three degrees; and on the eastern shores of North America, with some parts of the Western Ocean and Hudson's Bay, lying between the said shores; but for the other

other parts of the world, a variation chart may be attended with considerable benefit. However, the variation curves, when they run east and west, may sometimes be applied to good purpose in correcting the latitude, when meridian observations cannot be had, as it often happens on the northern coasts of America, in the Western Ocean, and about Newfoundland; for if the variation can be obtained exactly, then the east and west curve, answering to the variation in the chart, will shew the latitude. Secondly, As the deviation of the magnetical meridian, from the true one, is subject to continual alteration, therefore a chart to which the variation lines are fitted for any year, must in time become useless, unless new lines, shewing the state of the variation at that time, be drawn on the chart; but as the change in the variation is very slow, new variation charts published every seven or eight years will answer the purpose tolerably well. And thus it has happened that Halley's variation chart has become useless, for want of encouragement to renew it from time to time. However, in 1744, Mr. William Mountaine, and Mr. James Dodson, published a new variation chart, adapted for that year, which was well received; and several instances of its great utility having been communicated to them, they fitted the variation lines anew for the year 1756, and in the following year published the third variation chart, and also presented to the royal society a curious paper concerning the variation of the compass, with a set of tables annexed, containing the result of upwards of fifty thousand observations, in six periodical reviews, from the year 1700 to 1756 inclusive, and adapted to every five degrees of latitude and longitude in the more frequented oceans; which paper and tables were printed in the Transactions for 1757.

From these tables of observations, such extraordinary and whimsical irregularities occur in the variation of the compass, that we cannot think it wholly under the direction of one general and uniform law; but rather conclude, with Dr. Gowen, in the eighty-seventh proposition of his Treatise upon Attraction and Repulsion, that it is influenced by various and different magnetic attractions, perhaps occasioned by the heterogenous compositions in our great magnet, the earth. This doctrine of the variation will also apply to the COMPASS DIAL, which is a small dial fitted for the pocket, to shew the hour of the day, by the direction of the needle that indicates how to place them right, by turning the dial about till the cock or style stand directly over the needle. But these can never be very exact, because of the variation of the needle itself; unless that variation be allowed for, in making and placing the instrument.

OF THE COMMON COMPASSES.

The common compasses consist of two sharp-pointed branches or legs of iron, steel, brass, or other metal, joined together at the top by a rivet, about which they move as on a centre. Those compasses are of the best sort in which the pin or axle, on which the joint turns, is made of steel, and also half the joint itself, as the opposite metals wear more equally; the points should also be made of hard steel, well polished; and the joint should open and shut with a smooth, easy, and uniform, motion. In some compasses, the points are both fixed; but in others, one is made to take out occasionally, and a drawing-pen, or pencil, put in its place. There are in use compasses of various kinds and contrivances, adapted to the various purposes they are intended for; as,

Compasses of three Legs, or *Triangular Compasses*; the construction of which is like that of the common compasses, with the addition of a third leg or point, which has a motion every way. Their use is to take three points at once, and so to form triangles, and lay down three positions of a map to be copied at once.

Beam Compasses consist of a long straight beam or bar, carrying two brass cursors; one of these being fixed at one end, the other sliding along the beam, with a screw to fasten it on occasionally. To the cursors may be screwed points of any kind, whether steel, pencils, or the like. To the fixed cursor is sometimes applied an adjusting or micrometer screw, by which an extent is obtained to very great nicety. The beam compasses are used to draw large circles, to take great extents, &c.

Bow Compasses, or *Bows*, are a small sort of compasses, that shut up in a hoop, which serves for a handle. Their use is to describe arcs or circumferences with a very small radius.

Caliber Compasses. See CALLIPERS, vol. iii. p. 628.

Clockmakers Compasses are jointed like the common compasses, with a quadrant or bow like the spring compasses; only of different use, serving here to keep the instrument firm at any opening. They are made very strong, with the points of their legs of well-tempered steel, as being used to draw or cut lines in pasteboard, copper, &c.

Cylindrical and *Spherical Compasses*, consist of four branches joined in a centre, two of them being circular and two flat, a little bent at the ends. The use of them is to take the diameter, thickness, or caliber, of round or cylindrical bodies; as cannons, balls, pipes, &c. There are also spherical compasses, differing in nothing from the common ones, but that their legs are arched; serving to take the diameters of round bodies. There is also another sort of compasses lately invented, for measuring the diameter of round bodies, as balls, &c. which consist of two flat pieces of metal set at right angles on a straight bar or beam of the same; the one piece being fixed, and the other sliding along it, so far as just to receive the round body between them; and then its diameter, or distance between the two pieces, is shewn by the divisions marked on the beam.

Elliptical Compasses, are used to draw ellipses or ovals of any kind. The instrument consists of a beam about a foot long, bearing three cursors; to one of which may be screwed points of any kind; and to the bottom of the other two are rivetted two sliding dove-tails, adjusted in grooves made in the cross branches of the beam. The dove-tails having a motion every way, by turning about the long branch, they go backward and forward along the cross; so that when the beam has gone half way round, one of these will have moved the whole length of one of the branches; and when the beam has gone quite round, the same dove-tail has gone back the whole length of the branch. The distance between the two sliding dove-tails, is the distance between the two foci of the ellipse; so that by changing that distance, the ellipse will be rounder or flatter. Under the ends of the branches of the cross, are placed four steel points to keep it fast. The use of this compass is easy: by turning round the long branch, the pen, pencil, or other points, will draw the ellipse required.

German Compasses, have their legs a little bent outwards, near the top; so that when shut, the points only meet.

Hair Compasses, are so contrived within side by a small adjusting screw to one of the legs, as to take an extent to a hair's breadth, or great exactness.

Proportional Compasses, are those whose joint lies, not at the end of the legs, but between the points terminating each leg. These are either simple, or compound. In the former sort the centre, or place of the joint is fixed; so that one pair of these serves only for one proportion.

Compound Proportional Compasses, have the joint or centre moveable. They consist of two parts or sides of brass, which lie upon each other so nicely as to seem but one when they are shut. These sides easily open, and move about the centre, which is itself moveable in a hollow canal cut through the greatest part of their length. To this centre on each side is fixed a sliding piece, of a small length, with a fine line drawn on it serving as an index, to be set against other lines or divisions placed upon the compasses on both sides. These lines are, 1, a line of lines;

lines; 2, a line of superficies, areas, or planes, the numbers on which answer to the squares of those on the line of lines; 3, a line of solids, the numbers on which answer to the cubes of those on the line of lines; 4, a line of circles, or rather of polygons to be inscribed in circles. These lines are all unequally divided, the first three from one to twenty, and the last from six to twenty. The use of the first is to divide a line into any number of equal parts; by the second and third are found the sides of like planes or solids in any given proportion; and, by the fourth, circles are divided into any number of equal parts, or any polygons inscribed in them.

Spring Compasses, or Dividers, are made of hardened steel, with an arched head, which by its spring opens the legs; the opening being directed by a circular screw fastened to one of the legs, let through the other, and worked with a nut.

Trisecting Compasses, for the trisecting of angles geometrically, for which purpose they were invented by M. Tarragon. The instrument consists of two central rules, and an arch of a circle of 120 degrees, immoveable, with its radius; the radius is fastened with one of the central rules, like the two legs of a sector, that the central rule may be carried through all the points of the circumference of the arch. The radius and rule should be as thin as possible; and the rule fastened to the radius should be hammered cold, to be more elastic; and the breadth of the other central rule must be triple the breadth of the radius: in this rule also is a groove, with a dove-tail fastened on it, for its motion; there must also be a hole in the center of each rule.

Turn-up Compasses, a late contrivance to save the trouble of changing the points: the body is like the common compasses; and, towards the bottom of the legs without side, are added two other points, besides the usual ones; the one carrying a drawing-pen point, and the other a port-crayon; both being adjusted to turn up, to be used or not, as occasion may require.

COM'PASS SAW, *s.* The *compass-saw* should not have its teeth set, as other saws have; but the edge of it should be made so broad, and the back so thin, that it may easily follow the broad edge. Its office is to cut a round; and therefore the edge must be made broad, and the back thin, that the back may have a wide kerf to turn in. *Moxton.*

COMPAS'SION, *s.* [*compassion*, Fr. from *con* and *patior*, Lat.] Pity; commiseration; sorrow for the sufferings of others; painful sympathy.—Ye had *compassion* of me in my bonds. *Hebrews*, x. 34.—The feelings of compassion have been defined by Hobbes as a mere selfish passion, resulting from a mixture of fear and care for our own advantages in life. Hutcheson resolves it into native instinct. But Dr. Butler more properly considers *compassion* as an original, distinct, and godlike, faculty or affection of human nature: a striking example of which is as follows: When Alexander drew near the city of Persepolis, he perceived a large body of men, who exhibited a memorable example of the greatest misery. These were about four thousand Greeks, very far advanced in years; who, having been made prisoners of war, had suffered all the torments which the Persian tyranny could inflict. The hands of some had been cut off, the feet of others, and others again had lost their noses and ears; after which, the Persians having impressed by fire, barbarous characters on their faces, had the inhumanity to keep them as so many laughing-stocks, with which they sported perpetually. They appeared like so many shadows rather than men; speech being almost the only thing by which they were known to be such. Alexander could not refrain from tears at this sight; and, as they unanimously besought him to commiserate their condition, he bid them, with the utmost tenderness, not to despond; and assured them that they should again see their wives and native country. This proposal, which one might suppose should naturally have filled them with joy, seemed to heighten their misery; and, with tears in their eyes, "How will it be possible (said some of them) for us to appear publicly before all Greece, in the dreadful condition to which we are reduced; a condition still more shameful than dissatisfactory? The best way to bear misery is to conceal it; and no country is so sweet to the wretched as solitude, and an oblivion of their past misfortunes." They therefore besought the king to permit them to continue in a country where they had spent so many years, and to end their days among those who were already accustomed to their misfortunes. Alexander granted their request; and presented each of them three thousand drachmas, five men's suits of clothes, the same number of women's, two couple of oxen to plough their lands, and corn to sow them: he commanded the governor of the province not to suffer them to be molested in any manner; and ordered that they should be free from taxes and tributes of every kind. Such behaviour as this was truly royal. Thrice happy those princes who are affected with the pleasure which arises from the doing of good actions, and who melt with compassion for the unfortunate! *Q. Curtius.*

To COMPAS'SION, *v. a.* To pity; to compassionate; to commiserate. *A word scarcely used.*

O heavens! can you hear a good man groan,
And not relent, or not *compassion* him? *Shakespeare.*

COMPAS'SIONATE, *adj.* Inclined to compassion; inclined to pity; merciful; tender; melting; soft; easily affected with sorrow by the misery of others.—There never was any heart truly great and generous, that was not also tender and *compassionate*. *South.*

To COMPAS'SIONATE, *v. a.* To pity; to commiserate.—Experience layeth princes torn estates before their eyes, and withal persuades them to *compassionate* themselves. *Raleigh.*

Compassionates my pains, and pities me!
What is compassion, when 'tis void of love? *Addison.*

COMPAS'SIONATELY, *adv.* Mercifully; tenderly.—The fines were assigned to the re-building St. Paul's, and thought therefore to be the more severely imposed, and the less *compassionately* reduced and excused. *Clarendon.*

COM'PAST, *part. adj.* Of a round form.—Sore he sows'd him on the *compast* crest. *Spenser.*—She came to him the other day into the *compast* window. *Shakespeare.*

COMPATE'RNITY, *s.* [*con* and *paternitas*, Lat.] Gossipred, or *compaternity*, by the canon law, is a spiritual affinity; and a juror that was gossip to either of the parties might, in former times, have been challenged as not indifferent by our law. *Davies.*

COMPATIBI'LITY, *s.* Consistency; the power of coexisting with something else; agreement with any thing.

COMPA'TIBLE, *adj.* [corrupted, by an unskilful compliance with pronunciation, from *competible*, from *competo*, Lat. *to suit, to agree.* *Competible* is found in good writers, and ought always to be used.] Suitable to; fit for; consistent with; not incongruous to.—The object of the will is such a good as is *compatible* to an intellectual nature. *Hale.*—Consistent; agreeable.—Our poets have joined together such qualities as are by nature the most *compatible*; valour with anger, meekness with piety, and prudence with dissimulation. *Broome.*

COMPA'TIBLENESS, *s.* Consistency; agreement with any thing.

COMPA'TIBLY, *adv.* Fitly; suitably.

COMPA'TIENT, *adj.* [from *con* and *patior*, Lat.] Suffering together.

COMPA'TRIOT, *s.* [from *con* and *patria* Lat.] One of the same country.—The governor knew he was so circumspect as not to adhere to any of the factions of the time, in a neutrality indifferently and friendly entertaining all his *compatriots*. *Drummond.*

COMPE'ER, *s.* [*compar*, Lat.] Equal; companion; colleague; associate:

Sesostris
That monarchs harness'd, to his chariot yok'd
Base servitude, and his dethron'd *compeers*
Lash'd furiously. *Philips.*

To COMPE'ER, *v. a.* To be equal with; to mate:

In his own grace he doth exalt himself
More than in your advancement.
—— In my right,
By me invested, he *compeers* the best. *Shakespeare.*

To COMPEL, *v. a.* [*compello*, Lat.] To force to some act; to oblige; to constrain; to necessitate; to urge irresistibly.—He refused, and said, I will not eat: but his servants, together with the woman, *compelled* him. *1 Samuel*, xxvii. 23.

But first the lawless tyrant, who denies
To know their God, or message to regard,
Must be *compell'd* by signs and judgments dire. *Milton.*

To take by force or violence; to ravish from; to seize. This signification is uncommon and harsh:

The subjects grief
Comes through commissions, which *compel* from each
The sixth part of his substance, to be levied
Without delay. *Shakespeare.*

To gather together, and unite in a company. A Latinism, *compellere gregem*:

He to the town return'd,
Attended by the chiefs who fought the field,
Now friendly mix'd, and in one troop *compell'd*. *Dryden.*

To seize; to overpower:

Our men secure nor guards nor centries held,
But easy sleep their weary limbs *compell'd*. *Dryden.*

To call forth, a Latinism.—Whom to revenge she had this knight from far *compell'd*. *Spenser.*

COMPEL'LABLE, *adj.* That may be forced. Perhaps it should be *compellible*.

COMPELLA'TION, *s.* [from *compello*, Lat.] The stile of address; the word of salutation.—The stile best fitted for all persons, on all occasions, to use, is the *compellation* of Father, which our Saviour first taught. *Duppa.*

COMPEL'LER, *s.* He that forces another.

COM'PEND, *s.* [*compendium*, Lat.] Abridgment; summary; epitome; contraction; breviate.—Fix in memory the discourses, and abstract them into brief *compends*. *Watts.*

COMPENDIA'RIOUS, *adj.* [*compendiarius*, Lat.] Short; contracted; summary; abridged.

COMPENDIO'SITY, *s.* Shortness; contracted brevity.

COMPEN'DIOUS, *adj.* Short; summary; abridged; comprehensive; holding much in a narrow space; direct; near; by which time is saved, and circuition cut off.—They learned more *compendious* and expeditious ways, whereby they shortened their labours, and gained time. *Woodward.*

COMPEN'DIOUSLY, *adv.* Shortly; in a short method; summarily; in epitome.—By the apostles we have the substance of Christian belief *compendiously* drawn into few and short articles. *Hooker.*

COMPEN'DIOUSNESS, *s.* Shortness; brevity; comprehension in a narrow compass.—The inviting easiness and *compendiousness* of this assertion, should dazzle the eyes. *Bentley.*

COMPEN'DIUM, *s.* [Lat.] Abridgment; summary; breviate; abbreviature; that which holds much in a narrow room; the near way.—After we are grown well acquainted with a short system or *compendium* of a science, which is written in the plainest and most simple manner, it is then proper to read a larger regular treatise on that subject. *Watts.*

COMPEN'SABLE, *adj.* That which may be recompensed.

To COMPEN'SATE, *v. a.* [*compenso*, Lat.] To recompense; to be equivalent to; to counterbalance; to countervail; to make amends for.—The length of the night, and the dews thereof, do *compensate* the heat of the day. *Bacon.*—The pleasures of life do not *compensate* the miseries. *Prior.*

Nature to these, without profusion kind,
The proper organs, proper pow'rs assign'd;
Each seeming want *compensated* of course,
Here with degrees of swiftness, there of force. *Pope.*

COMPENSA'TION, *s.* Recompence; something equivalent; amends.—Poynings, the better to make *compensation* of his service in the wars, called a parliament. *Bacon.*

All other debts may *compensation* find;
But love is strict, and will be paid in kind. *Dryden.*

COMPEN'SATIVE, *adj.* That which compensates; that which countervails.

To COMPEN'SE, *v. a.* [*compenso*, Lat.] To compensate; to countervail; to be equivalent to; to counterbalance; to recompence.—The joys of the two marriages were *compensed* with the mournings and funerals of prince Arthur. *Bacon.*

To COMPEREN'DINATE, *v. a.* [*comperendino*, Lat.] To delay.

COMPERENDINA'TION, *s.* Delay; dilatoriness.

COMPERTO'RIUM, *s.* A judicial inquest in the civil law, made by delegates or commissioners to find out and relate the truth of a cause. *Pardeb. Antiq.* 575.

COM'PETENCE, or COMPETENCY, *s.* Such a quantity of any thing as is sufficient, without superfluity.—Something of speech is to be indulged to common civility, more to intimacies, and a *competency* to those recreative discourses which maintain the cheerfulness of society. *Government of the Tongue.*—Such a fortune as, without exuberance, is equal to the necessities of life.—It is no mean happiness to be seated in the mean: superfluity comes sooner by white hairs, but *competency* lives longer. *Shakes.*

Reason's whole pleasure, all the joys of sense,
Lie in three words, health, peace, and *competence*. *Pope.*

[In law.] The power or capacity of a judge or court, for taking cognizance of an affair.

COM'PETENT, *adj.* [*competens*, Lat.] Suitable; fit; adequate; proportionate.—If there be any power in imagination, the distance must be *competent*, the medium not adverse, and the body apt and proportionate. *Bacon.*—Adapted to any purpose without defect or superfluity.—The greatest captain of the English brought rather a guard, than a *competent* army, to recover Ireland. *Davies.*—Reasonable; moderate.—The clergy have gained some insight into men and things, and a *competent* knowledge of the world. *Atterbury.*—Qualified; fit; a *competent* judge, is one who has a right of jurisdiction in the case.—Let us first consider how *competent* we are for the office. *Government of the Tongue.*—Consistent with; incident to.—That is the privilege of the Infinite Author of things, who never slumbers nor sleeps, but is not *competent* to any finite being. *Locke.*—Qualified by law.—All witnesses that have the use of their reason (except such as are infamous or interested) are *competent*. *Blackstone.*

COMPETEN'TES, *s.* An order of catechumens, in the primitive Christian church, being the immediate candidates for baptism. See CATECHUMEN.

COM'PETENTLY, *adv.* Adequate; properly.—I think it hath been *competently* proved. *Bentley.*—Reasonably, moderately; without superfluity or want.—Some places require men *competently* endowed; but none think the appointment to be a duty of justice bound to respect desert. *Wotton.*

COMPE'TIBLE, *adj.* [from *competo*, Lat. For this word a corrupt orthography has introduced *compatible*.] Suitable to; consistent with.—It is not *competible* with the grace of God so much as to incline any man to do evil. *Hammond.*—The duration of eternity *a parte ante* is such as is only *competible* to the eternal God, and not communicable to any created being. *Hale.*

COMPE'TI-

COMPE'TIBLENESS, *s.* Suitablenefs; fitnefs.

COMPETI'TION, *s.* [from *con* and *petitio*, Lat.] The act of endeavouring to gain what another endeavours to gain at the fame time; rivalry; conteft.—Though what produces any degree of pleafure be in itfelf good, and what is apt to produce any degree of pain be evil, yet often we do not call it fo, when it comes in *competition*: the degrees alfo of pleafure and pain have a preference. *Locke.*—Double claim; claim of more than one to one thing: anciently with *to.*—*Competition to* the crown there is none, nor can be. *Bacon.*—Now with *for.*—The prize of beauty was difputed till you were feen; but now all pretenders have withdrawn their claims: there is no *competition* but *for* the fecond place. *Dryden.*

COMPE'TITOR, *s.* [*con* and *petitor*, Lat.] One that has a claim oppofite to another's; a rival: with *for* before the thing claimed.—Cicerius and Scipio were *competitors for* the office of prætor. *Tatler.*—He who trufts in God has the advantage in prefent felicity; and, when we take futurity into the account, ftands alone, and is acknowledged to have no *competitor*. *Rogers.*

How furious and impatient they be,
And cannot brook *competitors* in love. *Shakespeare.*

It had formerly *of* before the thing claimed.—Selymes, king of Algiers, was in arms againft his brother Mechemetes, *competitor of* the kingdom. *Knolles.*—In Shakefpeare it feems to fignify only an opponent:

The Guildfords are in arms,
And every hour more *competitors*
Flock to the rebels. *Richard* III.

COMPEY'RE, a town of France, in the department of the Aveiron, and chief place of a canton, in the diftrict of Milhaud, on the Tarn: one league north of Milhaud.

COMPIA'NO, a town of Italy, in the duchy of Parma, on the Taro: twelve miles from Pontremoli.

COMPIE'GNE, a town of France, and principal place of a diftrict, in the department of the Oife, with a foreft of wood, containing 27,000 acres, of which 100 are cut every year; the principal commerce confifts in corn, wine, and wood: the wine is much efteemed: twenty-eight miles eaft of Beauvais. Lat. 49. 23. N. lon. 20. 30. E. Ferro.

COMPILA'TION, *s.* [from *compilo*, Lat.] A collection from various authors. An affemblage; a coacervation.—There is in it a fmall vein filled with fpar, probably fince the time of the *compilation* of the mafs. *Woodward.*

To COMPI'LE, *v. a.* [*compilo*, Lat.] To draw up from various authors; to collect into one body. To write; to compofe.—In poetry they *compile* the praifes of virtuous men and actions, and fatires againft vice. *Temple.*—To contain; to comprife. *Not used.*

After fo long a race as I have run
Through fairy land, which thofe fix books *compile*,
Give leave to reft me. *Spenser.*

To make up; to compofe. *Not used.*

Lion-like, unlandifh and more wild,
Slave to his pride, and all his nerves being naturally *compil'd*
Of eminent ftrength, ftalks out and preys upon a filly fheep. *Chapman.*

To put together:

He did intend
A brafen wall in compafs to *compile*
About Cairmardin. *Spenser.*

To bring together:

The prince had perfectly *compylde*
Thefe paires of friends in peace and fettled reft. *Spenser.*

COMPI'LEMENT, *s.* Coacervation; the act of piling together; the act of heaping up.—I was encouraged to affay how I could build a man; for there is a moral as well as a natural or artificial *compilement*, and of better materials. *Wotton.*

COMPI'LER, *s.* A collector; one who frames a compofition from various authors.—Some draw experiments into titles and tables: thofe we call *compilers*. *Bacon.*

COMPITA'LIA, feftivals celebrated by the Romans the 12th of January and the 6th of March, in the crofs ways, in honour of the houfehold gods called Lares. Tarquin the Proud firft inftituted them, on account of an oracle which ordered him to offer heads to the Lares. He facrificed to them human victims; but J. Brutus, after the expulfion of the Tarquins, thought it fufficient to offer them only poppy heads, and men of ftraw. The flaves were generally the minifters, and, during their celebration, they enjoyed their freedom. *Varro.*

COMPLA'CENCE, or COMPLACENCY, *s.* [*complacentia*, low Lat.] Pleafure; fatisfaction; gratification.—Difeafes extremely leffen the *complacence* we have in all the good things of this life. *Atterbury.*—Others proclaim the infirmities of a great man with fatisfaction and *complacency*, if they difcover none of the like in themfelves. *Addison.*

I by converfing cannot thefe erect
From prone, nor in their ways *complacence* find. *Milton.*

The caufe of pleafure; joy:

O thou, in heav'n and earth the only peace
Found out for mankind under wrath! O thou,
My fole *complacence!* *Milton.*

Civility; complaifance; foftnefs of manners.—His great humanity appeared in the benevolence of his afpect, the *complacency* of his behaviour, and the tone of his voice. *Addison.*

Complacency and truth, and manly fweetnefs,
Dwell ever on his tongue, and fmooth his thoughts. *Addis.*

With mean *complacence* ne'er betray your truft,
Nor be fo civil as to prove unjuft. *Pope.*

COMPLA'CENT, *adj.* [*complacens*, Lat.] Civil; affable; foft; complaifant.

To COMPLA'IN, *v. n.* [*complaindre*, Fr.] To mention with forrow or refentment; to murmur; to lament. With *of* before the caufe of forrow: fometimes with *on.*—I will fpeak in the anguifh of my fpirit; I will *complain* in the bitternefs of my foul. *Job*, vii. 11.—Do not all men *complain*, even thefe as well as others, *of* the great ignorance of mankind? *Burnet.*

Shall I, like thee, on Friday night *complain?*
For on that day was Cœur de Leon flain. *Dryden.*

Sometimes with *for* before the caufal noun.—Wherefore doth a living man *complain*, a man *for* the punifhment of his fins? *Lam.* iii. 39.—To inform againft.—Now, mafter Shallow, you'll *complain of* me to the council. *Shakesp.*

To COMPLA'IN, *v. a.* [This fenfe is rare, and perhaps not very proper.] To lament; to bewail:

Pale death our valiant leader hath opprefs'd,
Come wreak his lofs whom bootlefs ye *complain*. *Fairfax.*

Gaufride, who could fo well in rhime *complain*
The death of Richard, with an arrow flain. *Dryden.*

COMPLAIN'ANT, *s.* One who urges a fuit, or commences a profecution, againft another.—Congreve and this author are the moft eager *complainants* of the difpute. *Collier.*

COMPLAIN'ER, *s.* One who complains; a murmurer; a lamenter.—Philips is a *complainer*; and on this occafion I told lord Carteret, that *complainers* never fucceed at court, though railers do. *Swift.*

COMPLA'INT, *s.* [*complainte*, Fr.] Reprefentation of pains or injuries; lamentation.—I cannot find any caufe of *complaint*, that good laws have fo much been wanting unto us, as we to them. *Hooker.*

Adam faw
Already in part, though hid in gloomieft fhade,
To forrow abandon'd, but worft felt within,
And in a troubled fea of paffion tofs'd,
Thus to difburthen fought with fad *complaint*. *Milton.*

The

The cause or subject of complaint; grief.—The poverty of the clergy in England hath been the *complaint* of all who wish well to the church. *Swift.*—A malady; a disease.—One, in a *complaint* of his bowels, was let blood till he had scarce any left, and was perfectly cured. *Arbuthnot.*—Remonstrance against; information against.—Against the goddess these *complaints* he made. *Dryden.*

In evil straight this day I stand
Before my judge, either to undergo
Myself the total crime, or to accuse
My other self, the partner of my life;
Whose failing, while her faith to me remains,
I should conceal, and not expose to blame
By my *complaint*, but strict necessity
Subdues me, and calamitous constraint. *Milton.*

COMPLAISAN'CE, *s.* [*complaisance*, Fr.] Civility; desire of pleasing; act of adulation.—You must also be industrious to discover the opinion of your enemies; for you may be assured, that they will give you no quarter, and allow nothing to *complaisance*. *Dryden.*

Fair Venus wept the sad disaster
Of having lost her fav'rite dove:
In *complaisance* poor Cupid mourn'd;
His grief reliev'd his mother's pain. *Prior.*

COMPLAISA'NT, *adj.* [*complaisant*, Fr.] Civil; desirous to please:

There are to whom my satire seems too bold;
Scarce to wise Peter *complaisant* enough,
And something said of Chartres much too rough. *Pope.*

COMPLAISANT'LY, *adv.* Civilly; with desire to please; ceremoniously:

In plenty starving, tantaliz'd in state,
And *complaisantly* help'd to all I hate;
Treated, caress'd, and tir'd, I take my leave. *Pope.*

COMPLAISANT'NESS, *s.* Civility; compliance.

To COMPLA'NATE, or *to* COMPLANE, *v. a.* [from *planus*, Lat.] To level; to reduce to a flat and even surface.—The vertebræ of the neck and back-bone are made short and *complanated*, and firmly braced with muscles. *Derham.*

COMPLE'AT. See COMPLETE.

COM'PLEMENT, *s.* [*complementum*, Lat.] Perfection; fulness; completion; completement.—For a *complement* of these blessings, they were enjoyed by the protection of a king of the most harmless disposition, the most exemplary piety, the greatest sobriety, chastity, and mercy. *Clarendon.*—The sensible nature, in its *complement* and integrity, hath five exterior powers or faculties. *Hale.*—Complete set; complete provision; the full quantity or number:

The god of love himself inhabits there,
With all his rage, and dread, and grief, and care;
His *complement* of stores, and total war. *Prior.*

Adscititious circumstances; appendages; parts not necessary, but ornamental: whence ceremony was called *complement*, now corrupted to *compliment*.—These, which have lastly sprung up, for *complements*, rites, and ceremonies, of church actions, are, in truth, for the greatest part, such silly things, that very easiness doth make them hard to be disputed of in serious manner. *Hooker.*

A doleful case desires a doleful song,
Without vain art or curious *complements*. *Spenser.*

Garnish'd and deck'd in modest *complement*,
Not working with the ear, but with the eye. *Shakespeare.*

COMPLEMENT *of an arch or angle*, as of 90° or a quadrant, is what any given arch or angle wants of it; so the complement of 50° is 40°, and the complement of 100 degrees is —10°, a negative quantity. The complement to 180° is usually called the supplement, to distinguish it from the complement to 90°, properly so called. The sine of the complement of an arc, is contracted into the word cosine; the tangent of the complement into cotangent, &c.

Arithmetical COMPLEMENT, is what a number or logarithm wants of unity or 1 with some number of ciphers. It is best found, by beginning at the left-hand side, and subtracting every figure from 9, except the last, or right-hand figure, which must be subtracted from 10. So, the arithmetical complement of the logarithm 9·5329714, by subtracting from 9's, &c. - is 0·4670286. The arithmetical complements are much used in operations by logarithms, to change subtractions into additions, which are more conveniently performed, especially when there are more than one of them in the operation.

COMPLEMENT, in astronomy, is used for the distance of a star from the zenith; or the arc contained between the zenith and the place of a star which is above the horizon. It is the same as the complement of the altitude, or co-altitude, or the zenith distance.

COMPLEMENT *of the Course*, in navigation, is the quantity which the course wants of 90°, or eight points, viz. a quarter of the compass.

COMPLEMENT *of the Curtain*, in fortification, is that part of the anterior side of the curtain, which makes the demigorge.

COMPLEMENT *of the Line of Defence*, is the remainder of that line, after the angle of the flank is taken away.

COMPLEMENTS *of a Parallelogram*, or *in a Parallelogram*, are the two lesser parallelograms made by drawing two right lines parallel to each side of the given parallelogram, through the same point in the diagonal.

COMPLEMENT *of Life*, a term much used, in the doctrine of Life Annuities, by De Moivre, and, according to him, it denotes the number of years which a given life wants of eighty-six, this being the age which he considered as the utmost probable extent of life. So fifty-six is the complement of thirty, and thirty is the complement of fifty-six. That author supposed an equal annual decrement of life through all its stages, till the age of eighty-six. Thus, if there be fifty-six persons living at thirty years of age, it is supposed that one will die every year, till they be all dead in fifty-six years. This hypothesis in many cases is very near the truth; and it agrees so nearly with Halley's table, formed from his observations of the mortuary bills of Breslaw, that the value of lives deduced either from the hypothesis, or the table, need not be distinguished; hence it very much eases the labour of calculating them.

COMPLE'TE, *adj.* [*completus*, Lat.] Perfect; full; having no deficiencies.—And ye are *complete* in him which is the head of all principality and power. *Coloss.* ii. 10.

Then marvel not thou great and *complete* man,
That all the Greeks began to worship Ajax. *Shakespeare.*

Complete, having no degrees, cannot properly admit *more* and *most*.—If any disposition should appear towards so good a work, the assistance of the legislative power would be necessary to make it *more complete*. *Swift.*—Finished; ended: concluded:

This course of vanity almost *complete*,
Tir'd in the field of life, I hope retreat. *Prior.*

To COMPLE'TE, *v. a.* To perfect; to finish:

To town he comes, *completes* the nation's hope,
And heads the bold train'd-bands, and burns a pope. *Pope.*

COMPLE'TELY, *adv.* Fully; perfectly.—Whatever person would aspire to be *completely* witty, smart, humourous, and polite, must be able to retain in his memory every single sentence contained in this work. *Swift.*

Then tell us, how you can your bodies roll
Through space, of matter so *completely* full? *Blackmore.*

COMPLE'TEMENT, *s.* [from *completement*, Fr.] The act of completing.—Allow me to give you, from the best authors,

authors, the origin, the antiquity, the growth, the change, and the *completement*, of satire among the Romans. *Dryden.*

COMPLE'TENESS, *s.* Perfection; the state of being complete.—I cannot allow their wisdom such a *completeness* as to exclude myself. *King Charles.*

COMPLE'TION, *s.* Accomplishment; act of fulfilling; state of being fulfilled.—There was a full entire harmony and consent of all the divine predictions, receiving their *completion* in Christ. *South.*—Utmost height; perfect state.—He makes it the utmost *completion* of an ill character to bear a malevolence to the best men. *Pope.*

COM'PLEX, or COMPLEXED, *adj.* [*complexus*, Lat.] Composite; of many parts; not simple; including many particulars.—Ideas made up of several simple ones, I call *complex*; such as beauty, gratitude, a man, the universe; which, though complicated of various simple ideas, or *complex* ideas made up of simple ones, yet are considered each by itself as one. *Locke.*

With such perfection fram'd
Is this *complex* stupendous scheme of things. *Thomson.*

COM'PLEX, *s.* Complication; collection.—This parable of the wedding supper comprehends in it the whole *complex* of all the blessings and privileges exhibited by the gospel. *South.*

COMPLEX'EDNESS, *s.* Complication; involution of many particular parts in one integral; contrariety to simplicity; compound state of nature.—From the *complexedness* of these moral ideas, there follows another inconvenience, that the mind cannot easily retain those precise combinations. *Locke.*

COMPLEX'ION, *s.* [*complexio*, Lat.] The inclosure or involution of one thing in another.—Though the terms of propositions may be complex, yet where the composition of the argument is plain, simple, and regular, it is properly called a simple syllogism, since the *complexion* does not belong to the syllogistic form of it. *Watts.*—The temperature of the body, according to the various proportions of the four medical humours:

Let melancholy rule supreme,
Choler preside, or blood, or phlegm,
It makes no diff'rence in the case,
Nor is *complexion* honour's place. *Swift.*

The colour of the external parts of any body.—Niceness, though it renders them insignificant to great purposes, yet it polishes their *complexion*, and makes their spirits seem more vigorous. *Collier.*

Why doth not beauty then refine the wit,
And good *complexion* rectify the will? *Davies.*

Few questions in physiology have engaged the attention of naturalists, more than the diversities of *complexion* among the human species. The great differences in this respect have given occasion to several authors to assert, that the whole human race have not sprung from one original; but that as many different species of men were at first created, as there are now different colours to be found among them. On this subject the late Dr. Hunter published a thesis, in which he considers the matter more accurately, and decides against any specific difference among mankind. He introduces his subject by observing, that when the question has been agitated, whether all the human race constituted only one species or not, much confusion has arisen from the sense in which the term species has been adopted. He therefore thinks it necessary to set out with a definition of the term. He includes under the same species all those animals which produce issue capable of propagating others resembling the original stock from whence they sprung. This definition he illustrates by having recourse to the human species as an example; and in this sense of the term he concludes, that all of them are to be considered as belonging to the same species. For as, in the case of plants, one species comprehends several varieties depending upon climate, soil, culture, and similar accidents; so he considers the diversities of the human race to be merely varieties of the same species, produced by natural causes. Of the different colours observable among mankind, he gives the following view:

BLACK. Africans under the line; inhabitants of New Guinea; inhabitants of New Holland.—SWARTHY. The Moors in the northern parts of Africa; the Hottentots in the southern parts of it.—COPPER-COLOURED. The East Indians.—RED-COLOURED. The Americans.—BROWN-COLOURED. Tartars, Persians, Arabs, Africans on the coast of the Mediterranean, Chinese.—BROWNISH. The inhabitants of the southern parts of Europe; as Sicilians, Abyssinians, Spaniards, Turks, and likewise the Samoiedes and Laplanders.—WHITE. Most of the European nations; as Swedes, Danes, English, Germans, Poles, &c. Kabardinski, Georgians, inhabitants of the islands in the Pacific Ocean.

In attempting to investigate the causes of these differences, Dr. Hunter observes, that there can be no dispute of the seat of colour being placed in the skin; that it is not even extended over the whole of this, but confined to that part named the cuticle, consisting of the epidermis and reticulum, and that it chiefly occupies the latter of these. The cuticle is much thicker and harder in black people, than in the white, the reticulum in the latter being a thin mucus, in the former a thick membrane. He concludes that this seat of colour in white people is transparent, and either totally deprived of vessels, or only furnished with very few; as the yellow colour in jaundice vanishes on the cause of the disease being removed; which is not the case with stains in the cuticle from gunpowder, or other causes. He next points out three causes destroying the pellucidity of the cuticle, giving it a brown colour, and rendering it thicker. These are, access of air, nastiness, and the heat of the sun. The influence of each of these he proves by many examples; and from these he is inclined to consider the last as by much the most powerful. If, however, it be admitted that these causes have this effect, he thinks that all the diversity of colour which is to be observed among mankind, may be easily accounted for. He remarks, that all the inhabitants of the torrid zone incline more or less to a black colour. When we observe the differences which occur among them, we must at the same time remember, that a black colour is not referred to heat alone, but to the other causes also: and when we attend to the diversity of temperature that occurs even in the torrid zone, the existence of a white nation there would by no means destroy the argument. He is farther of opinion, that the existence of a brown colour, and of considerable varieties from white, in the northern and coldest parts of Europe, may very easily be explained. This he accounts for from the manner of life of the inhabitants, by which they are either exposed to the inclemency of the air, or to constant nastiness from smoky abodes.

Having thus attempted to account, from natural causes, for the varieties which occur among mankind with respect to colour, he observes, that, to all this reasoning, an objection will naturally be made, from considering that infants bring these marks into the world with them, before they can be exposed to any such causes. Dr. Hunter imagines, however, that this may readily be explained, upon the supposition that many peculiarities acquired by parents are transmitted to their posterity; and of this, he thinks, no one can entertain the least doubt who attends to hereditary diseases. Thus gout, scrophula, mania, and many other affections, although at first induced by particular accidents, will continue to affect families for many generations. In the same manner, a parent exposed to causes destroying the natural whiteness of his complexion, will beget swarthy children; and the same causes continuing to operate upon the son, the darkness will be increased. Thus all the different shades may have been at first induced, and afterwards continued.

This

This subject of complexion has been very well illustrated by Mr. Clarkson, in his Essay on the Commerce and Slavery of the Human Species. The first point that occurs to be ascertained, is, 'What part of the skin is the seat of colour?' The old anatomists usually divided the skin into two parts or laminæ; the exterior and thinnest, called by the Greeks *epidermis*, by the Romans *cuticula*, and hence by us *cuticle*: and the interior, called by the former *derma*, and by the latter *cutis*, or *true skin*. Hence they must necessarily have supposed, that, as the true skin was in every respect the same in all human subjects, however various their external hue, so the seat of colour must have existed in the cuticle or upper surface. Malpighi, however, discovered that the skin was divided into three laminæ or parts; the cuticle, the true skin, and a certain coagulated substance situated between both, which he distinguished by the title of *rete mucosum*: which coagulated substance adhered so firmly to the cuticle, as, in all former anatomical preparations, to have come off with it; and, from this circumstance, to have led the ancient anatomists to believe, that there were but two laminæ, or divisible portions in the human skin. This discovery proved sufficient to ascertain the point in question: for it appeared afterwards that the cuticle, when divided according to this discovery from the other lamina, was semi-transparent; that the cuticle of the blackest negro was of the same transparency as that of the purest white; and hence, the true skin of both being invariably the same, that the rete mucosum was the seat of colour.

This has been confirmed by all subsequent anatomical experiments; from which it appears, that, whatever is the colour of this intermediate coagulated substance, nearly the same is the apparent colour of the upper surface of the skin. Neither can it be otherwise; for the cuticle, from its transparency, must necessarily transmit the colour of the substance beneath it, in the same manner, though not in the same degree, as the cornea transmits the colour of the iris of the eye. This transparency is a matter of ocular demonstration in white people. It is conspicuous in every blush; for no one can imagine that the cuticle becomes red as often as this happens: nor is it less discoverable in the veins, which are so easy to be discerned; for no one can suppose that the blue streaks, which he constantly sees in the fairest complexion, are painted, as it were, on the surface of the upper skin. From these, and a variety of other observations, no maxim is more true in physiology, than that on the rete mucosum depends the colour of the human body; or, in other words, that the rete mucosum being of a different colour in different inhabitants of the globe, and appearing through the cuticle or upper surface of the skin, gives that variety of complexion which strikes us so forcibly in contemplating the human race. And as this can be incontrovertibly ascertained, it is evident, that whatever causes co-operate in producing this different appearance, they produce it by acting upon the rete mucosum; which, from the almost incredible manner in which the cuticle is perforated, is as accessible as the cuticle itself. These causes are probably those various qualities of things, which, combined with the influence of the sun, contribute to form what we call *climate*. For when any person considers, that the mucous substance before mentioned is found to vary in its colour as the climates vary from the equator to the poles, his mind must be instantly struck with the hypothesis, and he will adopt it without any hesitation, as the genuine cause of the phenomenon.

This fact, of the variation of the mucous substance, according to the situation of the place, has been clearly ascertained by numerous anatomical experiments, in which subjects of all nations have come under consideration. The natives of the kingdoms and isles of Asia, are found to have their rete mucosum black; those of Africa, situated near the line, of the same colour; those of the maritime parts of the same continent, of a dusky brown; and the colour becomes lighter or darker, in proportion as the distance from the equator is either greater or less. The Europeans are the fairest inhabitants of the world. Those situated in the most southern regions of Europe, have in their rete mucosum a tinge of the dark hue of their African neighbours; hence the epidemic complexion, prevalent among them, is nearly of the colour of the pickled Spanish olive; while in this country, and those situated nearer the north pole, it appears to be nearly, if not absolutely, white. These are facts which anatomy has established; and we acknowledge them to be such, that we cannot divest ourselves of the idea, that climate has a considerable share in producing a difference of colour.

The only objection of any consequence that has ever been made to the hypothesis of climate, is this, that people under the same parallels are not exactly of the same colour. But this is no objection in fact; for it does not follow that those countries which are at an equal distance from the equator, should have their climates the same. Indeed nothing can be more contrary to experience. Climate depends upon a variety of accidents. High mountains in the neighbourhood of a place make it cooler, by chilling the air that is carried over them by the winds. Large spreading succulent plants, if among the productions of the soil, have the same effect; they afford agreeable cooling shades, and a moist atmosphere from their continual exhalations, by which the ardour of the sun is considerably abated. While the soil, on the other hand, if of a sandy nature, retains the heat in an uncommon degree, and makes the summers considerably hotter than those which are found to exist in the same latitude where the soil is different. To this proximity of what may be termed *burning sands*, and to the sulphureous and metallic particles which are continually exhaling from the bowels of the earth, is ascribed the different shades of blackness by which some African nations are distinguishable from each other, though under the same parallels. To these observations we may add, that though the inhabitants of the same parallel are not exactly of the same hue, yet they differ only by shades of the same colour; or, to speak with more precision, that there are no two people, in such a situation, one of whom is white, and the other black. To sum up the whole, suppose we were to take a common globe; to begin at the equator; to paint every country along the meridian line in succession from thence to the poles; and to paint them with the same colour which prevails in the respective inhabitants of each, we should see the black, with which we had been obliged to begin, insensibly changing to an olive, and the olive, through as many intermediate colours, to a white: and if, on the other hand, we should complete any one of the parallels according to the same plan, we should see a difference perhaps in the appearance of some of the countries through which it ran, though the difference would consist wholly in various shades of the same colour.

To this argument may be added one that is incontrovertible, which is, that when the black inhabitants of Africa are transplanted to colder, or the white inhabitants of Europe to hotter climates, their children, born there, are of a different colour from themselves; that is, lighter in the first, and darker in the second instance. As a proof of the first, we shall give the words of the abbé Raynal. "The children," says he, "which the Africans procreate in America, are not so black as their parents were. After each generation the difference becomes more palpable. It is possible, that after a numerous succession of generations, the men come from Africa would not be distinguished from those of the country into which they may have been transplanted." This circumstance is confirmed by a variety of persons who have been witnesses of the fact; particularly by many intelligent Africans, who have been parents in America, and who have declared, that the difference is so palpable in the northern provinces, that not only they themselves have constantly observed it, but

but that they have heard it observed by others. Neither is this variation in the child from the colour of the parent improbable. The children of the blackest Africans are born white. In this state they continue for about a month, when they change to a pale yellow. In time they become brown. Their skin still continues to increase in darkness with their age, till it becomes of a dirty fallow black: and at length, after a certain period of years, glossy and shining. Now, if climate has any influence on the mucous substance of the skin, this variation in the children from the colour of their parents is an event which must be reasonably expected: for being born white, and not having equally powerful causes to act upon them in colder as their parents had in the hotter climates which they left, it must necessarily follow, that the same effect cannot possibly be produced. Hence also, if the hypothesis be admitted, may be deduced the reason why even those children who have been brought from their country at an early age into colder regions, have become of a lighter colour than those who have remained at home till they arrived at a state of manhood. For having undergone some of the changes which we mentioned to have attended their countrymen from infancy to a certain age, and having been taken away before the rest could be completed, these farther changes, which would have taken place had they remained at home, seem either to have been checked in their progress, or weakened in their degree, by a colder climate.

We now come to the second and opposite case; for a proof of which we appeal to the words of Dr. Mitchell in the Philosophical Transactions, No. 476. Sect. 4. "The Spaniards who have inhabited America under the torrid zone for any time, are become as dark coloured as our native Indians of Virginia, of which I myself have been a witness; and were they not to intermarry with the Europeans, but lead the same rude and barbarous lives with the Indians, it is very probable, that, in a succession of generations, they would become as dark in complexion." To this instance we may add another, mentioned by a late writer of eminence, who, describing the African coast and the European settlements there, has the following passage. "There are several small Portuguese settlements, and one of some note at Mitomba, a river in Sierra Leona. The people here called *Portuguese*, are principally persons bred from a mixture of the first Portuguese discoverers with the natives, and now become, in their complexion and woolly hair, perfect negroes, retaining, a smattering of the Portuguese language."

But though these facts seem sufficient to confirm the hypothesis, yet they are not the only facts which can be adduced in its support. It can be shewn, that the members of the very same family, when divided from each other, and removed into different countries, have not only changed their family complexion, but that they have changed it to as many different colours as they have gone into different regions of the world. We cannot have, perhaps, a more striking instance of this than in the Jews. These people are scattered over the face of the whole earth. They have preserved themselves distinct from the rest of mankind by their religion; and, as they never intermarry with any but those of their own sect, so they have no mixture of blood in their veins that they should differ from each other: and yet nothing is more true, than that the English Jew is white, the Portuguese swarthy, the Armenian olive, and the Arabian copper; in short, that there appear to be as many different Jews as there are countries in which they reside. To these facts we may add the following observation, that if we can give credit to the ancient historians, a change from the darkest black to the purest white must have actually been accomplished. One instance, perhaps, may be thought sufficient. Herodotus relates, that the Colchi were black, and that they had crisped hair. These people were a detachment of the Æthiopian army under Sesostris, who followed him in his expedition, and settled in that part of the world where Colchis is usually represented to have been situated. Had not the same author informed us of this circumstance, we should have thought it strange that a people of this description should have been found in such a latitude. Now, as they were undoubtedly settled there, and as they were neither so totally destroyed, nor made any such rapid conquests, as that history should notice the event, there is great reason to presume that their descendants continued in the same, or settled in the adjacent, country; from whence it will follow, that they must have changed their complexion to that which is observed in the inhabitants of this particular region at the present day; or, in other words, that the black inhabitants of Colchis must have been changed into the fair Circassian. Suppose, without the knowledge of any historian, they had made such considerable conquests as to have settled themselves at the distance of a thousand miles in any one direction from Colchis, still they must have changed their colour: for, had they gone in an eastern or western direction, they must have been of the same colour as the Circassians; if to the north, whiter; if to the south, of a copper. There are no people within that distance of Colchis who are black.

From the whole of the preceding observations we may conclude, that as all the inhabitants of the earth cannot be otherwise than the children of the same original parent, and as the difference of their appearance must have of course proceeded from incidental causes, these causes are a combination of those qualities which we call *climate*: that the blackness of the Africans is so far engrafted in their constitution, in a course of many generations, that their children wholly inherit it if brought up in the same spot; but that it is not so wholly interwoven in their nature, that it cannot be removed if they are born and settled in another.

The same principles are adopted by the late professor Zimmerman, of Brunswick, in his celebrated work the Geographical History of Man. He proves, in the most satisfactory manner, that the complexion of the human species is uniformly correspondent with the degree of heat or cold to which they are habitually exposed. In maintaining this position, he makes a very proper distinction with regard to climate. By climate we are to understand, not simply or solely that which is distinguished by the geographical divisions of the globe, to the exclusion of what he terms physical climate, or that which depends on the changes produced in any given latitude by such adventitious circumstances as the lower or more elevated situations of a country, its being encompassed by water or large tracts of land, overspread or surrounded with forests, placed in an extensive plain, or environed by lofty mountains. Peculiarities of the like kind, as has been already noticed, frequently prevent the physical climate from corresponding entirely with the geographical, as a country influenced by them is often much warmer or colder than other regions placed under the same degree of latitude. At Senegal, and in the adjacent lands, the thermometer is often at 112 or 117 degrees in the shade; and here we find the inhabitants jet black, with woolly hair. The heat is equally great in Congo and Loango, and these countries are inhabited by negroes only; whereas in Morocco, to the north of these regions, and at the Cape of Good Hope, to the south, the heat is not so intense, nor are the inhabitants of so deep a hue. Lord Kames asks, "Wherefore are not the Abyssinians and the inhabitants of Sahara of as dark a complexion as the Moors on the coast of Guinea?" M. Zimmerman answers, that "these countries are much cooler." The desert is not only farther from the equator, but the winds blowing over the Atlas mountains, which like the Alps are covered with snow, and the westerly wind coming from the sea, must considerably mitigate the heat. Nor is Abyssinia so warm as either Monomotopa or Guinea. The north-east winds from the side of Persia and Arabia are

are cooled by their passage over the Red Sea; the northern winds from Egypt lose much of their heat on the chain of mountains that is extended between the countries; the winds from the south and the west are sea winds. Thus the only quarter from which they can derive excessive heat is from the west, as the air on this side must pass over tracts of heated lands." For a similar reason it is that negroes are not found either in Asia or South America under the equator. The situations of these countries expose them to sea breezes and cooling winds from the continent. Zimmerman confirms this hypothesis by observing, that the mountaineers of warm climates, as in Barbary and Ceylon, are much fairer than the inhabitants of the valleys; that the Saracens and Moors, who conquered the north-east part of Africa in 1700, from being brown, are become like the negroes near the equator; that the Portuguese, who settled at Senegal in 1400, became blacks; and Tudela the Jew asserts, that his countrymen in Abyssinia acquired the dark complexion of the original natives.

Upon the whole, complexion and figure may be styled habits of the body. Like other habits, they are created, not by great and sudden impressions, but by continual and almost imperceptible touches. Of habits both of mind and body, nations are susceptible as well as individuals. They are transmitted to offspring, and augmented by inheritance. Long in growing to maturity, national features, like national manners, become fixed only after a succession of ages. They become, however, fixed at last; and if we can ascertain any effect produced by a given state of weather or of climate, it requires only repetition during a sufficient length of time to augment and impress it with a permanent character. The sanguine countenance will, for this reason, be perpetual in the highest latitudes of the temperate zone; and we shall for ever find the swarthy, the olive, the tawny, and the black, as we descend to the south. This pliancy of nature is favourable to the unions of the most distant nations, and facilitates the acquisition and the extension of science, which would otherwise be confined to few objects and to a very limited range. It opens the way particularly to the knowledge of the globe which we inhabit; a subject so important and interesting to man. It is verified by experience. Mankind are for ever changing their habitations by conquests or by commerce; and we find them in all climates, not only able to endure the change, but so assimilated by time, that we cannot say with certainty whose ancestor was the native of the clime, and whose the intruding foreigner.

COMPLEX'IONAL, *adj.* Depending on the complexion or temperament of the body.—Men and other animals receive different tinctures from *complexional* efflorescencies, and descend still lower as they partake of the fuliginous and denigrating humours. *Brown.*—Ignorance, where it proceeds from early or *complexional* prejudices, will not wholly exclude from favour of God. *Fiddes.*

COMPLEX'IONALLY, *adv.* By complexion.—An Indian king sent unto Alexander a fair woman, fed with poisons, either by converse or copulation *complexionally* to destroy him. *Brown.*

COMPLEX'ITY, *s.* The state of being complex.—Some distinguished for their simplicity, others for their *complexity.* *Burke.*

COMPLEX'LY, *adv.* In a complex manner; not simply.

COMPLEX'NESS, *s.* The state of being complex.

COMPLEX'URE, *s.* The involution or complication of one thing with others.

COMPLI'ANCE, *s.* The act of yielding to any desire or demand; accord; submission.—I am far from excusing that *compliance*, for plenary consent it was not, to his destruction. *King Charles.*—The actions to which the world solicits our *compliance*, are sins, which forfeit eternal expectations. *Rogers.*

Let the king meet *compliance* in your looks,
A free and ready yielding to his wishes. *Rowe.*

A disposition to yield to others; complaisance.—He was a man of few words, and of great *compliance*; and usually delivered that as his opinion, which he foresaw would be grateful to the king. *Clarendon.*

COMPLI'ANT, *adj.* Yielding; bending; civil; complaisant:

The *compliant* boughs
Yielded them. *Milton.*

To COM'PLICATE, *v. a.* [*complico*, Lat.] To entangle one with another; to join; to involve mutually.—Though the particular actions of war are *complicate* in fact, yet they are separate and distinct in right. *Bacon.*—In case our offence against God hath been *complicated* with injury to men, we should make restitution. *Tillotson.*—When the disease is *complicated* with other diseases, one must consider that which is most dangerous. *Arbuthnot.*—To unite by involution of parts one in another.—Commotion in the parts may make them apply themselves one to another, or *complicate* and dispose them after the manner requisite to make them stick. *Boyle.*—To form by complication; to form by the union of several parts into one integral.—A man, an army, the universe, are *complicated* of various simple ideas, or complex ideas made up of simple ones. *Locke.*

Dreadful was the din
Of hissing through the hall! thick swarming now
With *complicated* monsters, head and tail. *Milton.*

COM'PLICATE, *adj.* Compounded of a multiplicity of parts.—What pleasure would felicitate his spirit, if he could grasp all in a survey, as a painter runs over a *complicate* piece wrought by Titian or Raphael. *Watts.*

COM'PLICATENESS, *s.* The state of being complicated; intricacy; perplexity.—There is great variety of intelligibles in the world, so much objected to our senses, and every several object is full of subdivided multiplicity and *complicateness.* *Hale.*

COMPLICA'TION, *s.* The act of involving one thing in another. The state of being involved one in another.—All our grievances are either of body or of mind, or in *complications* of both. *L'Estrange.*—The integral consisting of many things involved, perplexed, and united.—By admitting a *complication* of ideas, and taking too many things at once into one question, the mind is dazzled and bewildered. *Watts.*

COM'PLICE, *s.* [Fr. from *complex*, an associate, low Lat.] One who is united with others in an ill design; an associate; a confederate; an accomplice.—Justice was afterwards done upon the offenders, the principal being hanged and quartered in Smithfield; and divers of his chief *complices* executed in divers parts of the realm. *Hayward.*

To arms, victorious noble father,
To quell the rebels and their *complices.* *Shakespeare.*

COMPLI'ER, *s.* A man of an easy temper; a man of ready compliance.—Suppose a hundred new employments were erected on purpose to gratify *compliers*, an insupportable difficulty would remain. *Swift.*

COM'PLIMENT, *s.* [*compliment*, Fr.] An act or expression of civility, usually understood to include some hypocrisy, and to mean less than it declares; this is properly *complement*, something superfluous, or more than enough.—Virtue, religion, heaven, and eternal happiness, are not trifles to be given up in a *compliment*, or sacrificed to a jest. *Rogers.*

One whom the music of his own vain tongue
Doth ravish, like enchanting harmony:
A man of *compliments*, whom right and wrong
Have chose as umpire of their meeting. *Shakespeare.*

What honour that,
But tedious waste of time, to sit and hear
So many hollow *compliments* and lyes,
Outlandish flatteries? *Milton.*

To COM'PLIMENT, *v. a.* To sooth with acts or expressions of respect; to flatter; to praise.—It was not to *compliment* a society, so much above flattery, and the regardless air of common applauses. *Glanville.*

Monarchs should their inward soul disguise,
Dissemble and command, be false and wise;
By ignominious arts, for servile ends,
Should *compliment* their foes, and shun their friends. *Prior.*

To COM'PLIMENT, *v. n.* To use ceremonious or adulatory language.—I make the interlocutors upon occasion *compliment* with one another. *Boyle.*—She *compliments* Menelaus very handsomely, and says he wanted no accomplishment either of mind or body. *Pope.*

COMPLIMEN'TAL, *adj.* Expressive of respect or civility; implying compliments.—Languages, for the most part, in terms of art and erudition, retain their original poverty, and rather grow rich and abundant in *complimental* phrases, and such froth. *Wotton.*

COMPLIMEN'TALLY, *adv.* In the nature of a compliment; civilly; with artful or false civility.—This speech has been condemned as avaricious: Eustathius judges it spoken artfully and *complimentally*. *Broome.*

COMPLIMEN'TER, *s.* One given to compliments; a flatterer.

COM'PLINE, *s.* [*compline*, Fr. *completinum*, low Lat.] The last act of worship at night, by which the service of the day is completed.—If a man were but of a day's life, it is well if he lasts till even song, and then says his *compline* an hour before the time. *Taylor.*

At morn and eve, besides their anthems sweet,
Their peny masses and their *complines* meet. *Hubberd.*

To COMPLO'RE, *v. n.* [*comploro*, Lat.] To make lamentation together.

COMPLOT', *s.* [Fr. from *completum*, for *complexum*, low Latin. *Menage.*] A confederacy in some secret crime; a plot; a conspiracy.—I know their *complot* is to have my life. *Shakespeare.*

I cannot, my life, my brother, like but well
The purpose of the *complot* which ye tell. *Hubberd.*

To COMPLOT', *v. a.* To form a plot; to conspire; to join in any secret design, generally criminal.—A few lines after, we find them *complotting* together, and contriving a new scene of miseries to the Trojans. *Pope.*

Nor ever by advised purpose meet
To plot, contrive, or *complot* any ill. *Shakespeare.*

COMPLOT'TER, *s.* A conspirator; one joined in a plot:

Jocasta, too, no longer now my sister,
Is found *complotter* in the horrid deed. *Dryden.*

To COMPLY', *v. n.* [Skinner derives it from the French *complaire*; but probably it came from *complier*, to bend to. *Plier* is still in use.] To yield to; to be obsequious to; to accord with; to suit with. It has *with* before as well persons as things.—The truth of things will not *comply with* our conceits, and bend itself to our interest. *Tillotson.*

The rising sun *complies with* our weak sight,
First gilds the clouds, then shews his globe of light. *Waller.*

He made his wish *with* his estate *comply*;
Joyful to live, yet not afraid to die. *Prior.*

COM'POLI, a town of Italy, in the kingdom of Naples, and province of Lavora: four miles east of Sora.

COMPO'NENT, *adj.* [*componens*, Lat.] That which constitutes a compound body.—The bigness of the *component* parts of natural bodies may be conjectured by their colours. *Newton.*

To COMPO'RT, *v. n.* [*comporter*, Fr. from *porto*, Lat.] To agree; to suit: followed by *with*.—It is not every man's talent to distinguish aright how far our prudence may warrant our charity, and how far our charity may *comport with* our prudence. *L'Estrange.*

Some piety's not good there, some vain disport
On this side sin, *with* that place may *comport*. *Donne.*

To COMPO'RT, *v. a.* To bear; to endure. This is a Gallic signification, not adopted among us:

The maleconted sort,
That never can the present state *comport*,
But would as often change as they change will. *Daniel.*

To behave; to carry: with the reciprocal pronoun.—At years of discretion, and *comport* yourself at this rantipole rate! *Congreve.*

COMPO'RT, *s.* Behaviour; conduct; manner of acting and looking.—I shall account concerning the rules and manners of deportment in the receiving, our *comport* and conversation in and after it. *Taylor.*

I know them well, and mark'd their rude *comport*;
In times of tempest they command alone,
And he but sits precarious on the throne. *Dryden.*

COMPO'RTABLE, *adj.* Consistent; not contradictory.—We cast the rules and cautions of this art into some *comportable* method. *Wotton.*

COMPORT'ANCE, *s.* Behaviour; gesture of ceremony:

Goodly *comportance* each to other bear,
And entertain themselves with court'sies meet. *Spenser.*

COMPORT'MENT, *s.* Behaviour; practice.—The will of God is like a straight unalterable rule or line; but the various *comportments* of the creature, either thwarting this rule, or holding conformity to it, occasion several habitudes of this rule. *Hale.*

To COMPO'SE, *v. a.* [*composer*, Fr. *compono*, Lat.] To form a mass by joining different things together.—Zeal ought to be *composed* of the highest degrees of all pious affections. *Spratt.*—To place any thing in its proper form and method.—How doth the sea exactly *compose* itself to a level superficies, and with the earth make up one spherical roundness. *Ray.*—To dispose; to put in the proper state for any purpose.—The whole army seemed well *composed* to obtain that by their swords, which they could not by their pen. *Clarendon.*—To put together a discourse or sentence; to write as an author.—The greatest conqueror in this nation, after the manner of the old Grecian Lyrics, did not only *compose* the words of his divine odes, but generally set them to music himself. *Addison.*—To constitute by being parts of a whole.—A few useful things, confounded with many trifles, fill their memories, and *compose* their intellectual possessions. *Watts.*

Nor did Israel 'scape
Th' infection, when their borrow'd gold *compos'd*
The calf in Oreb. *Milton.*

To calm; to quiet.—He would undertake the journey with him, by which all his fears would be *composed*. *Clarendon.*

Compose thy mind;
Nor frauds are here contriv'd, nor force design'd. *Dryden.*

To adjust the mind to any business, by freeing it from disturbance.—The mind, being thus disquieted, may not be able easily to *compose* and settle itself to prayer. *Duppa.*—To adjust; to settle: as, *to* compose *a* difference. [With printers.] To arrange the letters; to put the types in order in the composing-stick. [In music.] To form a tune from the different musical notes.

COMPO'SED, *part. adj.* Calm; serious; even; sedate.—In Spain, there is something serious and *composed* in the manner of the inhabitants. *Addison.*

The Mantuan there in sober triumph sate,
Compos'd his posture, and his look sedate. *Pope.*

COMPO'SEDLY, *adv.* Calmly; seriously; sedately.—A man was walking before the door very *composedly* without a hat. One crying, Here is the fellow that killed the duke;

duke; every body asked, which is he? The man without the hat very *composedly* answered, I am he. *Clarendon.*

COMPO'SEDNESS, *s.* Sedateness; calmness; tranquillity.—He that will think to any purpose, must have fixedness and *composedness* of humour, as well as smartness of parts. *Norris.*

COMPO'SER, *s.* An author; a writer.—If the thoughts of such authors have nothing in them, they at least do no harm, and shew an honest industry, and a good intention in the *composer*. *Addison.*—He that adapts the music to words; he that forms a tune.—The *composer* has so expressed my sense, where I intended to move the passions, that he seems to have been the poet as well as the *composer*. *Dryden.*

COM'POSITE, *adj.* [*compositus*, Lat.] Mixed; made up of many parts; not simple.—The *composite* order in architecture is the last of the five orders of columns; so named, because its capital is composed out of those of the other orders; and it is also called the Roman and Italic order. See ARCHITECTURE, vol. ii. p. 70.

COM'POSITE NUMBER, *s.* A number compounded of, or made up by, the multiplication of two other numbers, greater than 1, or which can be measured by some other number greater than 1. As 12, which is composed, or compounded of 2 and 6, or 3 and 4, viz. by multiplying together 2 and 6, or 3 and 4, both products making the same number 12; which therefore is a composite number. Composites are opposed to prime numbers, or primes, which cannot be exactly measured by any other number, and cannot be produced by multiplying together two other factors. Composite numbers between themselves are the same with commensurable numbers, or such as have a common measure or factor; as 15 and 12, which have the common term 3.

COMPOSI'TION, *s.* [*compositio*, Lat.] The act of forming an integral of various dissimilar parts.—In the time of the Yncas reign of Peru, no *composition* was allowed by the laws to be used in point of medicine, but only simples proper to each disease. *Temple.*—The act of bringing simple ideas into complication: opposed to *analysis*, or the separation of complex notions.—The investigation of difficult things, by the method of analysis, ought ever to precede the method of *composition*. *Newton.*—A mass formed by mingling different ingredients.—Heat and vivacity, in age, is an excellent *composition* for business. *Bacon.*

Jove mix'd up all, and his best clay employ'd,
Then call'd the happy *composition* Floyd. *Swift.*

The state of being compounded; union; conjunction; combination.—Contemplate things first in their own simple natures, and afterwards view them in *composition* with other things. *Watts.*—The arrangement of various figures in a picture.—The disposition in a picture is an assembling of many parts; is also called the *composition*, by which is meant the distribution and orderly placing of things, both in general and in particular. *Dryden.*—Written work.—That divine prayer has always been looked upon as a *composition* fit to have proceeded from the wisest of men. *Addison.*—Adjustment; regulation.—A preacher, in the invention of matter, election of words, *composition* of gesture, look, pronunciation, motion, useth all these faculties at once. *Ben Jonson.*—Compact; agreement; terms on which differences are settled.—All public regiment, of what kind soever, seemeth evidently to have arisen from deliberate advice, consultation, and *composition* between men, judging it convenient and behoveful. *Hooker.*

Their courage droops, and, hopeless now, they wish
For *composition* with th' unconquer'd fish. *Waller.*

The act of discharging a debt by paying part; the sum paid. Consistency; congruity:

There is no *composition* in these news,
That gives them credit.——
—Indeed they are disproportion'd. *Shakespeare.*

[In grammar.] The joining of two words together, or the prefixing a particle to another word, to augment, diminish, or change its signification.

COMPOSI'TION, in law, an agreement or contract between a parson, patron, and ordinary, &c. for money or other thing in lieu of tithes. Land may be exempted from the payment of tithes, where *compositions* have been made: and real compositions for tithes are to be made by the concurrent consent of the parson, patron and ordinary. *Real compositions* are distinguished from personal contracts; for a composition called a personal contract is only an agreement between the parson and the parishioners, to pay so much instead of tithes; and though such agreement is confirmed by the ordinary, yet (if the parson is not a party) that doth not make it a real composition, because he ought to be a party to the deed of composition. *March's Rep.* 87. A *real composition* is, when an agreement is made between the owner of the lands and the parson or vicar, with the consent of the ordinary and the patron, that such lands shall for the future be discharged from the payment of tythes, by reason of some land, or other *real* recompense, given to the parson. *Blackstone.* But compositions for tithes made by the consent of the parson, patron, and ordinary, by virtue of stat. 13 *Eliz.* c. 10, shall not bind the successor, unless made for twenty-one years or three lives, as in case of leases of ecclesiastical corporations, &c. Compositions were at first for a valuable consideration, so that though, in process of time, upon the increase of the value of the lands, such compositions do not amount to the value of the tithes, yet custom prevails, and from hence arises what we call a *modus decimandi*. *Hob.* 29. See the article TYTHE.

COMPOSI'TION, in literature, the art of forming and arranging sentiments, and clothing them with language suitable to the nature of the subject or discourse. See the articles LANGUAGE, ORATORY, HISTORY, &c.

COMPOSI'TION, in logic, a method of reasoning, whereby we proceed from some general self-evident truth to other particular and singular ones. In disposing and putting together our thoughts, there are two ways of proceeding equally within our choice: for we may so suppose the truths, relating to any part of knowledge, as they presented themselves to the mind in the manner of investigation; carrying on the series of proofs in a reverse order, till they at last terminate in first principles: or, beginning with these principles, we may take the contrary way; and from them deduce, by a direct train of reasoning, all the several propositions we want to establish. This diversity in the manner of arranging our thoughts gives rise to the twofold division of method established among logicians; the one called *analytic* method, or the method of *resolution*, inasmuch as it traces things back to their source, and resolves knowledge into its first and original principles. This stands in contradistinction to the *synthetic* method: for here we proceed by gathering together the several scattered parts of knowledge, and combining them into one system, in such a manner as that the understanding is enabled distinctly to follow truth through all the different stages of gradation.

COMPOSI'TION, mechanical, of FORCES. See the article MECHANICS.

COMPOSI'TION, in music. See the article MUSIC.

COMPOSI'TION of PROPORTION, is when, of four proportionals, the sum of the first and second is to the 2d, as the sum of the third and fourth is to the 4th;

as if it be	a	: b : :	c	: d,
then by composition	$a+b$	: b : :	$c+d$	: d,
Or, in numbers, if	2	: 4 : :	9	: 18,
then by composition	6	: 4 : :	27	: 18.

COMPOSI'TION of RATIOS, is the adding of ratios together: which is performed by multiplying together their corresponding terms, viz. the antecedents together, and the consequents together, for the antecedent and consequent of the compounded ratio; like as the addition of logarithms is the same thing as the multiplication of their corresponding numbers. Or, if the terms of

of the ratios be placed fraction-wise, then the addition or composition of the ratios, is performed by multiplying the fractions together:

Thus, the ratio of $a : b$, or of $2 : 4$,
added to the ratio of $c : d$, or of $6 : 8$,
makes the ratio of $ac : bd$, or of $12 : 32$; and so the ratio of ac to bd is said to be compounded of the ratios of a to b, and c to d, &c.

COMPO'SITIVE, *adj.* Compounded; or, having the power of compounding.

COMPO'SITOR, *s.* He that ranges and adjusts the types in printing; distinguished from the pressman, who makes the impression upon paper.

CO'MPOST, *s.* [Fr. *compositum*, Lat.] A mixture of various substances for enriching the ground; manure. See the article HUSBANDRY.

Avoid what is to come
And do not spread the *compost* on the weeds,
To make them ranker. *Shakespeare.*

In vain the nursling grove
Seems fair awhile, cherish'd with foster earth;
But when the alien *compost* is exhaust,
Its native poverty again prevails. *Philips.*

To COMPO'ST, *v. a.* To manure; to enrich with soil.—As for earth, it *composteth* itself; for I knew a garden that had a field poured upon it, and it did bear fruit excellently. *Bacon.*

COMPOSTEL'LA, or SAN JAGO DE COMPOSTELLO, a city of Spain, and capital of Galicia, situated in a beautiful plain, on all sides surrounded with agreeable hills, between the Sar and Sarela, which unite about half a league below. It is the see of an archbishop. In the metropolitan church are preserved, as they believe, the remains of St. James, the patron of Spain, to whom the church is dedicated, and from whom the town is named; there are twelve parish churches within the walls, fourteen religious houses, and four hospitals. The annual revenue of the archbishop is said to amount to sixty thousand ducats: an university was established here in 1532. The order of St. Jago takes its title from this city, the knights of which possess eighty-seven commanderies, with an annual income of two hundred thousand ducats: ninety-eight miles west of Astorga. Lat. 42. 52. N. lon. 8. 17. E. Peak of Teneriffe.

COMPOSTEL'LA, a rich town in New Spain, and province of Xalisco, built in 1531, situated near the South Sea, 400 miles north-west of Mexico. The soil is barren, and the air unhealthy; but it has several mines of silver at St. Pecaque, in its neighbourhood. Lat. 21. 20. N. lon. 88. 25. W. Ferro.

COMPOS'TO (La), a town of Savoy: nine miles east-north-east of Chambery.

COMPOS'TURE, *s.* Soil; manure. *Not used:*

The earth's a thief,
That feeds and breeds by a *composture* stol'n
From gen'ral excrements. *Shakespeare.*

COMPO'SURE, *s.* The act of composing or inditing.—Their own forms are not like to be so found, or comprehensive of the nature of the duty, as forms of public *composure.* *King Charles.*—Arrangement; combination; mixture; order.—Hence languages arise, when, by institution and agreement, such a *composure* of letters, such a word, is intended to signify such a certain thing. *Holder.*—The form arising from the disposition of the various parts:

In *composure* of his face,
Liv'd a fair but manly grace. *Crashaw.*

Frame; make; temperament.—The duke of Buckingham sprung, without any help, by a kind of congenial *composure*, to the likeness of our late sovereign and master. *Wotton.*

To reel the streets at noon, and stand the buffet
With slaves that smell of sweat; say this becomes him:
As his *composure* must be rare indeed,
Whom these things cannot blemish. *Shakespeare.*

Adjustment.—God will rather look to the inward raptures of the mind, than to the outward form and *composure* of the body. *Duppa.*—Composition; framed discourse.—Discourses on such occasions are seldom the productions of leisure, and should be read with those favourable allowances that are made to hasty *composures.* *Atterbury.*—In the *composures* of men, remember you are a man as well as they; and it is not their reason, but your own, that is given to guide you. *Watts.*—Sedateness; calmness; tranquillity.—The calmest and serenest hours of life, when the passions of nature are all silent, and the mind enjoys its most perfect *composure.* *Watts.*

To whom the virgin majesty of Eve,
As one who loves, and some unkindness meets,
With sweet austere *composure* thus replied. *Milton.*

Agreement; composition; settlement or differences.—The treaty at Uxbridge gave the fairest hopes of an happy *composure.* *King Charles.*

Van guard! to right and left the front unfold,
That all may see, who hate us, how we seek
Peace and *composure.* *Milton.*

COMPOTA'TION, *s.* [*compotatio*, Lat.] The act of drinking or tippling together.—Secrecy to words spoke under the rose, only mean, in *compotation*, from the ancient custom in symposiac meetings, to wear chaplets of roses. *Brown.*

If thou wilt prolong
Dire *compotation*, forthwith reason quits
Her empire to confusion and misrule,
And vain debates; then twenty tongues at once
Conspire in senseless jargon; nought is heard
But din and various clamour, and mad rant. *Philips.*

To COMPOU'ND, *v. a.* [*compono*, Lat.] To mingle many ingredients together in one mass. To form by uniting various parts.—Whosoever *compoundeth* any like it, shall be cut off. *Exodus*, xxx.—The ideas, being each but one single perception, are easier got than the more complex ones; and therefore are not liable to the uncertainty which attends those *compounded* ones. *Locke.*—To mingle in different positions; to combine.—We cannot have a single image that did not enter through the sight; but we have the power of altering and *compounding* those images into all the varieties of picture. *Addison.*—[In grammar.] To form one word from two or more words.—Where it and Tigris embrace each other under the city of Apamia, there do they agree of a joint and *compounded* name, and are called *Piso-Tigris.* *Raleigh.*—To compose by being united:

Who'd be so mock'd with glory, as to live
But in a dream of friendship?
To have his pomp, and all what state *compounds*,
But only painted, like his varnish'd friends! *Shakespeare.*

To adjust a difference by some recession from the rigour of claims.—I would to God all strifes were well *compounded.* *Shakespeare.*—If there be any discord or suits between any of the family, they are *compounded* and appeased. *Bacon.*—To discharge a debt by paying only part.—Shall I, ye gods! he cries, my debts *compound?* *Gay.*

To COMPOU'ND, *v. n.* To come to terms of agreement, by abating something of the first demand. It has *for* before the thing accepted or remitted:

Pray but for half the virtues of this wife;
Compound for all the rest, with longer life. *Dryden.*

To bargain in the lump.—Here's a fellow will help you to-morrow: *compound* with him by the year. *Shakespeare.*—To come to terms, by granting something on each side:

Once

Once more I come to know of thee, king Harry,
If for thy ransom thou wilt now *compound*,
Before thy most assured overthrow? *Shakespeare.*

To determine. *Not in use:*

We here deliver,
Subscribed by the consuls and patricians,
Together with the seal o' th' senate, what
We have *compounded* on. *Shakespeare.*

COM'POUND, *adj.* Formed out of many ingredients; not simple.—The ancient electrum had in it a fifth of silver to the gold, and made a *compound* metal, as fit for most uses as gold. *Bacon.*—[In grammar.] Composed of two or more words; not simple.—Those who are his greatest admirers, seem pleased with them as beauties; I speak of his *compound* epithets. *Pope.*—*Compound or aggregated flower*, in botany, is such as consists of many little flowers, concurring together to make up one whole one; each of which has its style and stamina, and adhering seed, and are all contained within one and the same calyx: such are the sunflower, dandelion, &c. See BOTANY, vol. ii. p. 198.

COM'POUND, *s.* The mass formed by the union of many ingredients.—Man is a *compound* and mixture of flesh as well as spirit. *South.*

Love why do we one passion call,
When 'tis a *compound* of them all;
Where hot and cold, where sharp and sweet,
In all their equipages meet. *Swift.*

COM'POUND INTEREST, called also *interest upon interest*, is that which is reckoned not only upon the principal, but upon the interest itself forborn, which thus becomes a sort of secondary principal. See INTEREST.

COM'POUND MOTION, that motion which is the effect of several conspiring powers or forces, viz. such forces as are not directly opposite to each other; as, when the radius of a circle is considered as revolving about a center, and at the same time a point as moving straight along it; which produces a kind of a spiral for the path of the point. And hence it is easily perceived, that all curvilinear motion is compound, or the effect of two or more forces; although every compound motion is not curvilinear. It is a popular theorem in mechanics, that in uniform compound motions, the velocity produced by the conspiring powers or forces, is to that of either of the two compounding powers separately, as the diagonal of a parallelogram, according to the direction of whose sides they act separately, is to either of the sides. See MECHANICS.

COM'POUND NUMBERS, those composed of the multiplication of two or more numbers; as 12, composed of 3 times 4. See COMPOSITE.

COM'POUND PENDULUM, that which consists of several weights constantly keeping the same distance, both from each other, and from the center about which they oscillate. See HOROLOGY.

COM'POUND QUANTITIES, such as are connected together by the signs + or —. Thus, $a+b$, or $a-c+d$, or $aa-2a$, are compound quantities. These are distinguished into binomials, trinomials, quadrinomials, &c. according to the number of terms in them; viz. the binomial having two terms, the trinomial three, the quadrinomial four, &c. Also, those that have more than two terms, are called by the general name of multinomials, as also polynomials. See ALGEBRA.

COM'POUND RATIO, is that which is made by adding two or more ratios together; viz. by multiplying all their antecedents together for the antecedent, and all the consequents together for the consequent of the compound ratio.

COMPOUND'ABLE, *adj.* Capable of being compounded.

COMPOUND'ER, *s.* One who endeavours to bring parties to terms of agreement.—Those softners, sweetners, *compounders*, and expedient-mongers, who shake their heads so strongly. *Swift.*—A mingler; one who mixes bodies.—In Oxford university, one who having a landed estate takes a degree: when the estate amounts to a certain value, he is *grand compounder*. *Mason.*

COMPOUND'ING FELONY, in the criminal law, is where the party robbed not only knows the felon, but also takes his goods again, or other amends upon agreement not to prosecute. It was formerly held to make a man an accessary; but is now punished only with fine and imprisonment. 1 *Hawk. P. C.* c. 59.—To take any reward for helping a person to stolen goods, is made felony by 4 Geo. I. c. 11.—And to advertise a reward for the return of things stolen, incurs a forfeiture of fifty pounds by 25 Geo. III. c. 36.

To COMPREHE'ND, *v. a.* [*comprehendo*, Lat.] To comprise; to include; to contain; to imply.—If there be any other commandment, it is briefly *comprehended* in this saying, namely, Thou shalt love thy neighbour as thyself. *Rom.* xiii. 9.—To contain in the mind; to understand: to conceive.—'Tis unjust, that they who have not the least notion of heroic writing, should therefore condemn the pleasure which others receive from it, because they cannot *comprehend* it. *Dryden.*

Rome was not better by her Horace taught,
Than we are here to *comprehend* his thought. *Waller.*

COMPREHEN'SIBLE, *adj.* [*comprehensible*, Fr. *comprehensibilis*, Lat.] Intelligible; attainable by the mind; conceivable by the understanding.—The horizon sets the bounds between the enlightened and dark parts of things, between what is and what is not *comprehensible* by us. *Locke.*—Possible to be comprised.—Lest this part of knowledge should seem to any not *comprehensible* by axiom, we will set down some heads of it. *Bacon.*

COMPREHEN'SIBLY, *adv.* With great power of signification or understanding; significantly; with great extent of sense. Tillotson seems to have used *comprehensibly* for *comprehensively*.—The words wisdom and righteousness are commonly used very *comprehensibly*, so as to signify all religion and virtue. *Tillotson.*

COMPREHEN'SION, *s.* [*comprehensio*, Lat.] The act or quality of comprising or containing; inclusion.—The *comprehension* of an idea, regards all essential modes and properties of it; so body, in its *comprehension*, takes in solidity, figure, quantity, mobility. *Watts.*—Summary; epitome; compendium; abstract; abridgment in which much is comprised.—If we would draw a short abstract of human happiness, bring together all the various ingredients of it, and digest them into one prescription, we must at last fix on this wise and religious aphorism in my text, as the sum and *comprehension* of all. *Rogers.*—Knowledge; capacity; power of the mind to admit and contain many ideas at once.—You give no proof of decay of your judgment, and *comprehension* of all things, within the compass of an human understanding. *Dryden.*—[In rhetoric.] A trope or figure, by which the name of a whole is put for a part, or that of a part for the whole, or a definite number for an indefinite. *Harris.*

COMPREHEN'SION, *s.* in English church-history, was a scheme proposed by sir Orlando Bridgman, in 1667-8, for relaxing the terms of conformity in behalf of protestant dissenters, and admitting them into the communion of the church. A bill for this purpose was drawn up by lord chief baron Hale, but disallowed. The attempt was renewed by Tillotson and Stillingfleet, in 1674, and the terms were settled to the satisfaction of the nonconformists; but the bishops refused their assent. This scheme was likewise revived again immediately after the revolution; the king and queen expressed their desire of an union: however the design failed after two attempts; and the act of toleration was obtained.

COMPREHEN'SIVE, *adj.* Having the power to comprehend or understand many things at once:

His hand unstain'd, his uncorrupted heart,
His *comprehensive* head; all interests weigh'd,
All Europe sav'd, yet Britain not betray'd. *Pope.*

Having the quality of comprising much; compendious; extensive.—So diffusive, so *comprehensive*, so catholic a grace is charity, that whatever time is the opportunity of any other virtue, that time is the opportunity of charity. *Spratt.*

COMPREHEN'SIVELY, *adv.* In a comprehensive manner.

COMPREHEN'SIVENESS, *s.* The quality of including much in a few words or narrow compass.—Compare the beauty and *comprehensiveness* of legends on ancient coins. *Addison.*

CAMPREIGNAC', a town of France, in the department of the Upper Vienne, and chief place of a canton, in the district of Bellac: ten miles north of Limoges.

To COMPRE'SS, *v. a.* [*compressus*, Lat.] To force into a narrower compass; to squeeze together. To embrace.—There was in the island of Io a young girl *compressed* by a genius, who delighted to associate with the muses. *Pope.*

Her Neptune eyed, with bloom of beauty blest,
And in his cave the yielding nymph *comprest*. *Pope.*

COM'PRESS, *s.* Bolsters of linen, by which surgeons suit their bandages for any particular part or purpose. *Quincy.*—I applied an intercipient about the ankle and upper part of the foot, and by *compress* and bandage dressed it up. *Wiseman.*

COMPRESSIBI'LITY, *s.* The quality of being compressible; the quality of admitting to be brought by force into a narrower compass.

COMPRES'SIBLE, *adj.* Capable of being forced into a narrower compass; yielding to pressure, so as that one part is brought nearer to another.—Their being spiral particles, accounts for the elasticity of air; there being spherical particles, which gives free passage to any heterogeneous matter, accounts for airs being *compressible*. *Cheyne.*

COMPRES'SIBLENESS, *s.* Capability of being pressed close.

COMPRES'SION, *s.* [*compressio*, Lat.] The act of bringing the parts of any body more near to each other by violence; the quality of admitting such an effort of force as may compel the body compressed into a narrower space.—Whenever a solid body is pressed, there is an inward tumult in the parts, seeking to deliver themselves from the *compression*, and this is the cause of all violent motion. *Bacon.*

Compression differs from condensation as the cause from the effect, compression being the action of any force on a body, without regarding its effects; whereas condensation denotes the state of a body that is actually reduced into a less bulk, and is an effect of compression, though it may be effected also by other means. Nevertheless, compression and condensation are often confounded. Pumps, which the ancients imagined to act by suction, do in reality act by compression; the piston, in working in the narrow pipe, compresses the inclosed air, so as to enable it, by the force of its increased elasticity, to raise the valve, and make its escape; upon which, the balance being destroyed, the pressure of the atmosphere on the stagnant surface, forces up the water in the pipe, thus evacuated of its air.

It was long thought that water was not compressible into less bulk; and it was believed, till lately, that after the air had been purged out of it, no art or violence was able to press it into less space. In an experiment made by the Academy del Cimento, water, when violently squeezed, made its way through the fine pores of a globe of gold, rather than yield to the compression. But the ingenious Mr. Canton, attentively considering this experiment, found that it was not sufficiently accurate to justify the conclusion which had always been drawn from it; since the Florentine philosophers had no method of determining that the alteration of figure in their globe of gold, occasioned such a diminution of its internal capacity, as was exactly equal to the quantity of water forced into its pores. To bring this matter therefore to a more accurate and decisive trial, he procured a small glass tube of about two feet long, with a ball at one end, of an inch and a quarter in diameter. Having filled the ball and part of the tube with mercury, and brought it exactly to the heat of fifty degrees of Fahrenheit's thermometer, he marked the place where the mercury stood in the tube, which was about six inches and a half above the ball; he then raised the mercury by heat to the top of the tube, and there sealed the tube hermetically; then upon reducing the mercury to the same degree of heat as before, it stood in the tube $\frac{22}{100}$ of an inch higher than the mark. The same experiment was repeated with water exhausted of air, instead of mercury, and the water stood in the tube $\frac{33}{100}$ of an inch above the mark. Since the weight of the atmosphere on the outside of the ball, without any counterbalance from within, will compress the ball, and equally raise both the mercury and water, it appears that the water expands $\frac{11}{100}$ of an inch more than the mercury by removing the weight of the atmosphere. Having thus determined that water is really compressible, he proceeded to estimate the degree of compression corresponding to any given weight. For this purpose he prepared another ball, with a tube joined to it; and finding that the mercury in $\frac{22}{100}$ of an inch of the tube was the hundred thousandth part of that contained in the ball, he divided the tube accordingly. He then filled the ball and part of the tube with water exhausted of air; and leaving the tube open, placed this apparatus under the receiver of an air-pump, and observing the degree of expansion of the water answering to any degree of rarefaction of the air: and again by putting it into the glass receiver of a condensing engine, he noted the degree of compression of the water corresponding to any degree of condensation of the air. He thus found, by repeated trials, that, in a temperature of fifty degrees, and when the mercury has been at its mean height in the barometer, the water expands one part in 21740; and is as much compressed by the weight of an additional atmosphere; or the compression of water by twice the weight of the atmosphere, is one part in 10870 of its whole bulk. Should it be objected, that the compressibility of the water was owing to any air which it might be supposed to contain, he answers, that more air would make it more compressible; he therefore let into the ball a bubble of air, and found that the water was not more compressed by the same weight than before. In some farther experiments of the same kind, Mr. Canton found that water is more compressible in winter than in summer; but he observed the contrary in spirit of wine, and oil of olives. The following table was formed when the barometer was at twenty-nine inches and a half, and the thermometer at fifty degrees.

Compression of	Millionth parts.	Spec. grav.
Spirit of wine - - -	66 - - -	846
Oil of olives - - -	48 - - -	918
Rain water - - - -	46 - - -	1000
Sea water - - - -	40 - - -	1028
Mercury - - - -	3 - - -	13595

He infers that these fluids are not only compressible, but elastic; and that the compressions of them, by the same weight, are not in the inverse ratio of their densities, or specific gravities, as might be supposed. The compression of the air, by its own weight, is surprisingly great; but the air may be still further compressed by art. This immense compression and dilatation, Newton observes, cannot be accounted for in any other way, but by a repelling force with which the particles of air are endued; by virtue of which, when at liberty, they mutually fly each other. This repelling power, he adds, is stronger and more sensible in air, than in other bodies; because air is generated out of very fixed bodies, but not without great difficulty, and by the help of fermentation: now those particles always recede from each other with the greatest violence, and are compressed with the greatest difficulty, which, when contiguous, cohere the more strongly.

COMPRES'SURE,

COMPRES'SURE, *s.* The act or force of one body pressing against another.—We tried whether heat would, notwithstanding so forcible a *compressure*, dilate it. *Boyle.*

To COMPRI'NT, *v. n.* [*comprimere*, Lat.] To print together; it is commonly taken, in law, for the deceitful printing of another's copy, or book, to the prejudice of the rightful proprietor. See the article LITERARY PROPERTY.

To COMPRI'SE, *v. a.* [*comprendre*, *compris*, Fr.] To contain; to comprehend; to include.—Necessity of shortness causeth men to cut off impertinent discourses, and to *comprise* much matter in few words. *Hooker.*

'Tis the polluted love that multiplies;
But friendship does two souls in one *comprise*. *Roscommon.*

COMPROBA'TION, *s.* [*comprobo*, Lat.] Proof; attestation.—That is only esteemed a legal testimony, which receives *comprobation* from the mouths of at least two witnesses. *Brown.*

COM'PROMISE, *s.* [*compromissum*, Lat.]—*Compromise* is a mutual promise of two or more parties at difference, to refer the ending of their controversies to the arbitrement or equity of one or more arbitrators. *Cowell.*—A compact or bargain, in which some concessions are made on each side:

Wars have not wasted it, for warr'd he hath not;
But basely yielded, upon *compromise*,
That which his ancestors atchiev'd with blows. *Shakesp.*

To COM'PROMISE, *v. a.* To compound; to adjust a compact by mutual concessions: as, *they* compromised *the affair at a middle rate.* In Shakespeare, it means, unusually, to accord; to agree:

Laban and himself were *compromis'd*,
That all the yearlings, which were streak'd and pied,
Should fall as Jacob's hire. *Merchant of Venice.*

COMPROMISSO'RIAL, *adj.* Relating to a compromise.

COMPROVIN'CIAL, *s.* [from *con* and *provincial.*] Belonging to the same province.—At the consecration of an archbishop, all his *comprovincials* ought to give their attendance. *Ayliffe.*

COMPS, a town of France, in the department of the Var, and chief place of a canton, in the district of Draguignan: ten miles north of Draguignan.

COMPT, *s.* [*compte*, Fr. *computus*, Lat.] Account; computation; reckoning:

Your servants ever
Have theirs, themselves, and what is theirs, in *compt*,
To make their audit at your highness pleasure,
Still to return your own. *Shakespeare.*

To COMPT, *v. a.* [*compter*, Fr.] To compute; to number. We now use *to* COUNT, which see.

COMP'TIBLE, *adj.* Accountable; responsible; ready to give account; subject; submissive.—Good beauties, let me sustain my scorn; I am very *comptible* even to the least sinister usage. *Shakespeare.*

COMP'TON (Henry), bishop of London, was the youngest son of Spencer Earl of Northampton, born in 1632. After the restoration of Charles II. he became cornet of a regiment of horse; but soon after quitting the army for the church, he was made bishop of Oxford in 1674; and about a year after translated to the see of London. He was entrusted with the education of the two princesses Mary and Anne, whom he afterwards had the honour to marry to the princes of Orange and Denmark: and their firmness in the Protestant religion was in a great measure owing to their tutor. He was suspended from his ecclesiastical function by James II. but was restored by him again on the prince of Orange's invasion. He and the bishop of Bristol made the majority for filling the vacant throne with king William: he performed the ceremony of the coronation; was appointed one of the cimmissioners for raising the liturgy; and laboured with much zeal to reconcile dissenters to the church. His spirit of moderation made him unpopular with the clergy, and in all probability checked his further promotion. He died in 1713; but living in busy times, did not leave many writings.

COMPTO'NIA, *s.* [so named by Dr. Solander in honour of *Henry Compton*, bishop of London, who cultivated many curious exotic trees in his garden at Fulham.] In botany, a genus of the class monoecia, order triandria. The generic characters are—I. Male flowers. Calyx: ament cylindric, loosely imbricate all round with concave, kidney-form, acuminate, caducous, one-flowered scales; perianthium two-leaved; leaflets equal, boat-shaped, shorter than the scale of the ament. Corolla: none. Stamina: filaments three, shorter than the calyx, forked; antheræ six, two valved. II. Female flowers. Calyx: ament ovate, closely imbricate all round with one-flowered scales, as in the male; perianthium six-leaved; leaflets opposite in pairs, filiform, membranaceous at the base, many times longer than the scale of the ament. Pistillum: germ roundish; styles two, capillary. Seed: nut oval, one-celled, valveless.—*Essential Character.* Male: ament. Calyx: two-leaved; antheræ two parted. Female: ament. Calyx: six-leaved; styles two; nut ovate.

There is but one species, called Comptonia asplenifolia, or fern-leaved Comptonia. It rises with slender shrubby stalks, near three feet high; they are hairy, and divide into several slender branches. Leaves from three to four inches long, and half an inch broad, alternately indented (or insinuated) almost to the midrib, and have a great resemblance to those of spleenwort; they are of a dark green, hairy on their under side, and sit close to the stalks. The aments of male flowers come out on the side of the branches between the leaves; they are oval, and stand erect. The fruit is a bony nut, elliptic, turgidly lenticular, naked, smooth, shining, obscurely striated, bay-coloured, the size of a hazel nut. Inclosed is a single, ovate-globular, smooth, pale seed. Native of North America; as in the county of Lancaster, and on the banks of Northampton river among the firs. It flowers here from March to May. Cultivated in 1714, by the duchess of Beaufort. Mr. Miller says, that many of the plants have been brought to England from Philadelphia.

Propagation and Culture. Planted here on a loose moist soil it thrives very well, sometimes creeping at the roots, and sending up suckers plentifully, as in its native country. By these suckers it may be propagated. It will endure our cold very well.

To COMPTRO'LL, *v. a.* [This word is written by some authors, who did not attend to the etymology, for *controll*; and some of its derivatives are written in the same manner.] To controll; to overrule; to oppose.

COMPTROL'LER, *s.* director; supervisor; superior intendant; governor.—The *comptrollers* of vulgar opinions pretend to find out such a similitude in some kind of baboons. *Temple.*

My fates permit me not from hence to fly;
Nor he, the great *comptroller* of the sky. *Dryden.*

COMPTROL'LERSHIP, *s.* superintendance.—The gayle for stannery-causes is annexed to the *comptrollership. Carew.*

COMPUL'SATIVELY, *adv.* With force; by constraint. *Clarissa.*

COMPUL'SATORY, *adj.* [from *compulsor*, Lat.] Having the force of compelling; coactive:

Which is no other,
But to recover from us by strong hand,
And terms *compulsatory*, those foresaid lands
So by his father lost. *Shakespeare.*

COMPUL'SION, *s.* [*compulsio*, Lat.] The act of compelling to something; force; violence of the agent.—If reasons

reasons were as plenty as blackberries, I would give no man a reason on *compulsion*. *Shakespeare*.

Such sweet *compulsion* doth in music lie,
To lull the daughters of necessity. *Milton*.

The state of being compelled; violence suffered.—*Compulsion* is in an agent capable of volition, when the beginning or continuation of any action is contrary to the preference of his mind. *Locke*.

When the fierce foe hung on our broken rear,
With what *compulsion* and laborious flight
We sunk thus low! *Milton*.

COMPUL'SIVE, *adj.* [from *compulser*, Fr. *compulsus*, Lat.] Having the power to compel; forcible.—The clergy would be glad to recover their dues by a more short and *compulsive* method. *Swift*.

The Danube, vast and deep,
Supreme of rivers! to the frightful brink,
Urg'd by *compulsive* arms, soon as they reach'd,
New terror chill'd their veins. *Philips*.

COMPUL'SIVELY, *adv.* By force; by violence.

COMPUL'SIVENESS, *s.* Force; compulsion.

COMPUL'SORILY, *adv.* In a compulsory or forcible manner; by force; by violence.—To say that the better deserver hath such right to govern, as he may *compulsorily* bring under the less worthy, is idle. *Bacon*.

COMPUL'SORY, *adj.* [*compulsoire*, Fr.] Having the power of necessitating or compelling.—He erreth in this, to think that actions, proceeding from fear, are properly *compulsory* actions; which, in truth, are not only voluntary, but free actions; neither compelled, nor so much as physically necessitated. *Bramhall*.

COMPUNC'TION, *s.* [*componction*, Fr. from *pungo*, *punctum*, to prick, Lat.] The power of pricking; stimulation; irritation.—This is that acid and piercing spirit, which, with such activity and *compunction*, invadeth the brains and nostrils of those that receive it. *Brown*.—The state of being pricked by the conscience; repentance; contrition.—He acknowledges his disloyalty to the king, with expressions of great *compunction*. *Clarendon*.

COMPUNC'TIOUS, *adj.* Repentant; sorrowful; tender:

Stop up th' access and passage to remorse,
That no *compunctious* visitings of nature
Shake my fell purpose. *Shakespeare*.

COMPUNC'TIVE, *adj.* Causing remorse.

COMPURGA'TION, *s.* [*compurgatio*, Lat.] The practise of justifying any man's veracity by the testimony of another.

COMPURGA'TOR, *s.* One that by oath justifies another's innocence. *Compurgators* were introduced as evidence in the jurisprudence of the middle ages. Their number varied according to the importance of the subject in dispute, or the nature of the crime with which a person was charged. 4 *Comm.* 361.

COMPU'TABLE, *adj.* Capable of being numbered or computed.—If, instead of twenty-four letters, there were twenty-four millions, as those twenty-four millions are a finite number, so would all combinations thereof be finite, though not easily *computable* by arithmetick. *Hale*.

COMPUTA'TION, *s.* The act of reckoning; calculation:

My princely father
Then, by just *computation* of the time,
Found that the issue was not his. *Shakespeare*.

The sum collected or settled by calculation.—We pass for women of fifty: many additional years are thrown into female *computations* of this nature. *Addison*.

COMPUTA'TION, in law, the true account and construction of time, in any instrument or deed; and to the end neither party to an agreement, &c. may do wrong to the other, nor the determination of time be left at large, it is to be taken according to the just judgment of the law. A deed dated the 20th day of August, to hold from the day of the date, shall be construed to begin on the 21st day of August: but if in the habendum it be to hold from the making, or from thenceforth, it shall begin on the day delivered. 1 *Inst.* 46. 5 *Rep.* 1. If an indenture of lease dated the 4th day of July, made for three years from thenceforth, be delivered at four of the clock in the afternoon of the said 4th day of July, the lease shall end the 3d day of July in the third year: and the law in this *computation* rejects all fractions or divisions of the day.

To COMPU'TE, *v. a.* [*computo*, Lat.] To reckon; to calculate; to number; to count.—*Compute* how much water would be requisite to lay the earth under water. *Burnet*.

Alas! not dazzled with their noon-tide ray,
Compute the morn and ev'ning to the day;
The whole amount of that enormous fame,
A tale that blends their glory with their shame. *Pope*.

COMPU'TE, *s.* [*computus*, Lat.] Computation; calculation.—Though there were a fatality in this year, yet divers were out in their account, aberring several ways from the true and just *compute*; and calling that one year which perhaps might be another. *Brown*.

COMPU'TER, *s.* Reckoner; accountant; calculator. I have known some such ill *computers*, as to imagine the many millions in stocks so much real wealth. *Swift*.

COM'PUTIST, *s.* [*computiste*, Fr.] Calculator; one skilled in the art of numbers or computation.—We conceive we have a year in three hundred and sixty-five days exact: *computists* tell us, that we escape six hours. *Brown*.

COMPU'TO, [Lat.] A writ to compel a bailiff, receiver, or accountant, to yield up his accounts: it is founded on the statute of *Westm.* 2. c. 12. And also lies against guardians, &c. *Reg. Orig.* 135.

COM'RADE, *s.* [*camerade*, Fr. from *camera*, a chamber; one that lodges in the same chamber, *contubernio fruitur*.] One who dwells in the same house or chamber:

Rather I abjure all roofs, and chuse
To be a *comrade* with the wolf and owl. *Shakespeare*.

A companion; a partner in any labour or danger:

He permitted them
To put out both thine eyes, and fetter'd send thee
Into the common prison, there to grind
Among the slaves and asses, thy *comrades*,
As good for nothing else. *Milton*.

CO'MUM, in ancient geography, a town of the Orobii, of very ancient standing, and formerly powerful, daring to dispute with the Romans. It became afterwards no inconsiderable municipium, to which Julius Cæsar added 5000 new colonists, whence it was generally called *Novocomum*, and the people *Novocomenses*. But in time it recovered its ancient name, *Comum*; Pliny the younger, a native of that place, calling it by no other name. Now *Como*, in the duchy of Milan, at the south end of the lake of that name.

CO'MUS, the god of revelry, feasting, and nocturnal entertainments. During his festivals, men and women exchanged each other's dress. He was represented as a young and drunken man, with a garland of flowers on his head, and a torch in his hand, which seemed falling. He is more generally seen sleeping upon his legs, and turning himself when the heat of the falling torch scorched his side. *Philostratus*.

GENERAL INDEX.

CHEMISTRY.

CHINA.

END OF THE FOURTH VOLUME.

DIRECTIONS for placing the COPPER-PLATES to VOL. IV.

☞ The following Plates are to be placed opposite their respective Titles in the first Volume: viz. ACANTHONOTUS, the Notacanth. ANGUIS, Plate I. the Jaculus; and Plate II. the horned, tessellated, and annulated Snakes. ANTHIAS, the Tontelton, Jordaine, and Argus. These Plates belong to the second edition of Vol. I. so that those who have the *first* edition, should purchase the three New Numbers, 1, 45, and 48, which will make the *first* edition the same as the *second* and *third*. The Maps of BEDFORDSHIRE, BERKSHIRE, BUCKINGHAMSHIRE, and CAMBRIDGESHIRE, are to be pasted into Vols. II. and III. opposite their respective titles in those Volumes. The CANINA, or green BOA, to be pasted into Vol. III. facing page 135.

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